



NATIONAL BOARD FOR TECHNICAL EDUCATION

CURRICULUM AND COURSE SPECIFICATIONS

FOR

NATIONAL DIPLOMA

IN

AGRICULTURAL TECHNOLOGY

PLOT B, BIDA ROAD, P M B 2239, KADUNA, NIGERIA

NATIONAL DIPLOMA IN AGRICULTURE TECHNOLOGY

2.0 GOAL AND OBJECTIVES:

GOAL: The National Diploma in Agriculture is designed to produce agricultural technicians who are self – reliant, skilled and capable of adopting modern techniques in agricultural Production.

OBJECTIVES: A product of ND in Agriculture should be able to:

1. Establish agricultural farm enterprises in crop, animal and fish production;
2. Employ modern techniques in apiary, floriculture and micro-livestock (e.g. Rabbits, cane rat and snailery), quails and pigeons production.
3. Employ modern techniques in the production of animal feeds.
4. Assist in processing, storage and marketing of agricultural produce.
5. Assist in pest and disease control.
6. Carry out Agricultural Extension services
7. Carry out field survey involving land measurements and field layout.

Entry Requirements.

The general entry requirements for the ND Agricultural Technology programme are:

(a) Five credits level passes in WAEC or NECO and NABTEB in not more than two sittings.

The subjects must include Biology/Agricultural Science, Chemistry and any three of the following: Geography, Mathematics, Economics, Technical Drawing, Physics and English language. At least, a pass in English language and Mathematics is compulsory.

(b) Candidates who have successfully completed the Board's recognized pre-National diploma (Science Technology) course may be admitted into the Programme. Such students must have passed Biology/Agricultural science, Chemistry, Mathematics, English language and any one of the following subjects: Economics, Technical Drawing, Physics and Geography at WASC, SSSC, GCE O'Level or NECO and NABTEB before undertaking the course.

Structure of Programme

The National Diploma Agricultural Technology is a two year Programme i.e. four semesters of classroom, laboratory, field and workshop activities in the college. Three months Supervised Industrial Work Experience Scheme (SIWES) shall be carried out at the end of each year of the Programme. Each semester shall be of 17 weeks duration made up as follows: 15 Contact weeks of teaching, i.e. recitation, practical exercises, quiz, tests, etc and 2 weeks for examination and registration.

Evaluation Scheme

The National Diploma Agricultural Technology Examination must be externally moderated. In grading the students, theory shall constitute 50% while Practical is 50%.

Accreditation

Each Programme offered at the National Diploma level shall be accredited by the NBTE before the Diplomates can be awarded the diploma certificate. Details about the process of accrediting a Programme for the award of the ND are available from the Executive Secretary, National Board for Technical Education, Plot B, Bida Road, P.M.B. 2239, Kaduna, Nigeria.

Conditions for the Award of ND Agricultural Technology

Institutions offering accredited Programmes will award the National Diploma to candidates who successfully completed the Programme after passing prescribed course work, examinations, diploma project and the supervised industrial work experience. Such candidates should have completed a minimum of between 72 and 80 semester credit units depending on the Programme.

Diplomas shall be classified as follows:

Distinction - GPA of 3.50 and above

Upper Credit - GPA of 3.00 - 3.49

Lower Credit - GPA of 2.50 - 2.99

Pass - GPA of 2.00 - 2.49

Fail - GPA of below - 2.00

Guidance Notes for Teachers Teaching the Programme

The new curriculum is drawn in unit courses. This is in keeping with the provisions of the National Policy on Education which stresses the need to introduce the semester credit units which will enable a student who so wish to transfer the units already completed in an institution of similar standard from which he is transferring.

In designing the units, the principle of the modular system by product has been adopted; thus making each of the professional modules, when completed provides the student with technician operative skills, which can be used for employment purpose.

As the success of the credit unit system depends on the articulation of Programme between the institutions and industry, the curriculum content has been written in behavioral objectives, so that it is clear to all the expected performances of the student who successfully

completed some of the courses or the diplomats of the Programme. There is a slight departure in the presentation of the performance based curriculum which requires the conditions under which the performance are expected to be carried out and the criteria for the acceptable levels of performance. It is a deliberate attempt to further involve the staff of the department teaching the Programme to write their own curriculum stating the conditions existing in the institution under which the performance can take place and to follow that with the criteria for deferring an acceptable level of performance. Departmental submission on the final curriculum may be vetted by the Academic Board of the institution.

Our aim is to continue to see to it that a solid internal evaluation system exist in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the polytechnic system.

The teaching of the theory and practical work should, as much as possible be integrated. Practical exercises, especially those in professional courses and laboratory work should not be taught in isolation from the theory. For most courses, there should be a balance of theory to practice in the ratio of 50:50 or 60:40 or the reverse.

AGRICULTURAL TECHNOLOGY (NATIONAL DIPLOMA)

PROPOSED CURRICULUM TABLE

YEAR I- SEMESTER I

COURSE CODE	COURSE	THEORY HRS/WK	PRACTICAL HRS/WK	TOTAL HRS/WK
AGT 114	Principles of Animal Production	2	2	4.0
ABE 101	Introduction to Agricultural and Bio-Environmental Engineering	3	1	4.0
AGT 101	Introduction to Farm Woodland Management	2	2	4.0
GNS 102	Communication in English 1	2	0	2.0
GNS 111	Citizenship Education I	2	0	2.0
AGT 111	Principles of Crop Production	2	2	4.0
AGT 112	Elements of Agricultural Economics	2	0	2.0
COM 001	Computer Applications I	0	3	3.0
AGT 115	Introduction to Agricultural Marketing	2	0	2.0
AGT 113	Introduction to Soil Science	2	2	4.0
	Total	19	12	31

Year I- Semester II

COURSE CODE	COURSE	THEORY	PRACTICAL	TOTAL
AGT 129	Industrial Crop Production 1	2	2	4.0
AGT121	Annual Crops	2	1	3.0
AGT122	Crop Protection	2	1	3.0
AGT123	Sheep, Goat and Swine Production	1	2	3.0
AGT124	Principles of Bee Keeping	1	2	3.0
AGT126	Micro-Livestock Production	2	2	4.0
AGT127	Principles of Irrigation and Drainage	2	1	3.0
COM 002	Computer Applications II	0	3	3
GNS 202	Communication in English II	2	0	2.0
GNS 121	Citizenship Education II	2	0	2.0
AGT128	Post –harvest Technology and Biology	2	2	4.0
	Total	18	14	32

Year II
Semester III

COURSE CODE	COURSE	THEORY	PRACTICAL	TOTAL
MEC 112	Basic Workshop Practice	0	4	4.0
AGT 211	Pasture and Forage Production	1	3	4.0
AGT 212	Agro-Climatology	2	2	4.0
BAM 116	Introduction to Entrepreneurship	2	1	3.0
GNS 121	Citizenship Education II	2	0	2.0
AGT 214	Industrial Crop Production II	2	2	4.0
AGT 215	Soil Fertility and Crop Nutrition	2	2	4.0
AGT 216	Farm Soil Management	2	3	5.0
	Total	13	17	30

Year 2
Semester IV

COURSE CODE	COURSE	THEORY	PRACTICAL	TOTAL
AGT 222	Poultry Production	2	2	4.0
AGT 223	Farm Power and Mechanization	2	2	4.0
AGT 224	Genetics and Breeding	1	1	2.0
BAM 216	Practice of Entrepreneurship	1	2	3.0
AGT 225	Beef and Dairy Production	2	2	4.0
AGT 226	Horticultural Crop Production	2	2	4.0
AGT 227	Basic Fisheries Technology	2	1	3.0
AGT 228	Introduction to Animal Health	1	2	3.0
AGT 229	Farm Management	2	0	2.0
AGT 230	Agricultural Extension and Rural Sociology	3	0	3.0
	Total	18	14	32

PROGRAMME: **National Diploma in Agricultural Technology**

COURSE: AGT 114 - Principles of Animal Production

DURATION: 60 Hours (2 Hours Lectures, 2 Hours Practicals)

UNITS: 4.0

GOAL: To acquaint students with the basic principles of animal nutrition, reproduction and health management.

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:

- 1.0 Appreciate contribution of livestock to the national economy and areas of major livestock production in Nigeria
- 2.0 Appreciate different livestock rearing systems and their advantages and disadvantages
- 3.0 Understand different classes of feed resources and processing techniques
- 4.0 Understand monogastric, ruminant and pseudo-ruminant digestive systems
- 5.0 Appreciate different nutrients and their role in animal growth and production
- 6.0 Understand reproductive physiology and genetic improvement of farm animals.
- 7.0 Appreciate basic farm animals' health management principles

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: PRINCIPLES OF ANIMAL PRODUCTION	COURSE CODE: AGT 114	CONTACT HOURS: 4 Hours/wk (2 hrs lectures: 2 hrs practicals)
GOAL: To acquaint students with the basic principles of animal nutrition, reproduction and health management.		
COURSE SPECIFICATION:		Practical Contents:

	General Objective: 1.0 Appreciate contribution of livestock to the national economy and areas of major livestock production in Nigeria.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 List and appreciate the different uses of animals and animal products.	Explain social and economic uses of farm animals.	LCD projector Slide projector White board Markers. Laptop computers.	Identify different types of animals and animal products.	Show a range of animal species and types, and animal products to students e.g. meat, dairy produce, hides, fleeces etc.	Live animals, pictures, samples of products.
2	1.2 Identify different areas of livestock production and their comparative advantages 1.3 Understand the supply chain for animal products	Explain the geographical distribution of livestock production zones. Explain the supply chain for animal products and indicate how important it is for the Nigerian	LCD projector Slide projector White board Markers. Laptop computers.	Understand how animal products are processed, stored and distributed.	Accompany students to food or product processing enterprise	Processing company willing to accept visitors.

		national economy				
	General Objective: 2.0 Appreciate different livestock rearing systems and their advantages and disadvantages.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Understand the different livestock rearing systems (a).	Describe 1) Extensive livestock management systems 2) Semi-extensive livestock management systems	LCD projector Slide projector White board Markers. Laptop computers.	Observe various types of livestock farming systems.	Take students on field trips to see different types of livestock systems.	College farms. Private farms.
4	2.1 Understand the different livestock rearing systems (b).	3) Intensive livestock management systems Explain the advantages and disadvantages of each system		Observe various types of intensive livestock farming systems.	Take students on field trips to see different types of intensive livestock systems.	College farms. Private farms.
	General Objective: 3.0 Understand different classes of feed resources and processing techniques.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

5	3.1 Classify and understand the different livestock feeds items and their uses.	Guide students to identify and classify feedstuff into carbohydrate, protein, lipid and fibre sources. Explain the difference between roughages, concentrates etc. Explain the importance of minerals and vitamins in animal rations.	LCD projector Slide projector White board Markers. Laptop computers.	Identify different types of livestock feed.	Guide the students on how to identify different feed resources	Different feedstuffs and forage samples
6	3.2 Know and understand feed processing techniques, technologies and end products.	Explain the need for processing and how to process.		Identification of processed livestock feed.	Show students samples of processed feed.	Different feedstuff samples.
	General Objective: 4.0 Understand monogastric, ruminant and pseudo-ruminant digestive systems.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

7	4.1 Understand the physiology of digestive systems of monogastric, ruminant and pseudo ruminant animals.	Explain the most important physical aspects of the digestive system of each class of livestock.	LCD projector Slide projector White board Markers. Laptop computers.	Appreciate the anatomy and biochemistry of the different digestive systems.	Guide the students to identify the different parts of the digestive systems.	Digestive tract models of a ruminant, monogastric animal and pseudo ruminant.
8	4.2 Understand the biochemistry of digestive systems of monogastric, ruminant and pseudo ruminant animals.	Explain the most important biochemical aspects of the digestive system of each class of livestock.				
9	4.3 Understand how to calculate a simple ration formulation by hand.	Explain ration formulation for monogastric and ruminant animals.		Work out a ration formulation	Demonstrate how to work out a ration formulation.	Paper, calculators and pens.
General Objective: 5.0 Appreciate different nutrients and their role in animal growth and production						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	5.1 Understand the biochemical pathways in the animal of: a) carbohydrates	Introduce the biochemical characterization of each group of	LCD projector Slide projector White board Markers.	Understand how to perform simple lab	Demonstrate lab techniques for analysis of feedstuffs	Lab equipment and consumables.

	b) lipids c) proteins	feedstuffs and explain their pathway inside the animal.	Laptop computers. - Lesson notes.	analyses on feeds.		
	General Objective: 6.0 Understand reproductive physiology and genetic improvement of farm animals.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	6.1 Understand the influence of hormones on male and female reproduction. 6.2 Know the physiology of the male and female reproductive organs.	Explain the endocrinology of animal reproduction e.g. the oestrus cycle. Introduce the structures associated with reproduction.	LCD projector Slide projector White board Markers. Laptop computers.	Appreciate the anatomy of the male and female reproductive tracts and associated structures.	Demonstrate using 3-D models the physiology of reproduction.	3-D models of the male and female reproductive organs. Post-mortem samples of embryos and foetuses.
12	6.3 Understand what happens at fertilization, gestation and parturition.	Explain the basic processes of fertilization, gestation and parturition.	LCD projector Slide projector White board Markers. Laptop computers.			
13	6.4 Understand the concepts of animal genetics and how breed	Explain the structure of genes and how they behave	LCD projector Slide projector White board Markers.	Appreciate genetic variability of size, coat	Introduce students to a range of animal types	Farms and animals.

	improvement can be managed.	during mitosis and meiosis. Explain the concepts of genetic improvement through performance recording and selective breeding.	Laptop computers.	colour, milk yield, wool type etc of a range of animals.	and explain the concepts of dominant and regressive genes.	
	General Objective: 7.0 Appreciate basic farm animals' health management principles.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
14	7.1 Understand the causes and effects of diseases in livestock including viral, fungal and bacterial diseases, as well as parasites.	Explain how diseases affect animals and how they are spread. Explain what parasites are and how they inter-react with animals.	LCD projector Slide projector White board Markers. Laptop computers.	Identify symptoms of diseases and parasites by looking at live examples.	Demonstrate the identification of a range of disease symptoms and explain how to identify parasitic insects, annelids etc.	Samples of diseased tissue, live animals with problems, pictures, photographs etc.
15			LCD projector			Farms to visit.

	7.2 Know the main preventative health measures for livestock farmers and understand the importance of prophylactic medicine and alternative protection measures.	Explain the concepts of preventative medicine, flock or herd health, clean grazing techniques etc.	Slide projector White board Markers. Laptop computers.	See systems of preventative health measures in action.	Take students to visit farms where preventative measures are being used.	
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PROGRAMMEE: National Diploma in Agricultural Technology:

COURSE: ABE I0I - Introduction to Agricultural and Bio Environmental Engineering

DURATION: 60 Hours (3 Hour Lectures, 1 Hour Practicals)

UNIT: 4.0

GOAL: This course is designed to enable the students to understand the scope of Agricultural Engineering and its application in agricultural (crop, fibre and animal) production.

GENERAL OBJECTIVES

On completion of this course, the students should be able to:-

- 1.0 Outline the scope of Agricultural and Bio Environmental Engineering**
- 2.0 Understand the roles of Agricultural and Bio Environmental Engineering in National Economic Development.**
- 3.0 Know the application of Farm Power and Machinery in Agricultural Production.**
- 4.0 Know the application of Soil and Water Engineering in Agricultural Production.**
- 5.0 Know the application of Farm Structures in Agricultural Production.**
- 6.0 Know the use of Electric Power in Agricultural Production**
- 7.0 Know the application of Post harvest Technology in Agricultural Production.**
- 8.0 Introduce students to Professional Organizations relevant to Agricultural Engineering and Professional Activities**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: Introduction to Agricultural and Bio Environmental Engineering	COURSE CODE: ABE 101	CONTACT HOURS: 4 HOURS /wk (3 hr lectures: 1 hr practicals)
GOAL: This course is designed to enable the students to understand the scope of Agricultural Engineering and its application in agricultural (crop, fibre and animal) production.		
COURSE SPECIFICATION: : Theoretical practical		Practical Contents:
	General Objective : 1.0 Outline the scope of Agricultural and Bio Environmental Engineering	

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	Define Agricultural Engineering. 1.1 Outline the history of Agricultural Engineering.	Defines Agric Engineering Explain its mission (to reduce human drudgery, increase production, increase efficiency, etc). Give history and development of Agric. and Bio Environmental Engineering	Chalk or magic board, cardboard drawings etc	For students to effectively give the definition of Agric. Engineering.	Highlights the key words in the definition and ask the students to explain.	Chalk or magic board, cardboard drawings etc
2	1.2 Distinguish between Agricultural Engineering and other branches of Engineering.	List other fields of engineering (Mechanical, Civil, Electrical, Material and Metallurgy, etc). Explain the common boundaries and differences in the various branches of engineering. Emphasis on the uniqueness of Agric Engineering	Chalk or magic board, cardboard drawings etc	Ensure the students understand that agric engineering is the application of various discipline in science and engineering to solve agric problems.	States some problems of agriculture. Explains how each engineering field can be used to solve the problems.	Chalk or magic board, cardboard drawings etc
2	1.3 Distinguish the areas of specialization in Agricultural Engineering	State the areas of specialization of Agric. Engineering such as:	Chalk or magic board, cardboard drawings etc	Students to list and write the various areas of specializations in agric engineering.	Display a chart of the areas of specialization and other sub-areas.	Chalk or magic board, cardboard drawings etc

		*Farm Power and Machinery * Soil and Water Engineering *Farm Structures and Environment *Processing and Storage *Farm Electricity *Ergonomics and other emerging areas State the scope main target of each of the areas of specialization. Discuss their interrelationship of the areas of specialization.				
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	General Objective: 2.0 Understand the roles of agricultural and Bio Environmental Engineering in National Economic Development.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

3	Role in National Economic Development; 2.1 List the various job opportunities open to Agricultural Engineers in the Country.	List jobs in agriculture, engineering, education, banking, environmental and multinational sectors, etc - Provide list of successful Agric Engineers in the listed sectors	Chalk or magic board, cardboard drawings etc	Students to believe that an Agric Engineer is fit to work in any job that can be used to reduce human drudgery or is agric related.	Display list of jobs in engineering, education, banking, environmental studies etc	Chalk or magic board, cardboard drawings etc
3	2.2 Explain the contribution of Agricultural Engineering to National Economic Development such as: (i) Employment generation in the Agricultural sector. (ii) Production of food and fibre (iii) Source of foreign exchange earnings. (iv) Raw materials for industries, etc.	- Write areas of national economic developments. - Explain agric engineering has contributed or will contribute to such development. - Provide list of successful Agric Engineers involved in the various areas of National development	Chalk or magic board, cardboard drawings etc	Students should be able to list how agric engineering is contributing or will contribute to national developments	Ask students to write a technical report on the “What agric engineering is and its contributions to national development”	Technical write-up

	General Objective: 3.0 Know the application of farm power and machinery in agricultural production.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

4	<p>Farm Power and Machinery.</p> <p>3.1 Define the terms power and machinery</p>	<p>Define 'Farm Power', 'Farm and Machinery' in agric engineering.</p> <p>Give the examples of 'Farm Power' and 'Farm Machinery'</p>	Chalk or magic board, cardboard drawings etc	Students should be able to explain the mission of farm power and machinery option of agric engineering.	Identify various power sources and machinery used in agric engineering.	Drawings, pictures, catalogs etc.
4	<p>3.2 Differentiate between the following terms: implements, tools, equipment, and machinery</p>	<p>Explain each of the term.</p> <p>State the distinctive features of each.</p> <p>Provide list/ examples of implements, tools, equipment and machinery.</p>	Chalk or magic board, cardboard drawings, catalogs etc	Students to understand principle of grouping working materials in terms of implements, tools, equipment, and machinery	Visit the workshop to identify working materials that are implements, tools, equipment, and machinery	Workshop materials
5	<p>3.3 Describe the various sources of power on the farm, their mode of generation and utilization</p>	<p>List sources of power on the farm, including tractor, solar, hydro thermal, geo thermal, etc.</p> <p>State mode of generation of the power.</p> <p>Explain how the power is utilized in the farm.</p>	Chalk or magic board, cardboard drawings, catalogs etc	Students should know and write the sources of power on the farm, their mode of generation and utilization	Visit the farm identify the type of power being used, their mode of generation and utilization.	Farmstead

5	3.4	Classify agricultural tractor according to their power rating, make, and constructional features	<p>Mention various makes of tractors they know.</p> <p>List the classes of agricultural tractor base on power rating, and constructional features.</p> <p>Explain the listed tractor class.</p>	Chalk or magic board, cardboard drawings, pictures, catalogs etc	For students to classify tractors according to their makes and models, power rating and constructional features	<p>Visit a tractor sales or hiring unit.</p> <p>Observe various tractors.</p> <p>Classify tractors observed.</p>	Tractor sales or hiring outfit
6	3.5	Identify main units of a typical farm tractor	<p>List the functional units of a tractor (e.g. engine, gearbox, electrical systems, linkages etc.).</p> <p>Explain each part listed.</p>	Chalk or magic board, cardboard drawings, pictures, catalogs etc	Students should identify the functional units of the tractor system.	Point and name the functional units of the tractor.	Functional or dismantled units of tractor.
6	3.6	State the functions of tractor units identified in 3.7 above	Explain the functions of each of the units identified.	Chalk or magic board, cardboard drawings, pictures, catalogs etc	To understand the functional relationship between the units of the tractor and the work they perform.	Tabulate the units and their various functions.	Chalk or magic board, cardboard drawings, pictures, catalogs etc

	General Objective: 4.0 Know the application of soil and water engineering in agricultural practices.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

7	Soil and Water Engineering in Agricultural Practices 4.1 State the importance of soil and water management in irrigation, drainage, soil conservation and land reclamation on the farm.	Introduce the topic. List and explain the importance of soil and water management in irrigation, drainage, soil conservation and land reclamation on the farm.	Chalk or magic board, cardboard drawings, etc	Students should be able to tell what Soil and Water Engineering is all about. Give its importance in irrigation, drainage etc.	Visit some irrigation farms or shoot films to show the applications of Soil and Water Engineering.	Irrigation Farm or film projectors
	4.2 List different sources of water for irrigation	Identify and list the different sources of water for irrigation.	Chalk or magic board, cardboard drawings, etc	Students to know and mention sources of water for irrigation.	Display pictures or films to show various sources of water for irrigation.	Pictures or film projectors
8	4.3 Describe the various methods of controlling soil erosion	List various methods. Describe each method listed.	Chalk or magic board, cardboard drawings, etc	Students should mention the various soil control mechanism and describe each.	Visit erosion control sites or display pictures or films to show various methods of erosion control.	Visits, picture display or film show.
8	4.4 Describe the various water control structures, drainage structures and soil conservation structures on visitation to farm site	Take a visit to water control site. Identify each structure. Describe its constructional feature as well as the process of using it.	Farm or construction site.	Students to see identify and describe the constructional features of water, drainage and soil conversation control structure.	Take a visit to a water control site Identify each structure Describe its constructional feature as well as	Farm or construction site.

					the process of using it.	
9	4.5 Identify basic irrigation equipment on the farm	List basic irrigation equipment. Describe each listed item	Chalk or magic board, cardboard drawings, film projectors, etc	Students will identify, handle and understand the basic operations of some irrigation equipment.	Take a visit to the farm site Identify the available irrigation Describe its principles of operations.	Irrigation field.
9	4.6 Identify machinery for land drainage, reclamation and estate maintenance	List basic land drainage equipment. Describe each listed item	Chalk or magic board, cardboard drawings, film projector, etc	Students will identify, handle and understand the basic operations of land drainage equipment.	Take a visit to the farm site Identify the available land drainage Describe its principles of operations.	Irrigation and drainage field.
10	4.7 Description of water control structures and channels	List water control structures. Explain each characteristic listed. Explain how the measurements are being carried out.	Chalk or magic board, cardboard drawings, film projector, etc	Students should be exposed to water control structures like stilling basin, drop spillway, chutes, flumes, weirs etc.	Carry out measurements of hydraulic characteristics of water control structures like weirs etc	Irrigation or drainage control sites.

				They should carry out hydraulic characteristics measurements of control structure listed.		
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	General Objective: 5.0 Know the various roles of farm structures and environment for agricultural production :					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	Farm Structures and Environment 5.1 Introduce farm structures and environment and Identify various farm structures used for crop storage and animal husbandry	List various farm structures used for crop storage and animal husbandry such as cribs, silos, poultry houses, animal pens, warehouses, farm roads, dams, drainages, etc	Chalk or magic board, cardboard drawings, etc	Students should be able to identify different farm structures.	Provide pictures of different farm structures. Encourage students to identify and visit the sites of some farm structures in their locality	Chalk or magic board, cardboard drawings, etc
11	5.2 Animal housing units	Emphasis on different housing units for fish, snails, poultry, small ruminants (sheep & goats), large ruminants (cow), swine, etc	Chalk or magic board, cardboard drawings, etc	Students should be able to identify different housing units for fish and different animals.	Visit fish ponds and housing units for different farm animals.	Animal farms and fish pond.

11	5.3 Units for crop storage	List examples of crop storage systems	Chalk or magic board, cardboard drawings, etc	Students should be able to identify different housing units for crop storage	Visit different sites of crop storage facilities.	Storage facility sites.
12	5.4 Dams, hydraulic structures and farm roads	<p>List types of dams and hydraulic structures and state their uses</p> <p>State the differences between farm road and conventional road</p> <p>State the differences between earth dams and other types of dams.</p>	Chalk or magic board, cardboard drawings, etc	Students should be able to identify dams, farm roads and different hydraulic structures.	Visit a dam site and view some hydraulic structures	Dam site, farm road in neighbouring rural area
12	5.5 Structures for drying and residential quarters of the farmers	<p>State the advantages and disadvantages of drying flour in rural areas</p> <p>Emphasis the need for residential apartment for farmer and the</p>	Chalk or magic board, cardboard drawings, etc	Student should appreciate the advantage human residence on farm and the need of drying flour on farm.	Visit the nearest farm settlement.	Neighbouring farm settlement

		need for farm settlements				
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	General Objective: 6.0 Know the roles of farm electrification in agricultural production. :					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	Farm Electrification 6.1 State the importance of electric power in handling and processing of agricultural produce	Introduce topic State ways and areas where electricity can be used in the farm such as heating of brooder pens, operating milking equipment, pumping water for irrigation and farm house, operating processing machines etc..	Chalk or magic board, cardboard drawings, film projector etc	Students should mention areas in the farm where electricity is applied and its usefulness.	Visit neighbouring farms or projects where electricity is used in farm operations. Students should write their observations.	Farm area of project farms.
13	6.2 Locate and identify the various accessories of an electrical installation in farm building	- List various electrical accessories from generation,	Chalk or magic board, cardboard drawings, film projection of	- To see and name electrical accessories used in farm buildings	Locate each accessory and name it.	Generator, distribution accessories

		distribution to utilization within a farm building.	electrical accessories etc.			
	General Objective: 7.0 Know the roles of storage and processing in agricultural production.					
	:					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
14	7.1 Distinguishing various machines used in processing of agric materials.	List and describe some storage and processing machines such as separators, shellers/ threshers, size reduction machines, mixers, feed mills, dryers, crushers, pelleters, decorticators, etc.	Chalk or magic board, cardboard drawings, film projection of showing different processing operations.	Students should identify and know the differences and distinctive features of each of the processing machines.	Demonstrate the uses of any of the available processing and storage facilities.	Sheller, separator, milling storage and processing, crib, ware house, silo, etc.
14	7.2 Distinguishing various machines used for the storage of agric materials.	List and describe some storage facilities such as warehouse, silo, crib, barn, evaporative coolant systems	Chalk or magic board, cardboard drawings, film projection of storage facilities.	Students should identify and know the differences and distinctive features of each of the storage facilities.	- Display parts or units of the machines for agric processing.	Old or functional agric processing machines.

		(ECS), cold storage/ controlled atmosphere storage, hermetic storage, etc..			- Explain the main parts of the machine.	
14	7.3 Describe various methods of crop storage and State the economic importance of farm structure	List the economic importance of different categories of storage structures in agric production, industrial development, etc	Chalk or magic board, cardboard drawings, etc	Students should know about uses and applications of farm structures.	Using film show and slides emphasis the roles and economic importance of storage structures.	Video, film show and slides
	General Objective: 8.0 Introduce students to Professional Organizations relevant to Agricultural Engineering and Professional Activities :					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
15	8.1 Introduction to Agricultural Engineering Professional Organizations	Roles and functions of professional organizations List of National agricultural professional organizations	Chalk or magic board, cardboard drawings etc	Student to understand and appreciate the contributions of national and international professional associations to agricultural engineering practice.	Provide student with list of some registered member of agricultural engineering professional organizations and	Chalk or magic board, cardboard drawings etc

		List of National agricultural professional organizations			encourage interactions. :	
15	8.2 Membership of professional associations	<p>List the categories of membership including fellow, corporate, graduate and student membership</p> <p>Requirements for enlistment as member into various categories</p> <p>Roles of members to their professional associations</p>	Chalk or magic board, cardboard drawings etc	Encourage student to register as student member and participate in professional associations.		Chalk or magic board, cardboard drawings etc

PROGRAMME: **National Diploma in Agricultural Technology**

COURSE: AGT 101 - Introduction to Farm Woodland Management

DURATION: 60 HOURS (2 Hours Lectures, 2 hours Laboratory/Field Work)

UNITS: 4.0

GOAL: This course is aimed at introducing the student to sustainable management of woodland found on the farm

GENERAL OBJECTIVES:

On completion of this course the student should be able to:

- 1.0 Identify the important tree species and understand their potential for use as fuel or as a marketable resource
- 2.0 Understand how to use basic forest machinery
- 3.0 Understand how to manage woodland effectively, including tree protection and nutrition
- 4.0 Understand how to replace woodland effectively.
- 5.0 Understand woodland as a valuable ecosystem and a natural wildlife resource.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO FARM WOODLAND MANAGEMENT	COURSE CODE: AGT 101	CONTACT HOURS: 60
GOAL: This course is aimed at introducing the student to sustainable management of woodland found on the farm		
COURSE SPECIFICATION:		Practical Contents:

	General Objective: 1.0 Identify the important tree species and understand their potential for use as fuel or as a marketable resource.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Identify the important commercial tree species found on a farm.	Describe how to identify the different tree species of Nigeria.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	Field identification of tree species.	Accompany students on field trip to identify tree species.	A selection of woodland and forest visits.
2	1.2 Understand the importance of different tree species for wood fuel. 1.3 Understand the importance of different tree species for providing marketable wood or wood products.	Explain the value of wood as a fuel and how different species are used. Describe the properties of tree species for production of marketable wood or wood products.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	Understand the importance of different tree species for wood fuel. Understand the importance of different tree species for providing marketable wood or wood products.	Practical demonstration of the suitability of different species for wood fuel. Demonstrate wood grain, finish, density etc and show students a range of wood products.	Wood samples, fires, boilers, calorimeters. Wood samples and product samples.
	General Objective: 2.0 Understand how to use basic forest machinery.					
3	2.1 Understand what machines, implements and instruments are used in woodland management.	Describe machines and instruments used in woodland management.	Whiteboard and marker pens. OHP. Powerpoint	Experience how to use and maintain machines, implements and	Demonstrate how to use, maintain and repair simple	Axes, chain saws, spades, billhooks, hand saws, post thumper, electric

			computer and projector.	instruments used in woodland management.	machines, tools and instruments.	drill, safety equipment.
4	2.2 Know how to use and maintain machines, implements and instruments used in woodland management.	Explain the basic principles of use, maintenance and repair.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	Experience how to use and maintain machines, implements and instruments used in woodland management.	Demonstrate how to use, maintain and repair simple machines, tools and instruments.	Axes, chain saws, spades, billhooks, hand saws, post thumper, electric drill, safety equipment.
	General Objective: 3.0 Understand how to manage woodland effectively, including tree protection and nutrition.					
5	3.1 Understand common tree management terms: - coppicing - coppicing with standards - beating up - burning - silviculture - mapping and mensuration	Explain how to carry out various tree management operations.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	Gain practical experience of woodland management practices as described in 3.1.	Demonstrate woodland management practices as described in 3.1.	Woodland or forest. Suitable tools and instruments.
6	3.2 Have a basic understanding of the forestry and woodland industry in Nigeria and how it interacts with farming.	Give basic information on the importance of trees in Nigeria.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	See examples of forests, woodland and their interaction with farming.	Accompany students on field trips to see relevant examples and explain what they are seeing.	Suitable sites to visit.
7	3.3 Understand the basic principles of agro-forestry	Explain the concept of agro-	Whiteboard and marker		Accompany students on	Suitable farms where agro-

	and how woodland can be integrated with crops and animal production.	forestry and give some examples involving crop and animal production.	pens. OHP. Powerpoint computer and projector.	See examples of successful agro-forestry.	agro-forestry visits and explain what they are seeing.	forestry is practiced.
8	3.4 Identify the important weeds which can compete with trees. 3.5 Understand how to control weeds in farm woodland.	Discuss with students the important weeds found in woodland. Discuss methods of weed control	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	See the important weeds of woodland growing in the wild and see practical methods of control.	Demonstrate growing weeds and methods of control.	Suitable woodland. Sprays and sprayers, tools and implements.
9	3.6 Identify the important pests and disease which affect trees. 3.7 Understand how to control pests and diseases in farm woodland.	Help students to identify pests and diseases and their control.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	See the important pests and diseases of woodland in the wild and see practical methods of control.	Demonstrate pests and diseases and methods of control.	Suitable woodland. Sprays and sprayers, tools and implements.
10	3.8 Understand how to provide appropriate nutrition for woodland.	Inform students about tree nutrient requirements and how these can be provided.	Whiteboard and marker pens. OHP. Powerpoint computer and projector.	How to measure the need for, and correctly apply fertilizer and manures to woodland.	Demonstrate the correct way to carry out soil and plant samples for analysis and how to correctly apply fertilizers and manures to woodland trees.	Woods, augers, sample bags, fertilizer materials, application machinery.
11	3.9 Understand the concept of sustainable woodland management	Explain the concept of sustainability in	Whiteboard and marker pens. OHP.	See first hand successfully	Accompany students on field trip to see	Suitable visit venues.

	including sustainable wood fuel harvesting.	simple terms. Apply it to woodland management.	Powerpoint computer and projector	managed woodland.	successfully managed woodland.	
12	3.10 Know how to select trees for wood products and how to convert wood into marketable commodities.	Explain about end markets for wood products and how these can be satisfied by careful selection and preparation.	Whiteboard and marker pens. OHP. Powerpoint computer and projector	Practical experience of tree selection, wood preparation and conversion.	Demonstrate to students on-site how to select, prepare and convert wood into marketable products.	Woodland, logs, band saws, planes, routers etc.
	General Objective: 4.0 Understand how to replace woodland effectively.					
13	4.1 Identify when trees need to be replaced because of age, disease etc. 4.2 How to replace trees by replanting and successful aftercare.	Describe the symptoms of decay and other tree problems. Discuss replanting techniques.	Whiteboard and marker pens. OHP. Powerpoint computer and projector	Field identification of old, diseased, decaying or dangerous trees. Hands-on experience of tree planting and aftercare.	Demonstrate how to identify old, diseased, decaying or dangerous trees. Demonstrate tree planting and aftercare.	Woodland, suitable tools etc. replacement trees.
	General Objective: 5.0 Understand woodland as a valuable ecosystem and a natural wildlife resource.					
14	5.1 Identify the important environmental benefits of woodland ecosystems. 5.2 Understand the relationship between	Explain the concept of an ecosystem and discuss how farm woodland can be	Whiteboard and marker pens. OHP. Powerpoint	Look at successful examples of wildlife-rich woodland and	Accompany students on field trip to see successful examples of	Suitable visit venue.

15	woodland habitats and wildlife. 5.3 Understand how to manage farm woodland in such a way as to balance the commercial requirements with environmental protection.	managed to optimize its environmental benefits.	computer and projector	learn how it has been managed.	wildlife-rich woodland and learn how it has been managed.	
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PROGRAMMES: GENERAL STUDIES

COURSE TITLE: COMMUNICATION IN ENGLISH 1

CODE: GNS 102

PRE-REQUISITE: English language speaking and writing.

DURATION: 2 – 0 hours

CREDIT UNITS: 2

SCHEDULE: Year 1, Semester 1

GOALS: This course is designed to enable students to develop their communication and presentation skills.

GENERAL OBJECTIVES: On completion of the course the student should:

1. Understand the concept of communication.

2. Know the essential elements in the preparation of a written report
3. Know how to make an oral presentation.

PROGRAMME: NATIONAL VOCATIONAL CERTIFICATE IN GENERAL STUDIES						
COURSE:COMMUNICATION IN ENGLISH 1			COURSE CODE: GNS		CONTACT HOURS: 2 hrs	
GOAL: This course is designed to enable students to develop their communication skills.						
COURSE SPECIFICATION: Theoretical Contents: 2 hours					Practical Contents:.0 hours	
	General Objective: 1.0 Understand the concept of communication.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Define communication. 1.2 Analyse the process of communication.	Present an illustrated lecture on <ul style="list-style-type: none">the development of communication.barriers to communication (disabilities/ impairments)	PC Data Projector Interactive Whiteboard Appropriate Software to support interactive whiteboard.			
2	2.1 Understand effective communication	Outline the use of assistive technology in communication - <ul style="list-style-type: none">spell/ grammar check	PC Data Projector Interactive Whiteboard Appropriate Software to support interactive whiteboard.			

		<ul style="list-style-type: none"> • audio/ speech software • visual improvements (background colour, font size, style etc) <p>Demonstrate as required</p>				
3	<p>1.3 Analyse the purposes of communication.</p> <p>1.4 Explain the relationship between communication and language.</p>	<p>Discuss communication in a specialist field –</p> <ul style="list-style-type: none"> • Purpose • Methods • Vocabulary <p>Illustrate as required</p>	<p>PC Data Projector Interactive Whiteboard Appropriate Software to support interactive whiteboard.</p>		<p>Assist in the preparation of a 'note book' to record the vocabulary and definition of language used in a specialist field.</p>	<p>Notebooks</p> <p>Reference books and articles etc in the specialist field.</p>
General Objectives: 2.0 Know the essential elements in the preparation of a written report.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4	<p>2.1 Understand the requirement for preparation.</p>	<p>Outline purpose and methods of preparation for effective communication.</p> <p>Demonstrate methods of Note Taking to record significant information from a lecture, report, passage etc.</p>	<p>PC Data Projector Interactive Whiteboard Appropriate Software to support interactive whiteboard.</p>		<p>Issue short 'practice' task for note taking from a visual, oral or written topic.</p>	
5	<p>2.2. Understand how to structure a sentence and apply good grammar.</p>	<p>Explain sentence structure and grammar.</p> <p>.</p>	<p>PC Data Projector Interactive Whiteboard</p>			

		Show examples	Appropriate Software to support interactive whiteboard.			
6	2.3 Know how to structure a written piece of work.	<p>Explain the purpose and contents of –</p> <ul style="list-style-type: none"> • an introduction • the main body of text • a conclusion or closing paragraph <p>Show examples</p>	<p>PC Data Projector Interactive Whiteboard Appropriate Software to support interactive whiteboard.</p>			
7	2.4 Apply knowledge to the preparation of a written report.	<p>Issue task – to prepare a written report for a topic within a specialist field - <i>Potential to integrate with another course.</i></p>	Brief document			
8	2.5 Produce a draft report	<p>Assess and offer guidance to improve report writing skills and/ or content.</p>				
9	2.6 Write a report	<p>1:1 tutorial</p> <p>Encourage the use of Word Processing in the preparation of the report.</p> <p>Demonstrate how to –</p>				

		<ul style="list-style-type: none"> reference sources – books, www etc. integrate images, charts etc correctly label & reference same 				
10	2.6 Write a report	<p>Assess report</p> <p>In large group discuss generic issues or written reports.</p>	<p>Feedback sheet</p> <p>Interactive white board or flip chart.</p>			
	General Objectives: 3.0		Know how to make an oral presentation.			
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	
11	3.1 Understand the principles for oral communication	<p>Explain the principles of effective speaking, correct use of stress, rhythm, and intonation patterns.</p> <p>Discuss oral presentations in a specialist field e.g.–</p> <ul style="list-style-type: none"> Interview Communicate a proposal Sell a service or product etc. 	<p>PC</p> <p>Data Projector</p> <p>Interactive Whiteboard</p> <p>Appropriate Software to support interactive whiteboard.</p>			

		Utilise student experiences. Record significant information.				
12	3.2 Apply knowledge to the preparation of an oral presentation.	<p>Issue task – to prepare a short oral presentation within the specialist field of study. <i>Potential to integrate with another course.</i></p> <p>Reinforce preparation to minimise stress, ensure accurate knowledge etc.</p> <p>Identify and demonstrate methods to aid oral presentation –</p> <ul style="list-style-type: none"> • Mind Mapping • Prompt cards • Bullet points etc 	<p>Assignment sheet.</p> <p>Whiteboard & Pen</p> <p>Prompt cards</p>			
13	3.2 Apply knowledge to the preparation of a oral presentation.	Review topic(s)				
14	3.3 Demonstrate an understanding of effective presentation skills	Record student presentation(s) for assessment & discussion	Video recording equipment			
15	3.4 Appraise oral presentation skills.	<p>Discuss strengths and weaknesses of student presentation(s).</p> <p>Identify areas of development in oral</p>	<p>PC and Data Projector</p> <p>Whiteboard.</p>			

		presentation skills & set goals.				
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TYPE OF ASSESSMENT	PURPOSE AND NATURE OF ASSESSMENT (ITD)	WEIGHING
Examination	Final Examination (written) to assess knowledge and understanding	0
Test	At least 2 progress tests for feed back - written report & oral presentation	80
Practical	Note Book	20
TOTAL WEIGHT		100

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY			
Course: CITIZENSHIP EDUCATION		Course Code: GNS 111	Contact Hours 2HRS/WEEK
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the Constitution of Nigeria		
Week	Specific Learning Outcome:	Teachers Activities	Resources
1-4	1.1 Explain the term constitution 1.2 Distinguish the different types of constitution 1.3 Highlight some provisions of an International Constitution 1.4 Explain the effectiveness of International Constitution 1.5 Explain the supremacy of the Nigerian Constitution to other laws with emphasis on the 1989 constitution	Ask the students: • what their understand by the term constitution and to distinguish the different rules of constitution known • to explain the effectiveness of International Constitution	Chalkboard, duster

	1.6 Evaluate the main parts of the Nigeria Constitution 1.7 Draft a constitution for an association 1.8 Trace the historical development of the Nigerian Constitution 1.9 Discuss the merits and demerits of each of the Nigerian constitutions 1.10 Explain the concept of “rule of law”	<ul style="list-style-type: none"> • to explain Nigerian Constitution to other laws. • To identify the main parts of the Nigerian Constitution. <p>Assess to the students by given the assignment to draft a constitution for an association</p>	
	General Objective: 2.0 Understand the federal system of government in Nigeria		
Week	Specific Learning Outcome:	Teachers Activities	Resources
5-7	2.1 Describe a federation 2.2 Distinguish a federation from a confederation 2.3 Outline the basis for the federal system in Nigeria 2.4 Examine the evolution, structure and functions of the federal system in Nigeria. 2.5 Analyse the relationships among the three tiers of government in Nigeria 2.6 Evaluate the revenue allocation formula in operation in Nigeria 2.7 Compare and contrast other federation with Nigeria11	Ask the students: <ul style="list-style-type: none"> • to describe a federation and to differentiate between a federation and a confederation • to define the functions of the federal system in Nigeria and the relationship among the three tiers of government • to evaluate the revenue allocation formula operation in Nigeria 	<ul style="list-style-type: none"> • Chalk, blackboard, duster
	General Objective: 3.0 Know the constitutional rights and obligations of Nigerian citizens		
Week	Specific Learning Outcome:	Teachers Activities	Resources
8-9	3.1 Examine the significance of rights and obligations in Nigeria 3.2 Assess government’s protection of fundamental rights as contained in the Nigerian constitution 3.3 Evaluate the responsibilities and duties of Nigerian	<ul style="list-style-type: none"> • Ask the students to identify the responsibilities and duties of Nigerian citizenship 	<ul style="list-style-type: none"> • Chalk, blackboard, duster

	citizenships and the benefits for performing them 3.4 Assess the responsibilities and duties of constituted authority to the people 3.5 Evaluate the responsibilities and duties of government to the People		
	General Objective: 3.0 Understand Citizenships		
Week	Specific Learning Outcome:	Teachers Activities	Resources
10-12	4.1 Discuss the significance of citizenship 4.2 Analyse the principles and benefits of citizenship 4.3 Explain the difference in the modes of acquiring citizenship 4.4 Evaluate the merits and demerits of each type of citizenship 4.5 Analyse the basis for the acquisition and withdrawal of Nigerian citizenship 4.5 Examine the benefits derivable from Nigeria citizenship	Ask the students: • to discuss and analyse the principles and benefits of citizenship • to analyse the basis for the acquisition and withdrawal of Nigerian citizenship	• Chalk, blackboard, duster
	General Objective: 5.0 Fundamental objectives and directive principles of state policy in Nigeria		
Week	Specific Learning Outcome:	Teachers Activities	Resources
	5.1 State the fundamental obligations of government as provided in the constitution 5.2 Explain the general provisions of the fundamental objectives and directive principles of state policy 5.3 Explain the political, economic, social and education policies of Nigeria 5.4 Explain the directive principles and policy of the Nigerian government on culture, the mass media, national ethics and duties of the citizen	• Ask the students to explain the directive principles and policy of the Nigerian • Government on cultures, the mass media, national ethnics and duties of the citizen	• Chalk, blackboard, duster

	<p>5.5 Assess the conformity observance and application of the fundamental objectives and directive principles of state policy by governments and people of Nigeria.</p> <p>5.6 Recommend improvements on the provision conformity, observance and application of the fundamental objectives and directive principles of state policy</p>		
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PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 111 - Principles of Crop Production

DURATION: 60 hours (2 Hours Theory, 2 Hours Practicals)

UNITS: 4.0

GOAL: To acquaint the students with the principles and practices of crop production.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Identify and understand the scope of crop production in Nigeria.
- 2.0 Understand the different cropping systems.
- 3.0 Understand the principles and practices of tillage.
- 4.0 Understand the different methods of propagating plants.
- 5.0 Understand and practise successful weed control in crop production
- 6.0 Understand the principles and practices of manuring and fertilising.
- 7.0 Understand the principles and practices of crop protection.
- 8.0 Understand the principles and practices of harvesting, storage and product handling.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: PRINCIPLES OF CROP PRODUCTION			COURSE CODE: AGT 111		CONTACT HOURS: 60 HOURS (2 hrs lectures, 2 hours practicals)	
GOAL: To acquaint the students with the principles and practices of crop production.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Identify and understand the scope of crop production in Nigeria.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Understand the scope of crop production. 1.2 Know the objectives of crop production. 1.3 Understand the importance of crop production to agriculture.	Explain and demonstrate the scope and objectives of crop production.	LCD projector Slide projector White board Markers. Laptop computers.	See the scope and importance of crop production by visiting a range of crop production enterprises.	Accompany students on scoping visits and explain what they are seeing.	Suitable visit venues.

2	1.4 Appreciate the factors affecting crop production e.g. i. environmental factors; ii. economic factors; iii. social factors.	List and explain the principles and application of crop production in agriculture. Explain the factors affecting crop production.	LCD projector Slide projector White board Markers. Laptop computers.	See how specific factors affect the choice of cropping systems.	Accompany students on visits and explain what they are seeing.	Suitable visit venues.
General Objective: 2.0 Understand the different cropping systems.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Understand the following cropping systems: i. mixed cropping; ii. crop rotation; iii. monoculture; iv. relay cropping 2.2 Understand the advantages and disadvantages of different cropping systems.	Explain cropping systems and explain the advantages and disadvantages of each.	LCD projector Slide projector White board Markers. Laptop computers.	Identify the different cropping systems.	Guide students to identify the different cropping systems.	College and private farms.
4	2.3 Evaluate and select cropping systems to suit different situations.	Introduce methods of evaluation.	LCD projector Slide projector White board Markers.	Selection of cropping system to suit a practical situation.	Help students to evaluate and make a decision on cropping for	College or private farm.

			Laptop computers.		a given field situation.	
	General Objective: 3.0 Understand the principles and practices of tillage.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	3.1 Understand the term “tillage” and be aware of the requirements for seedbed production.	Explain the term “tillage” and the concept of seed requirements for germination and survival.	LCD projector Slide projector White board Markers. Laptop computers.	See examples of seedbed preparation for different crops using different implements.	Demonstrate examples of seedbed preparation for different crops using different implements.	College farms.
6	3.2 Understand how to produce suitable seedbeds.	Explain how implements, animals and machines are used to produce seedbeds	LCD projector Slide projector White board Markers. Laptop computers.	Carry out tillage operations in field.	Guide student to carry out tillage operations.	Tractor, hoes, ox-drawn tillage implements and land.
	General Objective: 4.0 Understand the different methods of propagating plants.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	4.1 Understand the difference between sexual and asexual propagation. 4.2 Decide which of the two methods of propagation in 4.1 above to use. 4.3 Be able to determine the quality of planting materials.	Explain the difference between asexual and sexual propagation and why each is used. Emphasize the quality of	LCD projector Slide projector White board Markers. Laptop computers.	Identify and understand the different methods of propagation in practice. How to test for seed viability.	Guide students to identify the different methods of propagation. Show students how to determine the	Crop seeds, cuttings, bulbs, rhizomes, leaves and tubers.

8	4.4 Know about the different planting methods: i. in situ; ii. drilling; iii.dibbling; iv.broadcasting.	planting materials. Introduce students to the different planting methods.	LCD projector Slide projector White board Markers. Laptop computers.	Plant seeds using the different methods at the appropriate time	viability of seeds. Guide students to plant seeds.	Seeds, containers, compost and growing chambers.
	4.5 Understand supplying and thinning and determine when to supply or thin.	Explain the concepts of supplying and thinning.		Supply seeds or seedlings and thin seedlings.	Guide students to thin and supply seeds where necessary.	Seeds, containers, compost and growing chambers.
General Objective: 5.0 Understand and practise successful weed control in crop production.				Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	5.1 Have a basic understanding of the definition and classification of weeds. 5.2 Identify some common weeds within the ecological zone. 5.3 Appreciate the effects of weeds on growing crops.	Introduce the range of weeds in Nigeria and explain their importance.	LCD projector Slide projector White board Markers. Laptop computers.	Field identification and classification of weeds.	Guide students to identify and classify weeds. Students should make a weed album.	Weed identification textbooks and standard weed album.
10	5.4 Understand how weeds can be controlled. 5.5 Know the different generic types of herbicides.	Explain how weeds are controlled by chemical and	LCD projector Slide projector White board Markers. Laptop computers.	Identify different types of herbicides and calibrate herbicide application	Guide students to identify herbicides and calibrate herbicide and	Herbicides containers, spraying equipment, spraying

	5.6 Identify common manufactured herbicides in use and apply them to crops.	non-chemical methods.		equipment and machinery.	application equipment and machinery.	machinery, tractors.
	General Objective: 6.0 Understand the principles and practices of manuring and fertilising.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	6.1 Know the objectives of manuring and fertilizing. 6.2 Identify the different types of manure and fertilizer in use. 6.3 Prepare some manures like compost and farm yard manures.	Explain the objectives of manuring and describe the different types of manure in use.	LCD projector Slide projector White board Markers. Laptop computers.	Identify the different types of manures and fertilizers. Prepare compost.	Guide students to identify different manures and fertilizers. Guide students to make compost.	Inorganic fertilizers Sheep and goat manure, cow dung, poultry litter, pig litter. Grass, water, ash, compost pit.
12	6.4 Understand the time and rate of application of manures and fertilizers. 6.5 Recognize and understand the following terminologies:- i. fertilizer ratio; ii. fertilizer rate; iii. active nutrients. 6.6 Appreciate the importance of nutrient elements found in manures and fertilizers.	Explain time and rate of manure and fertilizer application. Define manure ratio and fertilizer rate. Help students to calculate nutrient content of fertilizers and	LCD projector Slide projector White board Markers. Laptop computers.	Apply manures and fertilizers.	Assist students to apply manures and fertilizers.	Fertilizer, manures and application machinery.

	6.7 Understand the methods used to apply manures and fertilizers on crops.	manures. Describe application methods.				
	General Objectives: 7.0 Understand the principles and practices of crop protection.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	7.1 Understand the terms pests and diseases in relation to crop production. 7.2 List the common pests and diseases of crops in the field and in storage. 7.3 Identify some common pests and diseases of field crops. 7.4 Appreciate the effects of these pests and diseases on field crops and stored products.	Define pest and disease and list common pest and diseases of crops. Describe physical and economic effects of pest and diseases.	LCD projector Slide projector White board Markers. Laptop computers.	Identify common pests and diseases of field crops and stored products.	Guide students to identify common pest and diseases of field crops and stored products.	Pests and disease albums
14	7.5 Know which pest control measures should be adopted both in the field and storage especially biological, chemical and integrated methods. 7.6 Understand the advantages and disadvantages of various pest and disease control measures.	Explain time of application of pesticides and the advantages and disadvantages of pest and disease control methods.	LCD projector Slide projector White board Markers. Laptop computers.	Practise pest and disease control measures.	Guide students to perform pest and disease control measures.	Pesticides and application machinery. Crops.
	General Objective: 8.0 Understand the principles and practices of harvesting, storage and product handling.			Practical Contents:		

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
15	8.1 Understand the concept of 'harvesting'. 8.2 List the factors guiding harvesting time. 8.3 Identify harvesting tools and equipment. 8.4 Know the procedures for transporting and storing and preserving harvested products. 8.5 Know the procedures for primary processing of freshly harvested products. 8.6 Identify agricultural products preservation structures e.g. cribs rhombus barns, silos etc.	Define harvesting and factors guiding harvest timing. Explain harvest methods and machinery. Explain how crops are safely transported and stored, short and long term. Explain primary processing.	LCD projector Slide projector White board Markers. Laptop computers.	Identify harvesting tools and equipment. Carry out harvesting of named field or tree crop. See practical successful storage systems.	Guide students to identify harvesting tools and carry out harvesting operation. Accompany students to see crop storage.	Cutlasses, hoes, threshers, combine harvesters. Suitable visit venues.

Suggested assessment:

3 in-class test @ 20% each = 60%
 2 short projects @ 20% each = 40%

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 112 - Elements of Agricultural Economics

DURATION: 30 Hours (2 Hour Lectures)

UNITS: 2.0

GOAL: This course is designed to give the students a good background in basic economic principles as applicable to agriculture.

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GENERAL OBJECTIVES:

On completion of this course the student should be able to:-

- 1.0 Know the meaning of economics as applied to agriculture.
- 2.0 Understand demand and supply in economics.
- 3.0 Know the determination of market price.
- 4.0 Know the principles and application of elasticities.
- 5.0 Know the theory and application of the concept of production function.
- 6.0 Know the various types of costs and revenue.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: ELEMENTS OF AGRICULTURAL ECONOMICS	COURSE CODE: AGT 112	CONTACT HOURS: 30 HRS

GOAL: This course is designed to give the students a good background in basic economic principles as applicable to agriculture						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Know the meaning of economics as applied to agriculture.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Understand the concepts of economics and agricultural economics.	Define economics and explain agricultural economics.	LCD projector Slide projector White board Markers.			
	1.2 Understand the relationship between economics and other social sciences.	Explain the relationship between economics and other social sciences.	Laptop computers.			
	1.3 Identify and understand economic problems.	Identify and explain economic problems.				
2	1.4 Be aware of the concepts of scarcity, choice.	Define the concepts of scarcity, choice.	LCD projector Slide projector White board Markers.			
	1.5 Understand the relationships between such concepts as scarcity, choice, opportunity cost etc.	Explain the relationships between such concepts as scarcity, choice, opportunity cost etc.	Laptop computers.			

	General Objective: 2.0 Understand demand and supply in economics.					
3	2.1 Understand demand and the law of demand.	Explain demand and state the law of demand.	LCD projector			
	2.2 Understand the mathematical and diagrammatic representation of demand.	Illustrate demand with diagrams and equations.	Slide projector			
	2.3 Understand the factors affecting the demand for a commodity.	Explain the factors affecting the demand for a commodity.	White board			
4	2.4 Understand the relationship between change in the level of demand and movement along the demand curve.	Explain the relationship between change in the level of demand and movement along the demand curve.	Markers.			
	2.5 Understand the different types of demand.	Explain the different types of demand.	Laptop computers.			
5	2.6 Understand supply and the law of supply.	Explain supply and state the law of supply.				
	2.7 Understand the mathematical and diagrammatic representation of supply.	Illustrate supply with diagrams and equations.	LCD projector			
6	2.8 Understand the factors affecting the	Explain the factors affecting the supply of a commodity.	Slide projector			
			White board			
			Markers.			
			Laptop computers.			
			LCD projector			

	<p>supply of a commodity.</p> <p>2.9 Understand the relationship between change in the level of supply and movement along the supply curve.</p> <p>2.10 Understand the different types of supply.</p>	<p>Explain the relationship between change in the level of supply and movement along the supply curve.</p> <p>Explain the different types of supply.</p>	<p>Slide projector</p> <p>White board</p> <p>Markers.</p> <p>Laptop computers.</p>			
	General Objective: 3.0 Know the determination of market price.					
7	3.1 Know the relationship between the forces of demand and supply in a free market economy.	Explain the relationship between the forces of demand and supply in a free market economy.	LCD projector			
	3.2 Understand the effect of demand being greater, smaller or equal to supply.	Illustrate the effect of demand being greater, smaller or equal to supply.	Slide projector			
8			White board			
			Markers.			
			Laptop computers.			
	3.3 Determine equilibrium price from simultaneous linear equations.	Show how to determine equilibrium price from simultaneous linear equations.	LCD projector			
9			Slide projector			
			White board			
			Markers.			
			Laptop computers.			
		Explain the principle of price control.	LCD projector			

	3.4 Know the principle of price control. 3.5 Understand why prices of agricultural products fluctuate more than those of manufactured goods.	Explain why prices of agricultural products fluctuate more than those of manufactured goods.	Slide projector White board Markers. Laptop computers.			
	General Objective: 4.0 Know the principles and application of elasticities.					
10	4.1 Understand price elasticities of demand and supply, cross-elasticity of demand. 4.2 Compute the various values of elasticities from simple tables and information. 4.3 Draw the various coefficients with appropriate diagrams.	Explain price elasticities of demand and supply, cross-elasticity of demand. Show how to compute the various values of elasticities from simple tables and information. Explain how to draw the various coefficients with appropriate diagrams.	LCD projector Slide projector White board Markers. Laptop computers.			
11	4.4 Know various values of elasticities of price income and cross elasticities of demand. 4.5 Comprehend the importance of both elasticities of demand and supply as related to agriculture.	Explain various values of elasticities of price income and cross elasticities of demand. State the importance of both elasticities of demand and supply as related to agriculture.	LCD projector Slide projector White board Markers. Laptop computers.			

	General Objective: 5.0 Know the theory and application of the concept of production function.					
12	5.1 Understand the concept of “factors of production”. 5.2 Know the meaning of production function. 5.3 Distinguish between the curves of the production function.	Explain the concept of “factors of production”. Explain the meaning of production function. Explain the difference between the curves of the production function.	LCD projector Slide projector White board Markers. Laptop computers.			
13	5.4 Comprehend the different stages of production. 5.5 Understand the principles and application of the law of diminishing returns.	Illustrate graphically and in tabular forms the different stages of production. Explain the principles and application of the law of diminishing returns.	LCD projector Slide projector White board Markers. Laptop computers.			
	General Objective: 6.0 Know the various types of costs and revenue.					
14	6.1 Know the meaning of costs and revenue.	Define costs and revenue. Explain how to categorize cost into	LCD projector Slide projector White board Markers.			

15	6.2 Know how to categorize cost into fixed, average variable etc.	fixed, average variable etc. Explain how to categorize revenue into total, average and marginal etc. Show how to compute cost revenue and profit in tabular forms.	Laptop computers.			
	6.3 Know how to categorize revenue into total, average and marginal etc.		LCD projector Slide projector White board Markers.			
	6.4 Compute cost revenue and profit in tabular forms.	Illustrate costs, revenue and profit with diagrams.	Laptop computers.			
	6.5 Know how to represent costs, revenue and profit with diagrams.					

	Program:	Course code: COM001		Contact hours: 3 hours/week
	Subject/Course: Computer Applications 1			Theoretical: 0 hours/week
	Year: 1 Semester: 1	Pre-requisite:	None	Practical: 3 hours/week

General Objectives

1. Understand computer basics and use the operating system.
2. Use a word processing package.
3. Use a spreadsheet package(Excel).

	Department:	Course code: G103	Contact hours: 3 hours/week
	Subject/Course: Computer Applications 1		Theoretical: 0 hours/week
	Year: 1 Semester: 1	Pre-requisite: None	Practical: 3 hours/week

General Objective1: To understand computer basics and to use the operating system						
	Theoretical contents			Practical contents		
Week/s	Specific learning outcomes	Teacher's activities	Resources	Specific learning outcomes	Teacher's activities	Resources
1				Identify <ul style="list-style-type: none"> • What is computer . • Computer system • How a computer works • Hardware. • Software • Software application 	Explain: What is a software What is an operating system. To be able to use: the desktop icons the taskbar the start menu	Networked PC Lab Appropriated operating system Appropriated exercises stored on each PC Internet access Smart board/ white board

4				Know how to: Navigate to different drives and folders and drives Use windows explorer to manage folders. Use windows explorer to manage files.	Demonstrate: How to navigate to different folders and drives How to create select, , delete, , rename, move, copy a folder. How to create select, , delete, restore, rename, move, copy a files. Use the search command to look for specific files.	Networked PC Lab Appropriated operating system Appropriated exercises stored on each PC Internet access Smart board/ white board
General Objective2: To use correctly a word processing package.						
2				Know how to: Start / End the applications. Identify the main parts of word processing applications.	Demonstrate: How to Start/End an application. main part of the word processing software	Networked PC Lab Word processing packages Appropriated exercises stored on each PC Internet access Smart board/ white board

3				<p>Know how to Format a document</p> <p>Format characters</p> <p>Format paragraphs</p> <p>Type and edit a short text</p> <p>Copy move blocs of text.</p> <p>Find and replace a text</p> <p>Save the document.</p>	<p>Demonstrate: How to open and close one or several documents. How to switch between open documents How to create a new document (based on default or other available template). How to save document to a location on a drive. How to save the document with different format. TXT, HTML</p>	<p>Networked PC Lab</p> <p>Word processing packages</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>
5				<p>Know how to Prepare the document</p>	<p>Demonstrate: How to edit a document, typing, inserting text, selecting text, inserting additional text, rearranging blocks of text, deleting blocks of text, search and replace text ,undo changes, formatting text, styles, change font typeface and size, font styles and effects, change text colour, highlight text ,copy formatting, clear formatting, formatting paragraphs, indent paragraph.</p>	<p>Networked PC Lab</p> <p>Word processing packages</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>

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6				Know how to handle Graphics	Demonstrate: Symbols, special characters, equations, illustrations, pictures, smartart, resize graphics	<p>Networked PC Lab</p> <p>Word processing packages</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>
7				Know how to Create and use table efficiently. Insert, edit data in a table.	<p>Demonstrate: Inserting a table. Inserting, editing data in a table. Selecting rows, columns, cells, entire table. Inserting, deleting, rows and columns. Modifying column with, row height. Modifying cell borders and shadings.</p>	<p>Networked PC Lab</p> <p>Word processing packages</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>
8				Know how to: Proofread a document, spelling	Demonstrate: Proofreading a document, spelling and grammar ,	Networked PC Lab

				and grammar , thesaurus, customize autocorrect, create a new default dictionary, check word count, page formatting, modify page margins and orientations ,apply a page border and colour, insert common header and footer information , create a page break.	thesaurus, customize autocorrect, create a new default dictionary, check word count, page formatting, modify page margins and orientations ,apply a page border and colour, insert common header and footer information , create a page break.	Word processing packages Appropriated exercises stored on each PC Internet access Smart board/ white board
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General Objective3: To use correctly a Spreadsheet g package.(Excel)						
9				<p>Know how to:</p> <p>Start stop the Excel application</p> <p>Identify different elements of Excel</p> <p>Create, Save, Open and Close a worksheet.</p> <p>Work with cells, rows and columns..</p>	<p>Demonstrate:</p> <p>How to start and stop the application</p> <p>To show:</p> <p>The different elements of a spreadsheet application</p> <p>To demonstrate:</p> <p>How to move around he worksheet using the mouse and using the keyboard</p> <p>Enter samples of data into a cell</p> <p>Create a new spreadsheet using the default template,</p> <p>Save, Open and Close an Excel.</p> <p>Select a cell, a range of adjacent cells, a range of non-adjacent cells, Entire rows, Entire columns Entire worksheet.</p> <p>Insert /Delete rows, columns in a worksheet.</p> <p>Modify column widths, row heights.</p>	<p>Networked PC Lab</p> <p>Excel Package</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>
				Know how to:	Demonstrate:	

10				<p>Enter different types of data</p> <ul style="list-style-type: none"> • text • numbers • date • time <p>Format data and present them correctly</p>	<p>Enter different types of data</p> <p>Edit and modify the content of a cell</p> <p>Move, copy, Delete, the content of a cell (within a worksheet or between worksheets),</p> <p>Use the auto fill facilities to fill a rang cells with numbers, dates, days</p> <p>Format cells to display numbers to a specific number of decimal places.</p> <p>to display numbers with, without commas to indicate thousands.</p> <p>Format cells to display date style.</p> <p>Format cells to display a currency symbol.</p> <p>Format cells to display numbers as percentages.</p> <p>Change cell content appearance: font sizes, font types and colour.</p> <p>Apply formatting to cell contents such as: bold, italic, underline, double underline.</p>	<p>Networked PC Lab</p> <p>Excel package</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board</p>
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11				<p>Know how to Format cell by applying colours borders and alignments.</p>	<p>Demonstrate: How to Apply different colours to cell content, cell background. Copy the formatting from a cell, cell range to another cell, cell range. Apply text wrapping to contents within a cell. Align contents in a cell, cell range: left, centre, right, top, bottom. Centre a title over a cell range. Adjust cell content orientation. Add border effects to a cell, cell range.</p>	<p>Networked PC Lab</p> <p>Excel package</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p> <p>Smart board/ white board /</p>
12				<p>Know how to Generate formulas using cell references and arithmetic operators.</p>	<p>Demonstrate How to Work with a workbook ,save a workbook, open a workbook, entering data.</p>	<p>Networked PC Lab</p> <p>Excel package</p> <p>Appropriated exercises stored on each PC</p> <p>Internet access</p>

						Smart board/ white board
13				Know how to Generate formulas using standard functions.	<p>To demonstrate: How to Generate formulas using standard functions such as sum, average, minimum, maximum, count, functions.</p> <p>How to the insert function wizard to generate a formulas that implements t</p>	<p>Networked PC Lab Excel package Appropriated exercises stored on each PC Internet access Smart board/ white board</p>
14				Know how to Create a chart using Autosum, linking work sheets, sort and filter..	<p>Demonstrate: How to Use Autosum, linking work sheets, sort and filter..</p>	<p>Networked PC Lab Excel package Appropriated exercises stored on each PC Internet access Smart board/ white board /</p>
15				Know how to: Format a chart Add a title, label to the chart/graph. Remove a title, label from the chart/graph	<p>Demonstrate how to: Format a chart Add a title, label to the chart/graph. Remove a title, label from the chart/graph</p>	<p>Networked PC Lab Excel package Appropriated exercises stored on each PC</p>

				Change the chart/graph type Change the background colour in a chart/graph. Change the column, bar, line, pie slice colours in the chart/graph. Duplicate, move charts/graphs within a worksheet, between open spreadsheets. Resize, delete charts/graphs.	Change the chart/graph type Change the background colour in a chart/graph. Change the column, bar, line, pie slice colours in the chart/graph. Duplicate, move charts/graphs within a worksheet, between open spreadsheets. Resize, delete charts/graphs.	Internet access Smart board/ white board /
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ASSESSMENT (%)					
	Continuo us	Mid Semeste r	End Semeste r	Total	
Practica l	20	20	60		100

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 115 – Introduction to Agricultural Marketing

DURATION: 30 Hours (2 Hour Lectures)

UNITS: 2.0

GOAL: This course is designed to give the students a good background in basic marketing principles as applicable to agriculture.

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GENERAL OBJECTIVES:

On completion of this course the student should be able to:-

- 7.0 Understand the basic concepts and processes of marketing.
- 8.0 Understand the fundamental concepts of segmentation, targeting and positioning.
- 9.0 Identify and understand the individual elements of the extended marketing mix.
- 10.0 Apply the marketing mix to different agricultural market segments and contexts.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: INTRODUCTION TO AGRICULTURAL MARKETING			COURSE CODE: AGT 115		CONTACT HOURS: 30 HRS	
GOAL: This course is designed to give the students a good background in basic marketing principles as applicable to agriculture						
COURSE SPECIFICATION:					Practical Contents:	
	General Objective: 1.0 Understand the basic concepts and processes of marketing.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Be aware of the alternative definitions of marketing and understand the terminology of marketing e.g. customers, consumers, needs, wants, value, satisfaction, exchange relationships.	Describe and explain the alternative definitions of marketing and introduce students to the terminology of marketing.	LCD projector Slide projector White board Markers. Laptop computers.			
2	1.2 Understand the evolution of agricultural marketing and how successful businesses have adopted the concept.	Explain how marketing has evolved and how businesses use marketing to achieve successful profitability.	LCD projector Slide projector White board Markers. Laptop computers.			
3						

4	1.3 Have an overview of the marketing process including audit, integration, SWOT analysis, setting objectives, constraints and scope.	Give students an overview of how businesses plan their marketing need and strategies.	LCD projector Slide projector White board Markers. Laptop computers.			
	1.4 Know the benefits and costs of a marketing approach to rural business including customer satisfaction, customer care and retention, customer profitability and total quality marketing.	Explain how marketing can benefit businesses and show students how to cost their marketing efforts.	LCD projector Slide projector White board Markers. Laptop computers.			
	General Objective: 2.0 Understand the fundamental concepts of segmentation, targeting and positioning.					
5	2.1 Identify and understand the macro (political, legal, cultural, economic, ecological, ethical and technological) and micro (employees, suppliers, customers, financiers, pressure groups and	Help students to understand and evaluate those factors which affect the marketing strategy of a business.	LCD projector Slide projector White board Markers. Laptop computers.			

6	competitors) factors which influence agricultural marketing decisions. 2.2 Understand the dimensions of buyer behaviour and the factors which affect it e.g. demographics, psychology, wealth, motivation, lifestyle etc.	Explain how buyers and consumers behave in the marketplace and why.	LCD projector Slide projector White board Markers. Laptop computers.			
7	2.3 Understand the process of market selection, targeting strategies, positioning, macro and micro segmentation.	Discuss with students the phenomenon of market segmentation.	LCD projector Slide projector White board Markers. Laptop computers.			
	General Objective: 3.0 Identify and understand the individual elements of the extended marketing mix.					
8	3.1 Know the concepts of the 4P and 7P market mixes. Understand the meaning of products and brands, product mix, product life-cycle and product development.	Give an overview of the 'marketing' and 'extended marketing' mix and explain how "products" are developed and sold.	LCD projector Slide projector White board Markers. Laptop computers.			

9	3.2 Understand the concept of “place”, customer convenience and availability, distribution systems, management and logistics.	Introduce the concept of “place” and discuss with students its importance.	LCD projector Slide projector White board Markers. Laptop computers.			
10	3.3 Know how to set prices for goods by considering perceived value, demand elasticity, competition, costs of production, psychology of purchase and social responsibility.	Explain and discuss the concept of “price” and how it is used in marketing to achieve profit.	LCD projector Slide projector White board Markers. Laptop computers.			
11	3.4 Know how to promote products by using a mix of elements such as advertising and packaging, promotions, public relations, direct marketing, personal selling, branding, internet marketing etc.	Help students understand the concept of “promotion” and discuss the different options available to a rural business.	LCD projector Slide projector White board Markers. Laptop computers.			
12	3.5 Understand the additional elements of the marketing mix i.e. the	Introduce students to the latest ‘extended				

	product-service continuum, people, physical evidence and process management.	marketing mix' theory in more detail.	LCD projector Slide projector White board Markers. Laptop computers.			
	General Objective: 4.0 Apply the marketing mix to different agricultural market segments and contexts.					
13	4.1 Understand the national consumer markets for agricultural produce and how to tailor the marketing mix to suit each sector.	Explain what consumer markets are available for agricultural produce and services.	LCD projector Slide projector White board Markers. Laptop computers.			
14	4.2 Be aware of other markets such as organizational and service markets e.g. Governments, industrial, non-profit making, service users, service products and quality.	Explain what other markets are available and how they differ from fast moving consumer markets.	LCD projector Slide projector White board Markers. Laptop computers.			
15	4.3 Understand the importance of international markets on agricultural products and services. Globalization,	Explain the concept of globalization, international markets, export management, price influences etc.	LCD projector Slide projector White board Markers.			

	international marketing strategies.		Laptop computers.			
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Suggested assessment:

2 multiple choice exams @ 50% each = 100%

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 113 - Introduction to Soil Science

DURATION: 60 HOURS (2 Hours Lectures, 2 Hours Practicals)

UNITS: 4.0

GOAL: To acquaint students with the origin, properties and characteristics of farm soils.

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:

1.0 Understand rocks and minerals as parent materials of soils.

2.0 Understand the physical characteristics of soils.

- 3.0 Understand chemical properties of soils.**
- 4.0 Understand soil characteristics.**
- 5.0 Understand soil moisture and its importance.**
- 6.0 Understand soil organic matter and its importance**
- 7.0 Understand soil organisms and their impact on nature of soils.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE: INTRODUCTION TO SOIL SCIENCE		COURSE CODE: AGT 113			CONTACT HOURS: 60 HOURS (2 hrs lectures: 2 hrs practicals)	
GOAL: To acquaint students with the origin, properties and characteristics of farm soils.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand rocks and minerals as parent materials of soils.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 List the different types of rocks and state their origin (i) Igneous rock (ii) Sedimentary rock (iii) Metamorphic rock	Explain soil formation and different types of rock.	LCD projector Slide projector White board Markers. Laptop computers.	1.1 Identify common types of rocks and their minerals constituents 1.2 Draw different rock samples	Initiate a walking trip.	Rock and Soil samples.

				1.3 Describe types of rock		
2	1.2 Understand the processes of weathering (i) Physical weathering (ii) Chemical weathering (iii) Biological Weathering	Explain the processes of weathering and its agents.	LCD projector Slide projector White board Markers. Laptop computers.	See examples of weathering of rocks.	Accompany students on field trip.	Suitable visit venues.
General Objective: 2.0 Understand the physical characteristics of soils.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Understand the definition of soil. Know soil characteristics and how they affect soil fertility. 2.2 Understand the meaning of soil texture, its importance, and the different textural classes of soils.	Define and explain its characteristics. Discuss soil texture and its importance - Explain textural triangle - emphasize the importance of soil structure and describe.	LCD projector Slide projector White board Markers. Laptop computers.	- Identify different types of soil - Identify different textural classes. - Identify soil as a material source. - Understand the different types of soil structure.	- Show different types of soil - Show different textural classes. - Explain soil as a material source. - Demonstrate the different types of soil structure.	Soil Samples
4	2.3 Learn about soil structure and explain its importance	- Discuss the significance of air, water and temperature in the soil. - Guide students to				

5	<p>2.4 Know about the different ways of improving soil structure</p> <p>2.5 Understand clay, sand and silt and their properties.</p> <p>2.6 Appreciate the significance of air, and water in the soil.</p> <p>2.7 Understand soil depth and its importance in soil nutrient supply.</p>	<p>know ways of improving soil structure.</p> <ul style="list-style-type: none"> - Differentiate Between sand, silt and clay. - Demonstrate soil depth. 	<p>LCD projector Slide projector White board Markers. Laptop computers.</p>	<p>- Understand the differences between sand, silt and clay.</p> <p>Draw different textural classes</p>	<p>- Demonstrate the differences between sand, silt and clay. Show different textural Classes.</p>	<p>Soil Samples</p>
	General Objective: 3.0 Understand chemical properties of soils.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6	<p>3.1 Know about soil colloids and basic principles of ionic exchange.</p> <p>3.2 Understand the importance of cation exchange</p>	<p>Explain to students soil colloidal properties cation exchange, soil aeration and porosity.</p>	<p>LCD projector Slide projector White board Markers. Laptop computers.</p>	<p>Learn how to carry out acidity tests.</p>	<p>Guide the students on how to test alkaline and acidic soil Explain to students soil colloidal properties, cation exchange, soil</p>	<p>Soil samples. pH meter Conductivity Meter</p>
7	<p>3.3 Understand the importance of soil aeration</p> <p>3.4 Enumerate the effects of acidity on soils</p>	<p>Explain soil acidity, its causes and how it affects crop productivity. Explain how soil acidity can</p>				

8	3.5 List the characteristics of alkali soils 3.6 List the effects of alkalinity on soils 3.7 Understand the importance and methods of liming 3.8 Know about saline soils. 3.9 Understand how soil salinity affects nutrient availability 3.10 Appreciate the impact of liming on soil acidity and nutrient availability to crops.	be prevented and cured. - Define and explain the causes of saline soil. - Enumerate soil nutrient availability as affected by salinity - Enumerate soil nutrient availability as affected by liming.	LCD projector Slide projector White board Markers. Laptop computers.	Differentiate between saline and acidic soil by carrying out soil tests.	aeration and porosity. Differentiate between saline and acidic soils. Guide the students on how to test alkaline and acidic soils	Soil samples. pH meter Conductivity meter.
	General Objective: 4.0 . Understand soil characteristics.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	4.1 Understand soil characteristics influencing plant nutrition	Explain the most important soil characteristics influencing plant growth e.g. organic matter.	LCD projector Slide projector White board Markers. Laptop computers.	See plants growing in different soil types.	Demonstrate plants growing in different soil types.	Plants and soils.

	General Objective: 5.0 Understand soil moisture and its importance.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	5.1 Learn about soil moisture 5.2 List the different types of soil moisture 5.3 Identify available forms of soil moisture and the unavailable forms.	Discuss soil moisture in relation to plant nutrition, Define soil moisture. Discuss the different forms of soil moisture.	LCD projector Slide projector White board Markers. Laptop computers.	Illustrate the importance of soil moisture on nutrients availability to crops by simple experiment. See the effects of soil water and air using samples and the addition of water to demonstrate waterlogging, saturation, field capacity etc.	Guide the students on how to carry out simple experiment in soil moisture and nutrients availability Demonstrate waterlogging, saturation, field capacity etc.	Soil sample, seed of crops, water ,fertilizer. Soil samples, water supply.
	General Objectives: 6.0 Understand soil organic matter and its importance.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	6.1 State the origin of soil organic matter 6.2 List the factors affecting the quality	Describe different types of soil organic matter. Describe factors	LCD projector Slide projector White board Markers.	Prepare compost and farmyard manure.	Demonstrate compost and farmyard manure	- plant matter - ash - water

12	and quantity of organic matter in the soil. 6.3 List and describe the common types of organic matter viz: (i) Green manure (ii) Farm yard manure (iii) Compost	affecting the quality and quantity of organic matter.	Laptop computers.		preparation.	- spade - digger.
	6.4 Know about the nature and characteristics of humus	Explain the concept of the different types of humus in soils.	LCD projector Slide projector White board Markers.	See the effects of soil organic matter on soil properties such as workability, moisture retention etc.	Demonstrate the effects of soil organic matter on soil properties such as workability, moisture retention etc.	Soil samples.
	6.5 Understand the effect of organic matter on soil properties	Discuss the effect of organic matter on soil properties.	Laptop computers.			
	General Objective: 7.0 Understand soil organisms and their impact on nature of soils.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	7.1 Know the macro-fauna of the soil: Earthworms, squirrels and rodents (mammals). Snakes, termites, crickets etc.	List the different soil organisms and discuss their importance to soil ecology.	LCD projector Slide projector White board Markers. Laptop computers.	Learn how to identify soil macrofauna.	Demonstrate how to identify soil macrofauna.	Macrofauna samples.

14	7.2 Understand the functions of the micro-fauna of the soil e.g. nematodes, and the problems they can cause.	Discuss the types and functions of soil microfauna.	LCD projector Slide projector White board Markers. Laptop computers.	Learn how to identify soil microfauna.	Demonstrate how to identify soil microfauna.	Microfauna samples.
15	7.3 List and describe macroflora of the soils. 7.4 List micro-flora of the soils: Bacteria\Algae Fungi\Actinomycetes and appreciate their function.	Describe micro and macro flora found in the soil and explain their function.	LCD projector Slide projector White board Markers. Laptop computers.	Learn how to identify soil macro and micro flora.	Demonstrate how to identify soil macro and micro flora.	Macro and micro flora samples.

Suggested assessment:

5 in-class or practical tests @ 20% each = 100%

ND I SECOND SEMESTER

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 129 - Industrial Crop Production I

DURATION: 60 Hours (2 Hours Lectures, 2 Hours Practicals)

UNITS: 4.0

GOAL: This course is designed to acquaint students with the agronomy and Agro-techniques of different types of Industrial crops.

GENERAL OBJECTIVES:

On completion of this course the student should be able to:

- 1.0 Identify different types of industrial crops.
- 2.0 Identify areas of production of various industrial crops.
- 3.0 Understand the botany, of important industrial crops.
- 4.0 Understand the production techniques of industrial crops in Nigeria.
- 5.0 Understand the production cycle of major industrial crops in Nigeria.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: INDUSTRIAL CROP PRODUCTION I			COURSE CODE: AGT 129		CONTACT HOURS: 60 Hours (2 Hrs Lectures: 2 Hrs Practicals)	
GOAL: This course is designed to acquaint students with the agronomy and Agro-techniques of different types of Industrial crops.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Identify different types of industrial crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Identify the following Industrial crops cotton Jatropha, Jute, Kenaf,	Describe the crops in 1.1	White board, markers, slide and LCD	Identify the following industrial crops	Guide students to identify the following	Samples of crops and products.

	Sisal, Sweet Sorghum, Sugar cane, Tobacco etc. 1.2 Understand the origin and history of each crop in 1.1 above. 1.3 Understand their adaptation to Nigerian climatic conditions.	Explain the origin and history of each crop in 1.1. Explain their adaptation to Nigerian climatic conditions.	projectors, laptop computers.	cotton Jatropha, Jute, Kenaf, Sisal, Sweet Sorghum, Sugar cane, Tobacco etc. and their economic products .	industrial crops cotton Jatropha, Jute, Kenaf, Sisal, Sweet Sorghum, Sugar cane, Tobacco etc.	
WEEK	General Objective: 2.0 Identify areas of production of various industrial crops					
2	2.1 Identify producing areas of the various industrial crops. 2.2 Compare figures for: i. main producing areas ii. marginal areas. 2.3 Know the production trends of the main industrial crop producing areas in Nigeria.	Discuss and identify producing areas of the various industrial crops. Discuss and compare figures for: i. main producing areas ii. marginal areas.	White board, markers, slide and LCD projectors, laptop computers.	See commercial crops being grown.	Accompany students.	Suitable visit venues.
WEEK	General Objective: 3.0 Understand the botany of important industrial crops.					
3 and 4	3.1 Understand the botany of each industrial crop listed in 1.1 above under the following heading: i. taxonomy ii. morphology iii. anatomy	Describe the botany of each industrial crop listed in 1.1 above under the following heading:	White board, markers, slide and LCD projectors, laptop computers.	Botany of Industrial crops	Explain practically the botany of each industrial crop	Samples. Hand lenses.

5	iv. structural forms of fruits and seeds. 3.2 Know the varieties of industrial crops in 1.1 above. Identify improved and recommended varieties of the crops in 1.1 above.	i. taxonomy ii. morphology iii. anatomy iv. structure and forms of fruits and seeds. List the types of varieties of industrial crops in 1.1 above. Discuss varietal improvement and quality enhancement.		Identify varieties of industrial crops	Assist students to identify varieties of industrial the crops	Samples.
WEEK	General Objective: 4.0 Understand and explain the production techniques of industrial crops in Nigeria.					
6	4.1 Understand the following cultivation practices for industrial crop production: i nursery preparation ii. planting date, spacing, 7 iii. use of poly pots in the nursery. iv. nursery management practices e.g. weeding, shading, watering etc. 8	Describe the cultural practices for industrial crops as at 4.1.	White board, markers, slide and LCD projectors, laptop computers.	Watch and carry out cultural practices for industrial crops over 6 weeks to match lecture program.	Show and demonstrate cultural practices for industrial crops over 6 weeks to match lecture program.	College Farms, plants, implements, sprays, relevant machinery.

<p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p>	<p>v. site selection .vi .land preparation vii. Marking- out and planting. vii .Cultural management practices; ,including. pruning [objectives and methods] principles of crop protection: ix weed control: x .manuring and fertilizer application. Mulching: xi. Pruning of diseased branches of some industrial crops. 4.2 Carry out spraying of chemicals of different types and rates on different types of diseases and pests of industrial crops. 4.3 Understand harvesting, farm-level processing techniques, grading and marketing of processed produce.</p>					
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	4.4 Maintain implements for harvesting,					
WEEK	General Objective: 5.0 Understand the production cycle of major industrial crops in Nigeria.					
14	5.1 Describe the life cycle of major industrial crops e.g. cotton Jatropha, Jute, Kenaf, Sisal, Sweet Sorghum, Sugar cane, Tobacco etc.	Discuss the life cycle of major industrial crops e.g. cotton Jatropha, Jute, Kenaf, Sisal, Sweet Sorghum, Sugar cane, Tobacco etc.	White board, markers, slide and LCD projectors, laptop computers.	See in practice the life and production cycles of crops in 5.1	Accompany students.	Suitable visit venues.
15	5.2 Appreciate the yield capacity and profitability of the major industrial crops in 5.1.	Discuss the yield potential and profitability of major industrial crops.				

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 121 - Annual Crops

DURATION: 45 Hours (2 Hours Lectures, 1 Hour Practical)

UNITS: 3.0

GOAL: This course is designed to acquaint students with the agronomy and agro-techniques of different types of annual crops.

GENERAL OBJECTIVES:

On completion of this course the student should be able to:

- 1.0 Understand the general classification, identification and botany of important annual crops.
- 2.0 Understand the origin and geographical distribution of annual crops.
- 3.0 Understand the factors affecting crop production.
- 4.0 Understand the management of annual crops after planting.
- 5.0 Understand weeds, insect pests and diseases of annual crops.
- 6.0 Understand the harvesting procedures of annual crops.
- 7.0 Understand the handling, processing and storage of harvested annual crops.
- 8.0 Understand pasture and forage agronomy.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE TITLE: ANNUAL CROPS	COURSE CODE: AGT 121	CONTACT HOURS: 45 HOURS (2 hrs lectures: 1 hr practical)
GOAL: This course is designed to acquaint students with the agronomy and agro-techniques of different types of annual crops.		

COURSE SPECIFICATION:						
	General Objective: 1.0 Understand the general classification, identification and botany of important annual crops.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Understand the difference between an annual crop and a tree crop. 1.2 Identify some annual crops like maize, rice, cowpea, groundnut, cassava, yam, potato, sorghum and millet, soyabean, wheat etc. 1.3 Understand the basis for the agricultural classification of crops 1.4 Classify agricultural crops into <ul style="list-style-type: none"> - cultivated plants; - wild plants. 1.5 Classify plants according to duration of growth: <ul style="list-style-type: none"> - annuals - biennials - perennials 1.6 Classify crops based on mode of production <ul style="list-style-type: none"> - Field cash crops - Forage crops - Horticultural crops 	Explain the term annual crop and differentiate it from other crops. Classify and explain the basis for classifying crops.	LCD projector, white board, markers, laptop computers.	Identify annual crops botanically based on structure and forms	Guide students to identify annual crops based on structure and forms.	Seeds, fruits, seedlings and fully grown annual plants

2	<ul style="list-style-type: none"> - Plantation crops. <p>1.7 Classify crops on the basis of use.</p> <ul style="list-style-type: none"> - cereals (rice, sorghum, maize, millet etc) - grain legumes (cowpea, soyabeans, groundnuts) - root and tuber crops (cassava, sweet potato) - sugar crops (sugar cane) - fibre crops (hemp, kenaf) - vegetable (spinach, water leaves). <p>1.8 Understand the botany of each crop under 1.7 above.</p> <p>1.9 Know the botanical names of the crops in 1.7 above.</p> <p>1.10 Recognise the structure and forms of the crops in 1.7 above.</p> <p>1.11 Identify seed, seedling, fruits, storage organs and other essential parts of the major annual crops in 1.7 above.</p>	Explain the botany, structure and forms of annual crops and their botanical names.	LCD projector, white board, markers, laptop computers.	Identify the various annual crops. Identify various crops based on their culture, growth period, production, and uses.	Guide students to identify some annual crops.	Seeds, fruits, seedlings and fully grown annual plants.
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	General Objective: 2.0 Understand the origin and geographical distribution of annual crops.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Know of the origin and geographical distribution of annual crops listed in 1.7 above.	List and explain the various ecologies and how crops are distributed across ecologies.	LCD projector, white board, markers, laptop computers.	See crops growing in different geographical/ecological areas of the country.	Accompany students on field trip.	Suitable visit venues.
4	2.2 Identify varieties/cultivars of different annual crops using major characteristic physical features both in the field and the store.	Explain the characteristic features of the varieties/cultivars of major annual crops both while growing and in the store.	LCD projector, white board, markers, laptop computers.	Identify the major characteristic features of the varieties of annual crops.	Guide students to identify major varietal features of annual crops	College farm, seeds, seedlings and fully grown crops

	General Objective: 3.0 Understand the factors affecting crop production.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	<p>3.1 Understand the effect of the following factors on crop production:-</p> <ul style="list-style-type: none"> i. Environmental; ii. Economic; iii. Sociological. <p>3.2 Understand the ecological requirements of common annual crops under the headings:-</p> <ul style="list-style-type: none"> i. Temperature; ii. Rainfall; iii. Soil or Edaphic factors. <p>3.3 Know about annual crop adaptation to:</p> <ul style="list-style-type: none"> i. Soil pH; ii. Soil type; iii. Soil moisture regime. 	<p>List and explain the environmental, economical and sociological factors on annual crop production</p> <p>List and explain the ecological requirements of annual crops</p> <p>Explain the effects of soil pH, soil type and soil moisture regime on crop adaptation</p>	LCD projector, white board, markers, laptop computers			
6				Identify the effects of soil pH, soil type and moisture regime on annual crops, display pH meter, tensiometer.	Guide students to determine soil pH, soil type and soil moisture	Soil and water laboratory

7	<p>3.4 Understand the principles of crop production under:-</p> <ul style="list-style-type: none"> i. Site selection; ii. Land preparation; iii. Seed selection/treatment; iv. Spacing. <p>3.5 Understand the following terms:- Planting rate, seed rate and population.</p> <p>3.6 Carry out the following activities in the farm:- Seed beds preparation; fertilizer applications; mulching; watering; spraying insecticides.</p> <p>3.7 Cultivate and maintain some annual crops like maize, cowpea, yams, cassava, tomatoes, pepper, vegetables etc.</p>	<p>List and explain the principles of crop production as in 3.4i-iv</p> <p>Explain the terms in 3.5</p>	LCD projector, white board, markers, laptop computers	<p>Identify suitable land for annual crop production</p> <p>Identify optimum cultural practices for annual crop production</p>	<p>Accompany on field trip.</p> <p>Demonstrate optimum cultural practices for annual crop production.</p> <p>Guide students to cultivate some major annual crops.</p>	<p>Suitable visit venues.</p> <p>College farm</p>
	General Objective: 4.0 Understand the management of crops after planting.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8	4.1 Have a detailed knowledge of the following types of crop management practices:-	List and explain the various crop management	LCD projector, white board, markers,	Identify the optimum management practices for some annual crops	Guide students to carry out the various	Seeds, fertilizers, hoes, land

	thinning, supplying, fertilizer application, weeding and disease and pest control. 4.2 Identify appropriate timing for operations in 4.1 above.	practices as listed in 4.1	laptop computers		management practices for some annual crops	
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	General Objective: 5.0 Understand weeds/and insect pests and diseases of annual crops.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	5.1 Identify main weeds that retard growth of annual crops. 5.2 Identify main insect pests of annual crops. 5.3 Identify main diseases on annual crops. 5.4 Know the source of some weeds on crop farms.	List and describe the major weeds, pests and diseases of the various annual crops.	LCD projector, white board, markers, laptop computers.	Identify major weeds, pests and diseases of major annual crops.	Guide students to identify major weeds, pests and diseases of annual crops.	Field annual crops.

10	5.5 Be aware of the life cycle of the most common annual crop weeds, pests and diseases. 5.6 Understand their overall economic significance. 5.7 Have a basic knowledge of the damage caused by weeds, pests and diseases of annual crops.	Explain the life cycle, symptoms and economic importance of common weeds, pests and diseases of major annual crops.	LCD projector, white board, markers, laptop computers.	See damage caused by weeds, pests and diseases in the field.	Demonstrate damage to crops.	Field annual crops.
11	5.8 Have a general knowledge of methods of controlling weeds, pest attacks, and bacterial and fungal diseases on annual crops in the farm.	Explain control methods.	LCD projector, white board, markers, laptop computers.	See crop protection methods being demonstrated.	Demonstrate crop protection methods.	Field annual crops. Spray equipment, agrochemicals, implements.
	General Objective: 6.0. Know the harvesting procedures of annual crops.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	6.1 List and remember types of crop harvesting methods, both	List and explain types of crop harvesting	LCD projector, white board,	Identify efficient harvesting methods	Guide students to identify	Crops and equipment/tools /machinery.

	manually and using modern equipment. 6.2 Understand the criteria for determining time of harvesting of various annual crops. 6.3 Harvest major annual crops physically from the field.	techniques; explain effects of timely harvesting.	markers, laptop computers.		various harvesting equipment Guide students to harvest planted crops.	
WEEK	General Objective: 7.0 Understand the handling, processing and storage of harvested annual crops.			Practical Contents:		
13	7.1 Understand the general processes for handling of various harvested annual crops in the field – manually and using modern equipment. 7.2 Understand the different methods of manual and mechanical crop processing e.g. destalking, threshing, sorting, grading decorticating etc. 7.3 Understand the use of major processing machines e.g. shellers, dryers, cassava fryers etc.	List and explain methods and tools/equipment for field handling and processing of harvested annual crops List and explain the use of some major processing machines/tools	LCD projector, white board, markers, laptop computers.	Identify major processing tools/equipment	Demonstrate how the tools/equipment operates Guide students to operate the tools/machines	Processing tools/machines,
14	7.4 Know about the end product of the processing of grains, tubers, legumes, spices etc.	Explain some end-products of processed annual crops as in 7.4	LCD projector, white board, markers, laptop computers	Understand how to process annual crops in practice.	Demonstrate processing of some annual crops.	Harvested products, tools/equipment

	7.5 Process harvested product into consumable products e.g. processing of cassava into gari. 7.6 Understand the methods of storage of field processed products. 7.7 Understand the methods of storing planting materials.	List and explain storage options for field processed annual crops and planting materials			Guide students to process some annual crops e.g. cassava	
Week	General Objective: 8.0. Understand pasture and forage agronomy.			Practical Contents:		
15	8.1 Appreciate the scope of pasture and forage agronomy including grasses, legumes, their distribution, improvement, quality and assessment, establishment and conversation. 8.2 Identify major pastures, grasses and legumes within the vicinity. 8.3 Establish crop type collection/field laboratory/forage bank for growing crops on a permanent basis.	Explain the scope of the agronomy of pasture and forage crops as indicated in 8.1 List and explain the major pasture and forage crops within the college area	LCD projector, white board, markers, laptop computers	Identify major pasture and forage crops within the locality	Guide students to collect and identify various pasture and forage crops	College and private farms

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 122 - Crop Protection

DURATION: 45 Hours (2 Hours Lectures, 1 Hour Practical)

UNITS: 3.0

GOAL: This course is designed to provide the students with the basic knowledge of crop diseases and pests, and information on their methods of control.

General Objectives:

On completion of this course, the student should be able to:

- 1.0 Understand the general principles of crop protection.
- 2.0 Identify plant diseases and understand methods of control.
- 3.0 Identify insect pests of crops and understand methods of control.
- 4.0 Identify weeds and understand methods of control.
- 5.0 Identify nematode pests of crops and understand methods of control.
- 6.0 Identify vertebrate pests of crops and understand methods of control.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE: CROP PROTECTION		COURSE CODE: AGT 122		CONTACT HOURS: (2 hour lectures: 1 hours practical)		
GOAL: The course is designed to provide the students with the basic knowledge of crop diseases and pests, and information on their methods of control.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
	General Objective: 1.0 Understand the general principles of crop protection.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Appreciate the importance of crop protection in agriculture. 1.2 List various crop protection methods: - cultural - Biological - Chemical - Mechanical - Quarantine	Discuss basis for crop protection Explain the various crop protection methods.	LCD Projector, slide projector, white board, markers, laptop computers.			
2	1.3 Understand integrated pest management.	Define the concept of integrated pest management.	LCD Projector, slide projector, white board, markers,			

			laptop computers.			
	General Objective: 2.0 Identify plant diseases and understand methods of control.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Understand the definition of the term 'disease' in relation to crops. 2.2 Know the common diseases of annual and tree crops in Nigeria.	Discuss disease in relation to crops. Describe the pathogens and their plant hosts.	LCD Projector, slide projector, white board, markers, laptop computers, pictures of diseased plants	Identify common crop diseases.	Guide students in the identification of crop diseases.	Diseased plants, Microscopes, Magnifying Lens, school and private farms.
4	2.3 Know diseases caused by : a) fungi, b) bacteria c) viruses and their vectors. 2.4 Understand the effects, symptoms and spread of the diseases listed in 2.3 above.	Describe the plant pathogens listed in 2.3		Identify different diseases caused by various pathogens	Guide students to differentiate the diseases and their causative agents. Guide students to form disease album	Plant disease samples
5	2.5 Understand the methods of control of the pathogens listed in 2.3 above.	Explain and discuss methods of disease control		Practice methods of control of diseases	Demonstrate to students disease control methods	School and private farm

	General Objective: 3.0 Identify insect pests of crops and understand methods of control.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6	3.1 Be aware of the characteristic features of a typical insect. 3.2 Understand the life cycle of insects (complete and incomplete) and metamorphosis.	. Explain the characteristic features of a typical insect. Draw different life cycles of some insects. Explain the various mouth parts in insects.	LCD Projector, slide projector, white board, markers, laptop computers, pictures of insects.	Identify different species of insect pests Draw some species of insects. Identify insect pest (insect album).	Guide the student to identify insect pests. Guide students to develop an insect box.	Specimen of different life stages of insects. Various specimens of insect pests. Samples of different pesticides.
7	3.3 Learn the nature of damage caused by insect pests to plants: - Biting and chewing. - Sucking and piercing. - Boring - Cutting. 3.4 Recognize common crop	Discuss the nature and the part of plants that are damaged by insect pests.		Collect plant parts damaged by pest. Identify plant parts damaged by pests.	Guide students.	Various plant specimens with pest damages.

8	pests and the plants they damage. 3.5 Understand the methods of controlling insects with emphasis on – - cultural - Biological - Chemical - Quarantine - Integrated. 3.6 Have a basic understanding of the mode of action of chemical control, both contact and systemic. 3.7 Know details of the procedure and safety precautions used in chemical control of pests.	Discuss various methods of insect pests control with emphasis on integrated pest management. Discuss contact and systemic mode of action by pesticide. Enumerate the advantages of IPM. Explain pesticide safe use and precaution		Carry out pest control using pesticides. Carry out mixing of pesticide by diluting with water.	Guide students.	Pesticides measuring equipment, Water, Knapsacks.
General Objective: 4.0 Identify weeds and understand methods of control.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	4.1 Understand weeds in relation to crop production	Discuss weeds as they relate to crop production.	LCD Projector, slide projector, white board,	Identify common weeds of crops.	Assist students to identify common weeds. Guide	Various types of weeds.

	<p>4.2 Classify weeds into growth habit, life cycle and habitat etc.</p> <p>4.3 Understand the effects of weeds on crop plants.</p>	<p>Explain classification of weeds and the basis for classification.</p>	<p>markers, laptop computers, pictures of insects.</p>	<p>Differentiate between different weed types.</p>	<p>students to do weed album.</p>	
10	<p>4.4 Have a detailed knowledge of cultural, biological, chemical and integrated methods of weed control.</p> <p>4.5 Know about the methods of application of herbicides.</p>	<p>Explain cultural biological, chemical and integrated weed control methods.</p>		<p>Carry out different methods of herbicide application.</p>	<p>Guide students apply herbicides to control weeds.</p>	<p>Fields and spraying equipment.</p>
11	<p>4.6 Have a basic understanding of the modes of action of herbicides.</p> <p>4.7 Understand factors affecting effectiveness of herbicides – - herbicide rate and concentration</p> <p>4.8 Know how to take precautionary</p>	<p>Classify different herbicides and explain different methods of herbicide application and their selectivity.</p> <p>Discuss hazards</p>		<p>Distinguish herbicides based on mode of action.</p> <p>Identify different factors affecting herbicides effectiveness</p>	<p>Use herbicides containers to identify different herbicides.</p>	<p>Containers and labels.</p>

	measures in herbicide use.	associated with the use of herbicides and how to prevent them.				
	General Objective. 5.0 Identify nematode pests of crops and understand methods of control					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	5.1 Learn a definition of nematodes. 5.2 List common nematodes pest affecting crops. 5.3 Understand modes of infection, symptoms and damages caused by nematodes.	Explain nematode as an invertebrate, their mode of infection, symptoms, and damages caused by them.	LCD Projector, slide projector, white board, markers, laptop computers, pictures of insects.	Examine soil nematodes under the microscope. Identify typical nematodes in yam, tomatoes and beans.	Guide students to extract nematodes and examine them under the microscope.	Soil with high organic content. Microscope, hand lens. Collection of plants infected with nematode e.g. yam, tomato, bean, etc.
13	5.4 Understand methods of nematode control.	Describe methods of control.		Practice control methods.	Demonstrate control methods.	Fields and equipment.
	General Objectives: 6.0 Identify vertebrate pests of crops and understand methods of control.					

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
14	6.1 Know common crop vertebrate pests such as rodents, birds, monkey etc. 6.2 Know crops in which vertebrate pests listed in 6.1 are a major problem. 6.3 Understand the nature of damage caused by vertebrate pests.	Discuss vertebrae pests of crops and the nature of damage they cause. Identify crops in which vertebrate pests are major problems.	LCD Projector, slide projector, white board, markers, laptop computers, pictures of insects.	Identify a selection of vertebrate pests.	Guide the students to collect and identify some vertebrate pests	Specimen of vertebrate pests e.g. rodents, birds etc. Drawing or picture of monkey.
15	6.4 Know the methods of controlling vertebrate pests.	Explain the methods of controlling vertebrate pests such as traps, baits etc.		Identify some control tools such as traps and baits.	Guide students identify and make traps.	Materials and tools.

PROGRAMME:

NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE:

SHEEP, GOAT AND SWINE PRODUCTON

CODE:

AGT 123

DURATION:

45 HOURS Lecture 1 hour: Practical: 2

UNITS:**3 Units****GOAL:**

The course is designed to provide students with a basic knowledge of the principles and practice of sheep, goat and swine production.

GENERAL OBJECTIVES: On completion of this course the students should be able to:-

- 1.0 Know the important breeds of sheep, goats and pigs and their characteristics.
- 2.0 Know the types of housing and equipment required for sheep, pigs and goat rearing.
- 3.0 Understand the management of adult sheep, pigs and goats.
- 4.0 Know the care and management of females during gestation and parturition and of the young.
- 5.0 Understand nutrition in sheep, pigs and goats.
- 6.0 Understand the importance of improvement of animals through breeding and selection.
- 7.0 Understand health and disease problems in sheep, pigs and goats.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE TITLE: Sheep and Goat Production	COURSE CODE: AGT 123	CONTACT HOURS 45: 1hr Lecture, 2hrs Practical
GOAL: The course is designed to provide students with a basic knowledge of the principles and practice of sheep, goat and swine production.		
COURSE SPECIFICATION:		PRACTICAL CONTENTS:
GENERAL OBJECTIVE: 1.0 Know the important breeds of sheep, goats and pigs and their characteristics.		

Week	Specific Learning Objective	Teacher's Activities	Learning Resources	Specific Learning Objective	Teacher's Activities	Learning Resources
1	<p>1.1 Draw and label the external features of typical sheep, pigs and goats.</p> <p>1.2 Identify the various breeds of sheep, pigs and goats in Nigeria and their characteristics.</p> <p>1.3 Know the distribution and adaption of sheep, pigs and goats in Nigeria.</p> <p>1.4 Classify sheep and goats into meat type, milk type and dual purpose. Classify pigs into end-use categories.</p> <p>1.5 Understand the economic importance of sheep, pigs and goats in Nigeria.</p> <ul style="list-style-type: none"> - meat - milk - skin - manure 	<p>Lecture and discussion sessions.</p> <p>Emphasise the significance and importance of sheep, pigs and goat species to the Nigerian agricultural economy. Explain reasons for distribution.</p>	<p>Multi-media projection.</p> <p>Power point presentations.</p> <p>Associated teaching aids.</p> <p>Whiteboard.</p> <p>Charts.</p> <p>Posters.</p> <p>DVDs.</p> <p>Maps.</p>	<p>Distinguish between the external characteristics of sheep, pigs and goats.</p> <p>Understand factors influencing distribution of them in Nigeria.</p> <p>List factors which determine their economic importance.</p> <p>Identify different breeds and types of all three.</p>	<p>Introduce assignment list for this module.</p> <p>Organise a visit to sheep, pigs and goat farms.</p> <p>Design questionnaire for student use.</p>	<p>Sheep, pigs and goat farms.</p> <p>Different breeds.</p> <p>Questionnaire</p> <p>Transport.</p>
Week	GENERAL OBJECTIVE: 2.0 Know the types of housing and equipment required for sheep, pigs and goat rearing .					

2	<p>2.1 Understand the factors influencing the location of sheep, pigs and goat houses.</p> <p>2.2 Learn about the design of sheep, pigs and goat houses.</p> <p>2.3 Relate the design of the houses to climatic conditions.</p>	Link the design of housing with welfare considerations.	As above.	Design sheep, pigs and goat housing on paper following instructions. Link design with the need to maximize health and welfare. Present for exercise grading and assessment.	Provide students with design assignments instructions.	Photographs Posters Plans Design examples.
3	<p>2.4 Know the space requirement for different classes of sheep, pigs and goats.</p> <p>2.5 List and identify the equipment needed for rearing of sheep, pigs and goats.</p>	Consider, through discussion, the importance of adequate stocking density.	As above.	Carry out construction project to design. Feed, water troughs and other environmental physical needs of the animals. Observe farm example.	Provide instructions. Organise farm visit.	Sheep, pigs and goat equipment. Housing. Etc.
Wee k	GENERAL OBJECTIVE 3.0 Understand the management of adult sheep, pigs and goats.					
4	<p>3.1 Understand the importance of procurement of stock from reliable source and quarantine for the new stock.</p> <p>3.2 Know the major systems of sheep, pigs and goat management (extensive, semi-intensive and intensive)</p>	Discuss the sourcing of disease free stock. Identify the various systems of management. Consider the essential	As above.	<p>Participate in routine management practices for example:</p> <ul style="list-style-type: none"> - cleaning - feeding - watering <p>Observe commercial management practice.</p>	Supervise students. Organize farm visit. Prompt students to ask questions.	Drugs Disinfectants Farm premises Feeder designs

5	<p>3.3 Understand the importance of good sanitation ventilation and exercise in the management of sheep, pigs and goats.</p> <p>3.4 Know the various methods of identification in sheep, pigs and goats.</p> <p>3.5 Know how to control parasites in sheep, pigs and goats.</p> <p>3.6 Understand the principles of farm record keeping.</p>	<p>environmental variables.</p> <p>Link the importance of management and record keeping.</p>	<p>As above.</p> <p>Ledger examples</p>	<p>Participate in routine management practices and record keeping on the farm. Monitor and record animal management events.</p>	<p>Assist students to design record formats.</p>	<p>Identification equipment. Record ledger.</p>
Week	GENERAL OBJECTIVE 4.0. Know the care and management of females during gestation and parturition, and of the young.					
6	<p>4.1 Identify gestation period for ewes, sows and dams and their care during gestation.</p> <p>4.2 Understand steaming up, lambing, farrowing and kidding</p> <p>4.3 Know how to prepare for lambing, farrowing and kidding.</p> <p>4.4 Identify the signs of onset of parturition and the common problems encountered during parturition – like wrong presentation</p>	<p>Emphasize the critical affects of management and care during pregnancy.</p>	<p>As above and charts of correct and malpresentation of fetuses.</p>	<p>List the key management activities during the typical pregnancy of ewes, sows and dams. Appreciate the practical management of the same. Identify the signs of impending parturition.</p>	<p>Organise farm visit to see sheep, pigs and goat herds. Instruct students.</p>	<p>Pregnant ewes, sows and dams. Animal accommodation examples.</p>

7	<p>4.5 Understand the importance of post- parturition management like</p> <ul style="list-style-type: none"> i) Treatment of Navel with iodine ii) Feeding colostrum iii) Fostering iv) Creep feeding iv) Creep grazing <p>4.6 Know how to care for the young when with their mothers before weaning.</p> <p>4.7 Understand the process of weaning of lambs/piglets/kids</p>	<p>Discuss the important post-parturition management issues.</p> <p>Encourage student interaction and sharing of experience.</p>	As above. Power point illustrations.	Engage in practical management practices and care of the young. Carry out the practical report exercise.	Supervise students and grade practicals. Arrange for farm site visit.	Iodine Tincture, Lambs Piglets Kids Group feeds
8	4.8 Understand the reasons for and methods of castration in lambs, piglets and kids.	Link such practice with modern concerns over ethics and animal welfare.	As above.	Attempt the castration procedure under close supervision.	Grade reports. Supervise castration experience. Produce risk assessment.	-Castration equipment and kits - iodine Tincture, -disinfectant\ - Gloves -Anaesthesia
Week	GENERAL OBJECTIVE: 5.0 Understand nutrition in sheep, pigs and goats					
9	<p>5.1 Know the digestive system of sheep, pigs and goats.</p> <p>5.2 List and identify the various types of grasses and forages used for sheep and goat feeding, and dry and wet feedstuffs for pigs.</p>	Emphasise the appreciation of the principles of nutrition to practical feeding scenarios.	As above.	Observe the dissection of sheep (ruminant) digestive systems. Participate in limited dissection. Identify the components of the gastro intestinal tract.	Demonstrate dissections. Source materials. Instruct students.	Digestive system material. Dissection equipment.

10	<p>5.3 Know the nutrient requirements of sheep, pigs and goats and their daily meal and water allowance.</p> <p>5.4 Differentiate between feeding and grazing systems i.e. zero grazing; rotational grazing etc.</p> <p>5.5 Identify the symptoms of some nutritional diseases of sheep, pigs and goats.</p>	Associate grass species and varieties with grazing systems. Elaborate on nutritional disorders.	Charts on grazing systems. Photographs.	<p>Identify a number of grass species at different growth stages.</p> <p>Observe the management of grazing systems.</p> <p>Observe the management of pig feeding systems.</p> <p>Document observations.</p>	<p>Arrange field trip.</p> <p>Issue assessment.</p>	Grazing lands. Feedstuffs
Week	GENERAL OBJECTIVE: 6.0 Understand the importance of improvement of animals through breeding and selection.					
11	<p>6.1 Understand the factors considered in selection of livestock e.g. twinning, litter size, milkiness, rapid weight gain.</p> <p>6.2 Know the desirable characteristics or conformation of male and female sheep, pigs and goats for breeding.</p> <p>6.3 Understand the effects of pre-breeding, in-breeding and cross breeding on performance of sheep, pigs and goats.</p>	Lecture. Make clear the importance of correct selection of breeding animals.	Chalkboard Charts and Photographs Teaching aids.	<p>Create an appropriate selection and breeding programme for either sheep, pigs or goats.</p> <p>Identify the features of good conformation in breeding animals.</p>	Organise an exercise based on best selection and conformation criteria.	Breeding animals. Access to breeding records.

12	6.4 Understand the following: i) Age at puberty ii) Oestrus cycle and signs of heat iii) Photoperiodity in breeding iv) Age at first service v) Mating methods vi) Mating ratios	Emphasise the economic importance of correct reproductive management.	As above. DVD	Identify signs of oestrus in sheep, pigs and goats. Understand the practical implications of the breeding cycle of the three species.	Assist students observe signs of oestrus. Organise farm visit to observe breeding animals.	Animals demonstrating oestrus and breeding activity.
13	6.5 Understand the importance of flushing in sheep, pigs and goats. 6.6 Know about lambing/piglet percentage and pseudopregnancy in goats, pigs and sheep	Lecture on fertility improvement.		Design grazing and/or nutrition strategy to support 'flushing' in sheep, pigs and goats. Complete the exercise and submit for grading.	Prepare the flushing/nutrition exercise.	Study scenario. Actual farm records.
Week	GENERAL OBJECTIVE: 7.0 Understand health and disease problems in sheep, pigs and goats.					
14	7.1 Identify signs of ill health in sheep, pigs and goats. 7.2 List the common diseases in sheep, pigs and goats. 7.3 Identify the symptoms and control of these diseases.	Lecture Give possible examples on the school farm Demonstrate some of these control measures	-Sick animals -Slides -Photographs	Identify signs of all health and compromised welfare of sheep, pigs and goats. List common diseases and describe symptoms. Suggest various control measures.	Assist students to identify sick animals. Grade report.	Sick animals. Healthy animals. Treatment materials.
15	7.4 Conduct a revision session to reflect on the module learning experience.	Emphasize key points and highlight aims and objectives.	Classroom scenario.			

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PROGRAMME:

NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

Module:

AGT 124 PRINCIPLES OF BEE KEEPING

Duration:

45 hours 1 Theory: 2 Practical

Units:

3 Units

Goal: This course is designed to provide the student with the skill and knowledge required for bee keeping

General objectives: On completion of this course the students should be able to:-

- 1.0 Recognize the benefits and understand the history of beekeeping.
- 2.0 Know the conditions and requirements for successful apiary establishment and management
- 3.0 Recognize the equipments and basics of beekeeping processes.
- 4.0 Identify the activities and manipulation of bee in spring, summer, autumn and winter.
- 5.0 Understand the basics and tools of honeybee queen rearing.
- 6.0 Discuss the harvesting and processing of honey
- 7.0 Recognize the enemies of honey bees

PROGRAMME: National Diploma in Agricultural Technology						
COURSE TITLE: Principles of bee keeping			COURSE CODE: AGT 124		CONTACT HOURS 45: 1hr Lecture 2hrs Practical	
GOAL: This course is designed to provide the student with the skill and knowledge required for bee keeping						
COURSE SPECIFICATION: AGT 124					PRACTICAL CONTENTS:	
GENERAL OBJECTIVE: 1.0 Recognize the benefits and understand the history of beekeeping.						
Week	Specific Learning Objective	Teacher’s Activities	Learning Resources	Specific Learning Objective	Teacher’s Activities	Learning Resources

1	<p>1.1 Know the different products of honeybee and their nutritive and medical value.</p> <p>1.2 Understand the importance of honeybee in crop pollination.</p> <p>1.3 Explain commercial activity and its importance for national income.</p> <p>1.4 List beekeeping projects.</p> <p>1.5 Understand the laws of protecting beekeeping processes.</p>	Explain the benefits of honeybee rearing.	Overhead and slide projector. Video tapes. CD tutorials.	Understand the benefits of honeybee through field visits of authorities supervising the projects and activities of beekeeping.	Discuss the role of authorities responsible for beekeeping (societies of beekeepers, honeybee classes or classification s)	Means of transport.
2.	<p>1.6 Know and understand the past, present and future situation of beekeeping.</p> <p>1.7 Understand beekeeping in Nigerian regions.</p>	Explain the historic significance of bees.	Overhead and slide projector. Video tapes. CD tutorials.	Recognize and describe the benefits of honeybee. List beekeeping information (production, producers and hives etc)in named regions.	Organise field visits to relevant authorities and organizations responsible for beekeeping (museums).	Transport work sheet Example hive and apiaries.
Week	GENERAL OBJECTIVE: 2.0 Know the conditions and requirements for successful apiary establishment and management					
3	<p>2.1 Identify the apiary.</p> <p>2.2 Know different types of apiaries.</p> <p>2.3 Understand the conditions and requirements necessary for commercial apiary</p>	Explain conditions and requirements necessary for commercial suitable apiary establishment	Overhead and slide projector. Video tapes. CD tutorials.	Be able to line an apiary and know the advantages and disadvantages of the current apiaries.	Demonstrate how to line an apiary and to show the advantages and	An apiary. Lining material.

	establishment and management.	and management.			disadvantages	
Week	GENERAL OBJECTIVE 3.0 Recognize the equipments and basics of beekeeping processes.					
4	3.1 Distinguish the types of the beehives: 3.2 Langstroth hive. 3.3 Dadant hive. 3.4 Two queens hive. 3.5 Observation hive. 3.6 Other hives. 3.7 Recognize and understand different parts of each hive and their measurement. 3.8 Understand bee space.	Explain the types of the bee hives and determine the different parts of each.	Overhead and slide projector. Video tapes. CD tutorials.	List and describe the types of the beehives. Know different parts of each hive and their measurement. Understand bee space.	Show different beehives and their parts: Show how to measure the bee-space between the hive parts.	Different types of beehives.
Week	GENERAL OBJECTIVE 3.0. (continued)					
5	3.9 List the types of wax foundations. 3.10 Know and explain different tools and process for wiring and embedding. 3.11 Know tools and process for producing the sections comb honey. 3.12 Understand other types of foundations and combs.	Discriminate between types of wax foundations. Describe the tools and explain process of: Wiring and embedding. Producing section comb honey. Discriminate between different	Overhead and slide projector. Video tapes. CD tutorials.	Describe and list types of wax foundations. Select and understand know tools (and process) for wiring and embedding. Know the tools (and process) of producing section comb honey. Understand other types of foundations and combs.	Show and describe different wax foundations. Apply the process of wiring and embedding wax foundations in the wired-woody frames, and	Requirements for wiring and embedding process. Requirements for producing section comb honey. Different types of

		types of foundations and combs.			the process of embedding section comb foundation in its frame.	wax foundation. Other types
GENERAL OBJECTIVE 3.0 (continued)						
6	3.13 Select and list equipments for inspecting colonies.	Explain the equipments of inspecting colonies and explaining their functions.	Overhead and slide projector. Video tapes. CD tutorials.	List equipment for inspecting colonies.	Show : the process of wearing beekeeper cloths and of firing and using a smoker. The correct use of the other inspections	An apiary, equipments for inspecting colonies.
7	3.14 Know the times and periods for inspecting the colonies. 3.15 Understand the correct opening of the hive and inspecting the colony. 3.16 Understand the objectives and cycles of inspecting the colony: Cyclic inspection. Seasonal inspection: 3.17 Explain arrangement of colonies at spring.	Explain times , periods, objectives and cycles of inspecting the colonies. Explain the inspection log book.	Overhead and slide projector. Video tapes. CD tutorials	Specify correct times, periods, objectives and cycles of inspecting the colonies. Provide log book defects and correct information or inspection	Show the: process of colonies' inspection and performing the objectives of cyclic and seasonal inspection. Demonstrate the inspection of a log book.	An apiary. Log book of inspection. Equipments for inspecting colonies.

	3.18Describe inspecting before and within the nectar flow season. 3.19Inspect at extracting. 3.20Inspecting at summer autumn and winter. 3.21Know the significance of a log book of inspection.					
General Objective: 4. Identify the activities and manipulation of bee in spring, summer, autumn and winter.						
8	4.1Understand activities of bees in winter. 4.2Describe clustering. 4.3Know wintering and feeding: 4.4Know wintering and its requirements.	Explain activities of bees in winter.	Overhead and slide projector. Video tapes. CD tutorials.	List the activities that the beekeeper performs for protecting bees during winter.	Show the procedures for protecting bees over winter.	Requirements of wintering and feeding.
9	4.5Understand food requirements. 4.6List feeders. 4.7Know the basis of uniting colonies.	Explain food requirements. Explain uniting the colonies.	Overhead and slide projector. Video tapes. CD tutorials.	Explain food requirements and feeding process. Demonstrate basic techniques and methods of uniting colonies.	Demonstrate the process of preparation of sugar syrup. The process of feeding and methods of uniting the colonies.	Requirements of wintering and feeding. Requirements of uniting.

10	4.8Understand and be able to describe the activities of bees in spring. 4.9Identify swarming. 4.10Identify absconding (migration).	Explain activities of bees in spring. Explain swarming.	Overhead and slide projector. Video tapes. CD tutorials.	List activities of bees in spring. Be able distinguish between swarming and absconding (migration).	Show the procedures of protecting and control against swarming,	Requirements for dividing the colonies.
Week	General Objective : 4 (continued)					
11	4.11Explain robbing reasons (activities detriment; protection and control). 4.12Understand laying worker (reasons; activities detriment; control. 4.13Develop an understanding of colony dividing or artificial swarming.	Explain the terms robbing and laying worker. Explain the act of dividing.	Overhead and slide projector. Video tapes. CD tutorials.	Examine and distinguish between the robbing and laying worker Demonstrate dividing or artificial swarming.	Demonstrate the features of robbing and laying workers. Indicate the division process.	Requirements of dividing the colonies.
	General Objective: 4 (continued)					

12	<p>4.14 Understand the activities of bees in summer.</p> <p>4.15 Learn the means for protecting bees at summer.</p> <p>4.16 Know the importance of saving water for bees.</p> <p>4.17 Distinguish between moving and displacement of bees.</p>	<p>Explain activities and means for protecting of bees in summer.</p> <p>Explain the basics and properties of moving bees.</p>	<p>Overhead and slide projector.</p> <p>Video tapes.</p> <p>CD tutorials.</p>	<p>Examine and list activities, means of protecting bees in summer.</p> <p>Distinguish between moving and displacement of bees.</p>	<p>Show procedures for protecting bees at summer.</p> <p>Describe and explain: the process of displacement and moving colonies.</p> <p>the process of feeding bees.</p>	<p>Material to illustrate feeding and movement activities.</p>
	General Objective 5. Understand the	basics and tool	of honey bee	queen rearing		
13	<p>5.1 Know which tools are required to rear queens</p> <p>5.2 Know the cases of natural queen production.</p> <p>5.3 Understand controlled queen rearing methods.</p>	<p>Describe the tools and methods of rearing honeybee queens.</p>	<p>Overhead and slide projector.</p> <p>Video tapes.</p> <p>CD tutorials.</p>	<p>Examine and list tools of rearing honeybee queens.</p> <p>Examine some controlled queen rearing methods.</p>	<p>Demonstrate the tools of honeybee queen rearing.</p> <p>Create wax cups on wooden strips.</p> <p>Show some methods of queen rearing.</p>	<p>An apiary.</p> <p>Requirements of queen rearing.</p>

	General Objective 6. Discuss the harvesting and processing of honey					
14	6.1 Describe various equipment used in honey extraction. 6.2 Explain the correct use of honey extraction equipment.	Illustrate equipment for suitable honey extraction and its correct use.	Overhead and slide projector. Video tapes. CD tutorials.	List equipments used in honey extraction. Undertake correct use of honey extraction equipments.	Demonstrate the tools of extracting honey. Show how to use the tools of extracting honey correctly.	Honey extraction equipments
	General objective 7 Recognize	the enemies of	honey bees			
15	7.1 Recognize, identify and specify honeybee diseases and pests. 7.2 Understand pesticide use and learn poisoning risks.	Briefly explain the potential for bee diseases and pests. Emphasise the harmful effect of pesticides and economic losses to the industry.	Overhead and slide projector. Video tapes. CD tutorials.	Identify and distinguish honeybee diseases and pests. Determine appropriate pesticides use. Be familiar with the life cycle and potential threats from enemies	Inspect the honeybee colonies to recognize diseases, pests and pesticide influence on bees.	Samples of: Diseased bees. Bee pests. Poisoned bees

TYPE OF ASSESSMENT	PURPOSE AND NATURE OF ASSESSMENT	WEIGHTING (%)
Practical assessment	Demonstrating the skills required in bee hive management	60

Written exam	Test the theoretical knowledge	40
TOTAL		100

PROGRAMME:

NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE:

MICRO-LIVESTOCK PRODUCTION

CODE:

AGT 126

DURATION:

HOURS - 75 (Lecture 2hr: Practical: 2)

UNITS:

4 Units

GOAL:

The course is designed to provide students with basic knowledge of principles and practice of micro-livestock production.

GENERAL OBJECTIVES: On completion of this course the students should be able to:-

- 1.0 Know the important species of animals regarded as micro-livestock species.
- 2.0 Know the types of housing and equipment required for micro-livestock production.
- 3.0 Understand the nutrition and feeding of micro-livestock.
- 4.0 Understand reproduction and breeding of micro-livestock.
- 5.0 Understand the routine management for different species of micro-livestock.
- 6.0 Know the common diseases of micro-livestock animals and their control.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: MICRO-LIVESTOCK PRODUCTION			COURSE CODE: AGT 126		CONTACT HOURS 60: 2hr Lecture, 2hrs Practical	
GOAL: The course is designed to provide students with basic knowledge of principles and practice of micro-livestock production.						
COURSE SPECIFICATION:				PRACTICAL CONTENTS:		
GENERAL OBJECTIVE: 1.0 Know the important species of animals regarded as micro-livestock						
Week	Specific Learning Objective	Teacher's Activities	Learning Resources	Specific Learning Objective	Teacher's Activities	Learning Resources
1	1.1 Understand the term micro-livestock. 1.2 Identify the various species/varieties of <ul style="list-style-type: none">- Rabbit- Edible land snail- Grass cutter/cane rat- Giant bush rat- Guinea pigs- Pigeons- Quails	Assist students to identify the species of these animals.	Teaching aids. Illustrations Multi-media Whiteboard	Identify micro-livestock species in your environment.	Go on field trip with the students.	Micro-livestock species. Hutches/cages. Deep litter.
2	1.3 Explain the importance of rearing these species of animals.	List the factors and discuss.	Teaching aids. Illustrations Multi-media	Identify micro-livestock contributing to family income.	Visit to market centres.	Micro-livestock.

			Whiteboard	See the conduct of a market place.		Market centres.
3	1.4 Describe the distribution of the animals, their adaptive features and localities	Circulate maps for discussion.	Distribution Maps.	Identify adaptive features and behaviour in micro-livestock.	Assist students to consider issues.	Study facility.
Week	GENERAL OBJECTIVE: 2.0 Know the type of housing and equipment required for micro-livestock production .					
4	2.1 Describe the design of housing for each type of micro-livestock. 2.2 Relate the design of houses to climatic conditions and peculiarities of the animals	Give illustrations of housing designs.	As above.	Identify the equipment needed for rearing each species. Assist in the construction of habitats and housing.	Assist students. Set up practical.	Feeders Waterers.
5	2.3 Understand the principles of stocking, foundation stock procurement, stocking density or space requirement for each species. 2.4 List and identify the equipment needed for rearing each species.	Emphasise the importance of adequate space for livestock. Explain the equipment requirements of the different species.	As above	Understand importance of sourcing healthy stock. Calculate space allowances for different species. Link stocking density to the health and welfare of livestock.		Materials. Measuring devices. Animals.

Week	GENERAL OBJECTIVE 3.0 Understand the Nutrition and Feeding of Micro-Livestock .					
6	3.1 Know the digestive systems of Rabbits and Snails. 3.2 List and identify the various feeding resources used for micro-livestock.	Show diagrams of the digestive systems of rabbits and snails. Show examples of feed stuffs to students.	Charts Feed samples	Identify the various feeding resources used for micro-livestock. Relate to the types of digestive systems found in micro-livestock.	Organise nutrition practical.	Charts Feed samples
7	3.3 Learn the nutrients requirements of various species and their daily feed and water intake. 3.4 Identify the symptoms of nutritional diseases and disorders in micro- livestock.	Explain the nutrient requirements of various species and state their daily feed and water intake. Describe the symptoms of nutritional disease in micro-livestock examples.		Appreciate the negative impact of nutritional disorders on the health and performance of livestock. Establish nutrient requirements for health.	Organise assignment on nutrients and diet formulation.	Feed samples. Feed analysis tables.
Week	GENERAL OBJECTIVE 4.0. Understand Reproduction and breeding of micro-livestock					
8	4.1 Understand the reproductivity of micro-livestock 4.2 Learn about mating procedures in each type of micro-livestock.	Explain the concept of reproductivity of micro-livestock Explain about mating procedures	Teaching Aids	Appreciate different mating procedures.	Supervise and grade practicals	Charts Animals

		in each type of micro-livestock.				
9	4.3 Understand the different gestation periods and be aware of the care required for females during gestation.	Explain the different gestation periods and explain the care required for females during gestation.	As above	Witness incubation of snail eggs. Demonstrate care for young animals.	Arrange for students to see snail populations in practice.	Snail samples. Incubators.
10	4.4 Learn about egg laying and incubation in snail rearing.	Explain about egg laying and incubation in snail rearing	As above.	Complete breeding exercise for assignment. Provide examples of practical breeding programmes.	Set up and assist in the directed coursework assignment.	Study facility.
	4.5 Understand care for young ones after parturition/hatching	Explain the concept of post-natal care.				
	4.6 Understand breeding methods in mini-livestock. - pure breeding - in-breeding - cross breeding cross-mating in snails	Provide advantages and disadvantages of breeding methods.				
Week	GENERAL OBJECTIVE 5.0 Understand the routine management for different species of micro-livestock					

11	5.1 Understand the importance of good sanitation and know about the important sanitation measures.	Emphasize the importance of good sanitation to animal health and welfare and product safety.	As above.	Practice identification and handling. Practice handling of each type of mini-livestock.	Organise practical session.	Farm visit. Unit visit.
12	5.2 Identify various methods of tracing the identification of the various micro-livestock. 5.3 Explain handling of each type of micro-livestock	Emphasise the importance of traceability in livestock.	As above.	List good sanitation methods. Apply in practical livestock husbandry.	Arrange practical handling session.	As above.
Week	General Objective: 6.0 Know the common diseases of micro-livestock animals and their control					
13	6.1 List and categorise the common diseases/pests and parasites of the various categories of livestock.	Identify diseases	As above DVD	Identify symptoms of diseased animals. Discuss the problem of disease methods of treatments with vet on farm.	Organise vet practicals.	Diseased animals

14	6.2 Know the symptoms and control measures for these diseases/pests/parasites. 6.3 Know some preventive measures against diseases/pests/parasites	Recommend treatments for diseases Discuss preventive measures appropriate to disease.	As above	Carryout assignment on health and disease.	As above.	Treatment lotions, chemicals and other drugs.
15	6.4 Revise and reflect on module content.	Provide opportunity to focus on the highlights and key facts.	Previous presentations.			

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 127 - Principles of Irrigation and Drainage.

DURATION: (2 Hours Lectures, 1 Hours Practical)

UNITS: 3.0

GOAL: This course is designed to equip the students with basic skills of irrigation and drainage.

GENERAL OBJECTIVES:

On completion of this module, the student should be able to:

- 1.0 Understand the concept of irrigation and drainage.
- 2.0 Understand water requirements of crops.
- 3.0 Identify and understand and sources of irrigation water.
- 4.0 Understand effects of water stress on crop growth.
- 5.0 Identify and understand irrigation structures and pumps.
- 6.0 Understand irrigation water application methods and scheduling.
- 7.0 Understand principles of drainage.
- 8.0 Understand the principles of water conservation and supply

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: PRINCIPLES OF IRRIGATION AND DRAINAGE.	COURSE CODE: AGT 127	CONTACT HOURS: (2 hours lecture: 1 hours practical)
Goal: This course is designed to equip the students with basic skills of irrigation and drainage.		

COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
	General Objective: 1.0 Understand the concept of irrigation and drainage					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know about prospects and potential of irrigation in Nigeria	Highlight importance and potential of irrigation in Nigeria.	LCD projector, slide projector, white board, markers.	See examples of irrigation and drainage schemes.	Show examples of irrigation and drainage schemes.	Suitable visit venues.
2	1.2 Learn the definition of irrigation. 1.3 Appreciate the difference between irrigation and drainage. 1.4 Understand the problems associated with irrigation and drainage	Define irrigation. Discuss irrigation problems.				
	General Objective 2.0 To understand water requirements of crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Know the uses of water in plants Understand the different forms of soil moisture e.g. gravitational water, capillary water and hygroscopic water. Understand the concept	Explain the uses of water and discuss the different forms of soil water and their importance to crop production.	LCD projector, slide projector, white board, markers.	See how water is held in soil.	Show how water is held in soil.	Soil samples, water.

4	<p>of available water, field capacity and permanent wilting point etc.</p> <p>2.2 Know about the water requirements of crops.</p> <p>2.3 Estimate irrigation water requirements e.g. the consumptive use of water.</p> <p>2.4 List the factors that determine water quality.</p> <p>2.5 Classify irrigation waters according to their qualities,</p> <p>2.6 Understand the mechanisms and importance of evapotranspiration</p>	<p>Explain water requirements of crops</p> <p>Explain how to estimate total water requirement.</p> <p>Explain concept of available water.</p> <p>Describe water quality parameters.</p> <p>Define evapotranspiration and its importance.</p>		<p>Calculate the determination of water requirements of crops.</p>	<p>Guide the student how to determine water requirement of crop.</p>	<p>Lysimeters, Pan evaporimeter, meteorological station.</p>
General Objective 3.0 Identify and understand sources of irrigation water.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	<p>3.1 Understand sources of water for irrigation.</p>	<p>Outline sources of irrigation water.</p> <ul style="list-style-type: none"> - Rivers - Stream. 	<p>LCD projector, slide projector,</p>	<p>Identify sources of irrigation water.</p>	<p>Take students on excursion to nearby dams, rivers, streams</p>	<p>Suitable visit venues.</p>

6	3.2 State the forms in which ground water exists.	<ul style="list-style-type: none"> - Lakes - Ground water - Domestic water 	white board, markers.		and lakes where irrigation activities take place.	
	3.3 Estimate ground water yield. 3.4 Compute discharge from wells.	Explain 'yield' and 'discharge'		Estimate ground water yield.	Demonstrate the yield of ground water from tube wells and bore holes.	Water meters and flumes
General Objective 4.0 Understand effects of water stress on crop growth.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	4.1 Understand the concept of water stress. 4.2 Be aware of the effects of water stress on crops. 4.3 Know the beneficial effects of water stress to crops.	Explain and define water stress. Explain the various effects of water stress on plant functions and processes e.g photosynthesis, respiration, growth, carbohydrate metabolism, protein metabolisms, hormonal balance, etc.	LCD projector, slide projector, white board, markers.	Observe the effect of water stress on the appearance of crops. .	Show students how to grow crops and stress them by not applying water and observe the effects on physical appearance.	<ul style="list-style-type: none"> - seeds - plastic pots - watering cans.

	General Objective 5.0 Identify and understand irrigation structures and pumps.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8	5.1 Know about irrigation water conveyance systems and measuring devices with their component parts. 5.2 Understand irrigation structures and water control structures such as off takes, cross drainage works, siphons, lining of canals.	Describe and explain major structures in irrigation schemes.	LCD projector, slide projector, white board, markers.	See structures used in irrigation on field trip.	Accompany students.	Suitable visit venues.
9	5.3 Identify types of irrigation pumps 5.4 State criteria for pump selection. 5.5 Understand the working principles of selected pumps.	Describe the different pumps used in irrigation Explain and discuss the criteria for pump selection.		Maintain irrigation pump	Demonstrate the servicing of irrigation pumps. Show the students different pumps used in irrigation.	Different pumps

	General Objective 6.0 Understand irrigation water application methods and scheduling.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	6.1 Describe different water application methods in irrigation e.g. surface irrigation, sub-surface irrigation, sprinkler irrigation and drip system. 6.2. Understand the factors that determine choice of irrigation methods.	Explain crop water application systems. Describe the Factors influencing the choice of irrigation methods.	LCD projector, slide projector, white board, markers.	Observe irrigation water application methods.	Visit an existing irrigation project. Show the students how to maintain and operate different water application methods.	Crops field, siphon tubes, irrigation pumps source of water. .
11	6.3 Know how to schedule irrigation to make optimum use of water. 6.4 Calculate the depth of water application in irrigation.	Describe irrigation Scheduling methods based on crop, climate and soil parameters .		Practice irrigation schedule methods.	Show students how to schedule irrigation.	Paper, calculators.
	General Objective 7.0 Understand principles of drainage					

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	7.1 Understand the definition of drainage 7.2 Understand the difference between surface drainage and tile drainage. 7.3 Know the sources of drainage problems e.g. poor land grading, flood, poor soil structure, high water table, surface runoff, soil compaction.	Describe drainage problems in agriculture Explain the sources of drainage problems.	LCD projector, slide projector, white board, markers.	Plan the layout of drainage structures.	Guide student to layout drainage structure.	- Paper - Hoes - Tractor
13	7.4 Know the methods of carrying out soil drainage e.g. open drains, tile drains, sub-surface methods 7.5 Be aware of the types and features of drainage structures	Explain methods of carrying out soil drainage e.g. open drains, tile drains, sub-surface methods. Describe types and features of drainage structures.		Carry out soil drainage.	Demonstrate soil drainage methods and procedure.	Drainage equipment, pipes etc.
General Objective 8.0 Understand the principles of water conservation and supply.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

14	5.1 Understand the importance of water conservation. 5.2 Know the various methods of conserving water on the farm e.g. earth dams. 5.3 Know the various methods of water storage.	Explain the importance of water conservation practice. List and describe the various methods of conserving water on the farm e.g. earth dams ridge-tie water.	LCD projector, slide projector, white board, markers.	Understand water conservation techniques.	Demonstrate the various forms of water conservation techniques.	College farm
15	5.4 Know the uses of water on the farm. 5.5 Understand the process of water supply and development from boreholes, wells and reservoirs and water harvesting structures.	Describe the various methods of farm water storage and explain the uses of water on the farm.		Identify the ways of harnessing water resources.	Guide students to identify different water harvesting techniques. Organize visits to irrigation farms.	College farm Private farms

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 128 - Post Harvest Technology and Biology

DURATION: 2 Hours Lectures, 2 Hours Practicals

UNITS: 4.0

GOAL: This course is designed to provide the students with the basic skills and knowledge on crop processing and storage.

GENERAL OBJECTIVES:

On completion of this course, the students should be able to:

1. Understand the physical characteristics of crop produce.
2. Understand the cleaning, sorting and separation methods of food grains and other crop produce.
3. Understand the principles and methods of milling, shelling and decortication.
4. Understand the various handling equipment for crop produce.
5. Understand the methods of drying crop produce.
6. Understand pest control and hygiene in the store.
7. Understand the methods of storage and preservation of crops.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: POST HARVEST TECHNOLOGY AND BIOLOGY	COURSE CODE: AGT 128	CONTACT HOURS: (2 hrs lecture: 2 hrs practical)
Goal: This course is designed to provide the students with the basic skills and knowledge on crop processing		
COURSE SPECIFICATION	Practical Contents:	
	General Objective: 1.0 Understand the physical characteristics of crop produce.	

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 List the unique features of crop materials. 1.2 Know about density and moisture content of agricultural crops. 1.3 Understand visual properties of crop materials. 1.4 Understand the importance of visual properties in processing, handling and storage of crop materials.	Outline the features of crop materials and explain the importance of visual assessment.	LCD projectors, slide projectors, white board, markers, laptop computer	Determine density, and moisture content of crop materials.	Demonstrate the determination of density and moisture content of different crop produce.	- moisture meter, containers, - Samples of crops - Oven.
General Objective: 2.0 Understand Know the cleaning, sorting and separation methods of food grains and other crop produce.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2	2.1 Know the process of cleaning, sorting and separation of crop materials.	Describe cleaning process and separation of crop produce.	LCD projectors, slide projectors, white board, markers,	Identify the equipment used for carrying out the process in 2.1 and 2.2 .	Demonstrate the equipment used.	Unsorted groups, sieves and blowers.

3	<p>2.2 Know various methods of grain cleaning, sorting, grading and separation.</p> <p>2.3 Understand the purpose of each of the processes in 2.1 and 2.2 above</p> <p>2.4 Know the principles and methods of carrying out each of the processes in 2.1 and 2.2 above.</p>	<p>Explain the processes of sorting and grading crops.</p> <p>Describe the methods used to carry out each of the processes in 2.1 and 2.2.</p>	laptop computer	Clean, sort, grade and separate grains using appropriate equipment.	Guide the students in cleaning sorting, grading and separation of grains.	Grains and equipment.
General Objective: 3.0 Understand the principles and methods of milling, shelling and decortication.						
4	<p>3.1 Explain milling, shelling and decortication.</p> <p>3.2 Describe the various methods of shelling, milling and decortications.</p>	Describe operations of milling, shelling and decortication machines.	LCD projectors, slide projectors, white board, markers, laptop computer	<p>Identify equipment for carrying out the processes in 3.1 above</p> <p>Carry out milling, shelling and decortications operations using appropriate equipment.</p> <p>Carry out minor servicing operations of</p>	<p>Demonstrate the servicing of equipment for processing of crops materials.</p> <p>Demonstrate the operation of milling, shelling, testing and decorticating machines.</p>	<p>Shelling machine</p> <ul style="list-style-type: none"> - Milling machine. - Decortications machine - De-stoning machine - De-husking machine

				equipment for processing of crops materials.		
	General Objective: 4.0 Understand the various handling equipment for crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	4.1 List handling devices. 4.2 Describe the mechanisms of chain, belt, auger, bucket, pneumatic, oscillating and gravity conveyors, cranes, carts and trucks for handling agricultural materials.	Describe the handling of crop produce. List handling equipment. Describe the various conveying handling and conveying equipment.	LCD projectors, slide projectors, white board, markers, laptop computer	Identify handling devices of agricultural produce. Select appropriate handling devices for specific jobs in 4.2 above. Operate various conveyor devices .	Assist students to identify and operate handling and conveying devices of agricultural produce.	- conveyors - Trucks. - Refrigerators vehicles, etc. -
6	4.3 Calculate the capacities of conveyors 4.4 Calculate the cost of conveyance of crop materials.	Explain how to compute the capacity and cost of conveyance.				
	General Objective 5.0 Understand the methods of drying crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

7	5.1 Understand the concept of drying. 5.2 Understand the importance and purpose of drying crop produce. 5.3 List the parameters for drying.	Explain the process of drying crop materials Explain parameters for drying.	LCD projectors, slide projectors, white board, markers, laptop computer	Identify drying equipment.	Demonstrate the use of drying equipment.	- solar dryer - pneumatic dryer - ovens - blowers, etc
8	5.4 Know the components of a drying system.	Describe various drying processes and equipment.				
General Objective 6.0 Understand pest control and hygiene in the store.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	6.1 Understand the physical and economic damage that pests and diseases can cause in store.	Discuss why pests and diseases can be detrimental to crop storage.	LCD projectors, slide projectors, white board, markers, laptop computer			
10	6.2 Know the prevention measures against rodents in stored products.	Describe the importance of rodent control in store. Describe the control and		Control rodents using rodenticides and bait.	Demonstrate methods of rodent control in stores and houses.	- Rodent traps, - Rodenticides - Baits. - Crop samples.

11	6.3 Know how to control rodents in stores.	prevention of rodents in stored products.				
	6.4 Know the processes of detecting insects in store. 6.5 Understand traditional and modern techniques of insect control in store.	List the various pests found in stores and describe the types of insecticides used in store.		Examine stored products to detect insects. Set trays for insects Apply chemical and physical methods of insect control in stored products.	Show how to set insect traps in stores. Demonstrate how to apply pest control chemicals.	Stores, traps and chemicals.
12	6.6 Identify and understand microbiological organisms causing storage losses. 6.7 Understand how microbiological organisms can be controlled in stores and stored produce.	Explain and identify microbiological organisms causing storage losses.		Identify microbiological organisms causing storage losses.	Use microscope to identify microbiological organisms causing storage losses.	Hand lens, microscope, microbial cultures.
	General Objective; 7.0 Understand the methods of storage and preservation of crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	7.1 Define storage and preservation.	Discuss preservation and	LCD projectors, slide projectors,	Carry out the various storage methods.	Guide the student on how	- Storage equipment

	7.2 Explain the parameters for safe storage 7.3 Explain terms used in storage practice.	storage of crops.	white board, markers, laptop computer	Identify the materials and structures used in storage and preservation.	to store various crops.	- crop samples.
14	7.4 Understand the physiological factors which affect crop storage and quality.	Describe and discuss physiological factors which affect crop storage and quality.		See examples of problems in crops e.g. respiration effects, heating, water loss etc.	Show examples.	Crops in store.
15	7.5 Know the various methods of storage and preservation and understand where each is appropriate to use.	Discuss the various methods of storage and preservation for perishable and non-perishable crops.				

	Program:	Course Code: COM002	Contact Hours: 3 hours /week
	Subject/Course: Computer Applications II		Theoretical: 0 hours /week

	Year: 1	Semester: 2	Pre-requisite:	Practical: 3 hours /week
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General Objectives

The module gives to the student the basic skills allowing him to develop and present a power presentation, use the world wide web and to use an E-mail application.

1. Develop and present a power point presentation.
2. Use efficiently the world wide web and use efficiently a search engines
3. Setup and use correctly an Email application.

	Department:	Course Code: G202	Contact Hours: 3 hours /week
	Subject/Course: Computer Applications 2		Theoretical: 0 hours /week
	Year: 1 Semester: 2	Pre-requisite:	Practical: 3 hours /week

	Theoretical Content			Practical Content		
	General Objective: Develop and Present a power point presentation					
Week	Learning Outcomes	Teacher’s activities	Resources	Learning Outcomes	Teacher’s activities	Resources
1				Perform the basic operations Start/End the application Create, open, modify, save and close a presentation. Adjust Settings Work with slides - Add, delete, copy, move slide. -customize -Proofing. -save	Show how to: - Run the application. - Open a presentation. - Create new presentation (default template). - Save under other name. - Save the presentation with different types such as : RTF, PPS, PPT, image file format and other versions. - switch between open presentations. - Zoom in/out and use zoom tools. - Switch between different views of a presentation - Create a new presentation using the default template , Edit , Save , Open and Close a presentation	PC connected to an OHP with appropriate operating system & Power point presentation of lectures Online lecture notes Internet access. Smart board/ white board

					- Apply design templates to a presentation and to change between designs	
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2				Know how to Format the slide content Format text	Show how to: Create a presentation, new presentation, save a presentation , add slides , theme	PC connected to an OHP with appropriate operating system & Power point presentation of lectures Online lecture notes Internet access. Smart board/ white board
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3				Know how to: -enter text, select text ,copy and paste , cut and paste , undo/redo , spell check , formatting text , change font typeface and size, font styles and effects ,change text colour, word art, change paragraph alignment, text direction, adding content ,adding picture.	Demonstrate how to: -enter text, select text ,copy and paste , cut and paste , undo/redo , spell check , formatting text , change font typeface and size, font styles and effects ,change text colour, word art, change paragraph alignment, text direction, adding content ,adding picture.	PC connected to an OHP with appropriate operating system & Power point presentation of lectures Online lecture notes Internet access. Smart board/ white board
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4				Know how to: Adding shape, adding smart art, adding a photo album , create a table , enter data in a table , modify the table structure and format a table, insert a table from word or excel, create a chart , edit chart data , modify a chart ,use slide effects.	Show how to: Adding shape, adding smart art, adding a photo album , create a table , enter data in a table , modify the table structure and format a table, insert a table from word or excel, create a chart , edit chart data , modify a chart ,use slide effects.	PC connected to an OHP with appropriate operating system & Power point presentation of lectures Online lecture notes Internet access. Smart board/ white board
5				Know how to: - -Use slide show options -setup slide show -rehearse timings -create speaker notes -Print a presentation -package a presentation	Demonstrate how to: - -Use slide show options -setup slide show -rehearse timings -create speaker notes -Print a presentation -package a presentation	PC connected to an OHP with appropriate operating system & Power point presentation of lectures Online lecture notes Internet access. Smart board/ white board

	General Objective: Use efficiently the world wide web and use efficiently a search engines.					
Week	Learning Outcomes	Teacher's activities	Resources	Learning Outcomes	Teacher's activities	Resources

6				Understand Internet , internet protocols , internet structure ,email , the world wide web, remote access ,file sharing ,steaming media ,voice telephony.	Explain: Internet , internet protocols , internet structure ,email , the world wide web, remote access ,file sharing ,steaming media ,voice telephony.	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
7				Know how to Surf the web with internet explorer Understand the web -using internet explorer7 -basic web surfing -using tabbed browsing Searching from the browser.	-Explain how to surf the web: -using internet explorer7 -basic web surfing -using tabbed browsing Searching from the browser.	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
8				Know how to save your favourite pages , print the pages.	Demonstrate how to : Save your favourite pages , print the pages.	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
9				Be able to:	demonstrate how to: <i>Printing / Preview a document.</i> Printing a framed Web site	Networked PC lab An OHP connection to a PC. Internet access.

				<i>Print/ Preview a document.</i> Modify page setup options. Print a Web page Present a search report	Modify page setup options. Present a search report as a printed document.	Different internet browsers
10				Know how to: -send and receive Email. -setup your Email account -understand the windows mail window	demonstrate how to: -send and receive Email. -setup your Email account -understand the windows mail window	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers

	General Objective: Setup and use correctly an Email application.					
Week	Learning Outcomes	Teacher's activities	Resources	Learning Outcomes	Teacher's activities	Resources
11				Know how to Create an e-mail account Be able to: Sending and receiving Email	Explain how to Be : Send and receive Email	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
12				Know how to:	Demonstrate how to:	Networked PC lab

				<ul style="list-style-type: none"> • Open the Inbox folder • Create a new message • Send the message.. 	-compose a message, reading new messages, reply to a message, sending files via email, attaching a file to an email message, opening an email attachment.	An OHP connection to a PC. Internet access. Different internet browsers
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13				Understand: -spam blocking -Phishing filter -virus protection -using address book to manage personal contacts.	Explain: -spam blocking -Phishing filter -virus protection -using address book to manage your contacts.	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
14				Understand: Different types of connections	Demonstrate how to: - traditional dial-up - broadband and DSL -broadband cable -broadband satellite.	Networked PC lab An OHP connection to a PC. Internet access. Different internet browsers
15				Know how to: -setting up a new connection	Demonstrate how to: -setting up a new connection	Networked PC lab An OHP connection to a PC.

				-connecting in vesta and windows xp -sharing internet -connect to public hotspot.	-connecting in vesta and windows xp -sharing internet -connect to public hotspot.	Internet access. Different internet browsers
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ASSESSMENT (%)					
	Continuo us	Mid Semeste r	End Semeste r	Total	
Practica l	20	20	60		100

PROGRAM: GENERAL STUDIES
 COURSE TITLE: COMMUNICATION IN ENGLISH II
 COURSE CODE: GNS 202
 PREREQUISITE: GNS 201 - COMMUNICATION IN ENGLISH I
 DURATION: 2 HOURS PER WEEK (30 HOURS PER SEMESTER)
 CREDIT UNITS: 2.0
 SCHEDULE: Year 1, Semester 2

GOAL: This course is designed to equip the student with the necessary level of competence and proficiency to enable him adapt to his professional environment. At the end of this course, the student should be able to communicate clearly and effectively in both general and specific situations.

GENERAL OBJECTIVES: On completion of this course the student should:

1. Understand registers
2. Understand the principle of correspondence
3. Know how to apply the principle of writing for publication.
4. Know how to write a report.

General Objective: 1.0 Understand registers				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	<p>On completion of this course the student should:</p> <p>Registers</p> <p>1.1 Explain registers</p> <p>1.2 Explain factors influencing register, viz., field (profession, mode (speech or writing), tenor (relationship between the interacting parties)</p>	<p>Registers</p> <p>1.1 Explain registers</p> <p>1.2 Explain factors influencing register, viz., field (profession, mode (speech or writing), tenor</p>				

		(relationship between the interacting parties)				
2	1.3 List some items of register peculiar to different professions 1.4 Identify items of register in a given passage	1.3 List some items of register peculiar to different professions 1.4 Identify items of register in a given passage				
3	1.5 State appropriate uses of jargon.	1.5 State appropriate uses of jargon.				

	General Objective: 2.0 Understand the principle of correspondence					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

3	Correspondence 2.1 Describe different types of business letters, e.g. applications, enquiries, invitations and complaints, with their replies	Correspondence 2.1 Describe different types of business letters, e.g. applications, enquiries, invitations and complaints, with their replies				
4	2.2 Use suitable language for a specific type of letter	2.2 Use suitable language for a specific type of letter				
5	2.3 Write the letters listed in 2.1 above.	2.3 Write the letters listed in 2.1 above.				

	General Objective: 3.0 Know how to apply the principle of writing for publication.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

6	Writing for Publication 3.1 Explain techniques of writing for publication	Writing for Publication 3.1 Explain techniques of writing for publication				
7	3.2 Write essays on topical and current issues 3.3 Analyse published essays of literary value	3.2 Write essays on topical and current issues 3.3 Analyse published essays of literary value				
8	3.4 Evaluate the development of ideas in a given article	3.4 Evaluate the development of ideas in a given article				
9	3.5 Write good articles for publication	3.5 Write good articles for publication				

	General Objectives: 4.0 Know how to write a report.			
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WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	Reports Define a report List the types of report	Reports Define a report List the types of report				
11	Enumerate uses of reports	Enumerate uses of reports				
12	List the characteristics of a good report	List the characteristics of a good report				
13	Outline the stages of writing a report	Outline the stages of writing a report				
14	Evaluate a given report	Evaluate a given report				
15	Write a report Know how to write a report.	Write a report				

PROGRAMME: **National Diploma in Agricultural Technology**

COURSE: **AGT 128 - Post Harvest Technology and Biology**

DURATION: 2 Hours Lectures, 2 Hours Practicals

UNITS: 4.0

GOAL: This course is designed to provide the students with the basic skills and knowledge on crop processing and storage.

GENERAL OBJECTIVES:

On completion of this course, the students should be able to:

1. Understand the physical characteristics of crop produce.
2. Understand the cleaning, sorting and separation methods of food grains and other crop produce.
3. Understand the principles and methods of milling, shelling and decortication.
4. Understand the various handling equipment for crop produce.
5. Understand the methods of drying crop produce.
6. Understand pest control and hygiene in the store.
7. Understand the methods of storage and preservation of crops.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE: POST HARVEST TECHNOLOGY AND BIOLOGY	COURSE CODE: AGT 128	CONTACT HOURS: (2 hrs lecture: 2 hrs practical)
Goal: This course is designed to provide the students with the basic skills and knowledge on crop processing		

COURSE SPECIFICATION			Practical Contents:			
	General Objective: 1.0 Understand the physical characteristics of crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 List the unique features of crop materials. 1.2 Know about density and moisture content of agricultural crops. 1.3 Understand visual properties of crop materials. 1.4 Understand the importance of visual properties in processing, handling and storage of crop materials.	Outline the features of crop materials and explain the importance of visual assessment.	LCD projectors, slide projectors, white board, markers, laptop computer	Determine density, and moisture content of crop materials.	Demonstrate the determination of density and moisture content of different crop produce.	- moisture meter, containers, - Samples of crops - Oven.
	General Objective: 2.0 Understand Know the cleaning, sorting and separation methods of food grains and other crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2	2.1 Know the process of cleaning, sorting and	Describe cleaning process and separation of crop produce.	LCD projectors, slide projectors,	Identify the equipment used for carrying out the process in 2.1 and 2.2 .	Demonstrate the equipment used.	Unsorted groups, sieves and blowers.

3	<p>separation of crop materials.</p> <p>2.2 Know various methods of grain cleaning, sorting, grading and separation.</p> <p>2.3 Understand the purpose of each of the processes in 2.1 and 2.2 above</p> <p>2.4 Know the principles and methods of carrying out each of the processes in 2.1 and 2.2 above.</p>	<p>Explain the processes of sorting and grading crops.</p> <p>.</p> <p>Describe the methods used to carry out each of the processes in 2.1 and 2.2.</p>	<p>white board, markers, laptop computer</p>	<p>Clean, sort, grade and separate grains using appropriate equipment.</p>	<p>Guide the students in cleaning sorting, grading and separation of grains.</p>	<p>Grains and equipment.</p>
General Objective: 3.0 Understand the principles and methods of milling, shelling and decortication.						
4	<p>3.1 Explain milling, shelling and decortication.</p> <p>3.2 Describe the various methods of shelling, milling and decortications.</p>	<p>Describe operations of milling, shelling and decortication machines.</p>	<p>LCD projectors, slide projectors, white board, markers, laptop computer</p>	<p>Identify equipment for carrying out the processes in 3.1 above</p> <p>Carry out milling, shelling and decortications operations using appropriate equipment.</p> <p>Carry out minor</p>	<p>Demonstrate the servicing of equipment for processing of crops materials.</p> <p>Demonstrate the operation of milling, shelling, testing and</p>	<p>Shelling machine</p> <ul style="list-style-type: none"> - Milling machine. - Decortications machine - De-stoning machine - De-husking machine

				servicing operations of equipment for processing of crops materials.	decorticating machines.	
	General Objective: 4.0 Understand the various handling equipment for crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	4.1 List handling devices. 4.2 Describe the mechanisms of chain, belt, auger, bucket, pneumatic, oscillating and gravity conveyors, cranes, carts and trucks for handling agricultural materials.	Describe the handling of crop produce. List handling equipment. Describe the various conveying handling and conveying equipment.	LCD projectors, slide projectors, white board, markers, laptop computer	Identify handling devices of agricultural produce. Select appropriate handling devices for specific jobs in 4.2 above. Operate various conveyor devices .	Assist students to identify and operate handling and conveying devices of agricultural produce.	- conveyors - Trucks. - Refrigerators vehicles, etc. -
6	4.3 Calculate the capacities of conveyors 4.4 Calculate the cost of conveyance of crop materials.	Explain how to compute the capacity and cost of conveyance.				
	General Objective 5.0 Understand the methods of drying crop produce.					

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	5.1 Understand the concept of drying. 5.2 Understand the importance and purpose of drying crop produce. 5.3 List the parameters for drying.	Explain the process of drying crop materials Explain parameters for drying.	LCD projectors, slide projectors, white board, markers, laptop computer	Identify drying equipment.	Demonstrate the use of drying equipment.	- solar dryer - pneumatic dryer - ovens - blowers, etc
8	5.4 Know the components of a drying system.	Describe various drying processes and equipment.				
General Objective 6.0 Understand pest control and hygiene in the store.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	6.1 Understand the physical and economic damage that pests and diseases can cause in store.	Discuss why pests and diseases can be detrimental to crop storage.	LCD projectors, slide projectors, white board, markers, laptop computer			
10	6.2 Know the prevention measures against rodents in stored	Describe the importance of rodent control in store.		Control rodents using rodenticides and bait.	Demonstrate methods of rodent control	- Rodent traps, - Rodenticides - Baits. - Crop samples.

	products. 6.3 Know how to control rodents in stores.	Describe the control and prevention of rodents in stored products.			in stores and houses.	
11	6.4 Know the processes of detecting insects in store. 6.5 Understand traditional and modern techniques of insect control in store.	List the various pests found in stores and describe the types of insecticides used in store.		Examine stored products to detect insects. Set trays for insects Apply chemical and physical methods of insect control in stored products.	Show how to set insect traps in stores. Demonstrate how to apply pest control chemicals.	Stores, traps and chemicals.
12	6.6 Identify and understand microbiological organisms causing storage losses. 6.7 Understand how microbiological organisms can be controlled in stores and stored produce.	Explain and identify microbiological organisms causing storage losses.		Identify microbiological organisms causing storage losses.	Use microscope to identify microbiological organisms causing storage losses.	Hand lens, microscope, microbial cultures.
General Objective; 7.0 Understand the methods of storage and preservation of crops.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

13	7.1 Define storage and preservation. 7.2 Explain the parameters for safe storage 7.3 Explain terms used in storage practice.	Discuss preservation and storage of crops.	LCD projectors, slide projectors, white board, markers, laptop computer	Carry out the various storage methods. Identify the materials and structures used in storage and preservation.	Guide the student on how to store various crops.	- Storage equipment - crop samples.
14	7.4 Understand the physiological factors which affect crop storage and quality.	Describe and discuss physiological factors which affect crop storage and quality.		See examples of problems in crops e.g. respiration effects, heating, water loss etc.	Show examples.	Crops in store.
15	7.5 Know the various methods of storage and preservation and understand where each is appropriate to use.	Discuss the various methods of storage and preservation for perishable and non-perishable crops.				

ND II SEMESTER I

PROGRAMME: National Diploma in Agricultural Technology

COURSE: MEC 112 - Basic Workshop Technology and Practice

DURATION: 4 Hours Practicals

UNITS: 4.0

GOAL: This course is designed to enable students to work practically with wood, metal and plastic on farms with limited resources.

On completion of this module, the student should be able to:

- 1. Know basic safety precautions.**
- 2. Use and maintain various tools.**
- 3. Use simple measuring and testing techniques.**
- 4. Know basic drilling and reaming operations.**
- 5. Know various simple metal joining operations.**
- 6. Cut and join metal by gas welding.**
- 7. Know various metal arc welding operations.**
- 8. Know the various wood working tools and operations.**

9. Know simple operations on plastics.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: BASIC WORKSHOP TECHNOLOGY AND PRACTICE			COURSE CODE: MEC 112		CONTACT HOURS: 30 HOURS (2 HOURS PRACTICALS)	
GOAL: This course is designed to enable students to work practically with wood, metal and plastic on farms with limited resources.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objectives: 1.0 Know basic safety precautions.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Observe safety precautions 1.2 Operate safety equipment e.g. fire extinguishers, safety water hose etc.	Let students know how accidents happen when working with tools. Discuss some unsafe acts and conditions when working with tools. Let students know how a farm workshop should be arranged • Ask students to differentiate between types of fires and mediums to extinguish them.	Chalkboards, OHPs, Safety Posters. Textbooks.	Operate fire extinguishers.	Show students how to extinguish fires.	CO2 fire extinguisher Water hose Sand buckets
2	1.3 Use of protective clothes and equipment	List types of protective clothes suitable for the farm workshop a. Overall b. Safety boots	Chalkboards, OHPs, Safety Posters. Textbooks. Clothes and equipment.			

	1.4 Observe all safety rules and regulations	c. Eye glasses (safety) d. Hand gloves etc. Explain how to use the safety clothes and equipment. Explain in detail safety rules and regulations which they should observe on farm.				
WEEK	General Objective: 2.0 Use and Maintain Various Tools					
3 and 4				2.1 Use marking-out tools 2.2 Produce simple objects using bench/hand tools such as files, chisels, scrapers, saws etc. 2.3 Maintain files, dividers, saws, gauges try squares, bevel edge square etc.	Ask students to differentiate between a. Hand tools and machine tools b. Bench tools and machine cutting tools • Ask students to list out marking out tools used on the bench Ask students to identify bench cutting tools • Explain the use of these tools and their care	Work bench • Bench vice • Hammers • Set of drills • Steel rule • Scribes • Scribing blocks • Inside and outside caliper • Surface place • Dividers • Centre punches, hammers • Files • Chisels • Scrapers • Hook saw

					<ul style="list-style-type: none"> • Explain the effect of not using these tools properly and keeping them in good working condition. 	<ul style="list-style-type: none"> • Bench drilling machine & access • Sets of drills • Bevel edge sq. • File card or wine brush • Chamois cloth
	General Objective: 3.0 Use Simple Measuring and Testing Equipment					
5 and 6	.			<p>3.1 Perform simple measuring exercises.</p> <p>3.2 Use dial indicators to (i) set up jobs on the lathe (ii) roundness testing etc.</p> <p>3.3 Carry out simple exercises involving flatness squareness, straightness and surface finish test</p>	<p>Ask students to differentiate the difference between measuring and testing.</p> <p>Ask students to use</p> <p>a) measuring instruments</p> <p>b) testing instruments</p> <p>Explain how gauges, calipers and micrometers work.</p> <p>Explain how a dial indicator works and give simple examples of its use.</p> <p>Show students the following:</p>	<p>Micrometers- external & internal</p> <ul style="list-style-type: none"> • Vernier calipers • Steel rule • Test mandrel/test bar • 070 x 300mm long dial indicator with stand

					a. Types of surface finish achievable on farm b. The difference between flatness, and straightness.	
7				3.4 Perform taper measurement on jobs 3.5 Inspect jobs using simple comparators	a. Discuss difference between the use of Vernier protractor and sine bar and their limitations. b. Ask students to state types of comparators and use them to inspect jobs.	<ul style="list-style-type: none"> • spirit level • surface roughness tester (portable type) • SURF TEST 4 • 900 angle gauge • straight edge • vernier protractor • sine bar • set of standard slip gauges • marking out table • bench comparator • 0 - 100mm • S-d Test mandrels
	General Objective: 4.0 Know basic drilling and reaming operations					
8				4.1 Operate different types of drilling machine	Differentiate between a. drilling and boring operations b. radial drilling and sensitive drilling machines Inform students of other types of drilling machines which they	<ul style="list-style-type: none"> • Radial drilling machine • Bench drilling machine • Pillar drilling machine • Column type drilling machine

					may have in a larger farm workshop a. Pillar b. Column c. Multi spindle etc Ask students to differentiate between a. Counter boring and counter sinking	
9				4.2 Carry out simple drilling operations such as counter-boring and counter-sinking	Demonstrate how operations in 4.2 are carried out.	<ul style="list-style-type: none"> • Counter boring drills • Counter sinking drills • Centre drills. • Pedestal grinding machine attached with a twist drill grinding attachment.
10				4.3 Carry out reaming operations a. by hand b. on a lathe 4.4 Select correct speeds for reaming small and large holes.	<ul style="list-style-type: none"> • Ask students to do reaming operation • Ask students to drill and ream small and large holes using correct speeds and feed and appropriate lubricants. 	<ul style="list-style-type: none"> • Hand reamers • Machine reamers • Tap wrench • Jacobs chuck and key • Medium size Lathe • Reduction sleeves • Radial drilling machine • Pillar drilling machine • Reamers (machine)
	General Objective: 5.0 Know various simple metal joining operations.					
11				5.1 Fabricate a metal container by Knock-up joining	Demonstrate to students the various metal joining methods.	<ul style="list-style-type: none"> • OXY-acetylene gas welding set • Manual rolling machine • Guillotine shear

				5.2 Join metals by the grooving technique 5.3 Carry out soft soldering	<ul style="list-style-type: none"> • Ask students to fabricate metal container by Knock-up joining • Join metals by grooving technique. 	<ul style="list-style-type: none"> • Assorted cutting snips • Bending machine/press brake.
	General Objective: 6.0 Cut and Join Metal by Gas Welding					
12				6.1 Assemble OXY-acetylene welding plant 6.2 Select various welding regulators, clips, blow pipe and nozzles. 6.3 Perform gas welding by various welding techniques Gut by flame cutting technique	<ul style="list-style-type: none"> • Ask students to distinguish between soft soldering and brazing • Ask students to carryout soft soldering exercise using appropriate soldering flux and assess • Ask students to list out all the component parts of an OXY-acetylene welding plant and identify them. • Ask students to assemble them • Ask students to identify this components and select appropriately 	<ul style="list-style-type: none"> • Blow lamps • Soldering iron • Soldering flux • Safety welding goggles • Oxygen gas cylinder • Acetylene gas cylinder • Regulators, clips, nozzles • Hoses, flash gas lighter • Welding nozzles • Gas welding set • Chipping hammer • Wire brush • Flame cutting blow pipe (nozzle) • Gas welding set

					for welding exercise and assess <ul style="list-style-type: none"> • Ask students the various welding techniques • Ask students to perform gas welding using the various techniques • Ask students to adjust the flame appropriately for cutting 	
	General Objective: 7.0 Know various metal arc welding operations					
13				7.1 Regulate current and determine polarity for metal arc welding 7.2 Determine polarity and select current 7.3 Perform various arc-welding joints by down and up and hand operation. 7.4 Select and prepare metal edges for various	<ul style="list-style-type: none"> • Ask students to determine polarity for metal arc welding and regulate current. • Ask students to distinguish between down welding and up welding operation • Perform down and up welding operation • Ask students to prepare appropriate metal edges for various metal thickness 	<ul style="list-style-type: none"> • Electric arc welding • Machine • Face shield • Welding table • Welding chipping hammer • Wire brush • Hand gloves • Leather apron's • Hand grinder • Pedestal grinding machine

				thickness and technique welding		
	General Objectives: 8.0 Know the various wood working tools and operations.					
14	8.1 List and state the applications of the following a. Geometric /marking out tools e.g. try square, dividers and gauges. b. Planing tools e.g. jack, smooth, try planes, spoke shaves etc. c. Cutting tools, e.g. saws, chisels, knives, boring tools. d. Impelling tools e.g. hammers and mallets.	• Ask students to list and state the applications of these tools (a) - (e)	Chalkboard, OHPs,	8.2 Mark out and prepare wood using the tools in 8.1 8.3 Maintain all tools in 8.1 8.4 Carry out various wood work operations using the tools in 8.1	• Ask students to mark out and prepare wood using tools in 8.1 on a practical exercise • Ask students to maintain tools in 8.1 using appropriate materials and tools. • Ask students to use the tools in 8.1 for the operations on an exercise or training model	

	e. Pneumatic tools.					
	General Objectives: 9.0 Know Simple Operations on Plastics					
15	9.1 Understand the various types of plastic groups such as thermo-setting and thermo-plastic	<ul style="list-style-type: none"> • Ask students to distinguish between thermo-setting and thermo-plastic. • Ask students the characteristics of each type. 	Chalkboard, OHPs,	9.2 Use conventional metal cutting tools to perform operations on each type in 9.1 9.3 Carry out joining operations using plastics in 9.1 9.4 Review previous activities and assess students.	<ul style="list-style-type: none"> • Ask students to use conventional metal cutting tools for operation on thermo-setting and thermo-plastic. What is the result of each operation? • Ask students to join the thermo-setting and thermo-plastic. 	<ul style="list-style-type: none"> • Set of drill • Wood turning lathe • HSS cutting tools • Evostic glue

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 211 - Pasture and Forage Production.

DURATION: 45 Hours (1 Hour Lecture, 2 Hours Practical)

UNITS: 4.0

GOALS: This course is designed to provide the students with the basic knowledge and skill in forage crop production.

GENERAL OBJECTIVES:

On completion of this course the student should be able to:

- 1.0 Understand the general classification, identification and botany of important forage crops.
- 2.0 Understand how to establish pastures and forage crops.
- 3.0 Understand the improvement and management practices of pastures and forage crops
- 4.0 Understand how to make good quality hay and silage.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE: PASTURE AND FORAGE PRODUCTION			COURSE CODE: AGT 211		CONTACT HOURS: 45 HOURS (1 hr lecture: 2 hrs practical)	
GOAL: This course is designed to provide the students with the basic knowledge and skill in forage crop production.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the general classification, identification and botany of important forage crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know how important pasture and forage production is in	Discuss the importance of	White board, markers Lesson note Slide Projector	Identify various pasture crops common in the immediate locality.	Show the students various pasture crops.	Fields of pasture and forage crops.

	Nigeria and understand how it is an integral part of livestock production.	pasture and forage crop in animal production.	LCD projector.			
2	1.2 Identify various forage and pasture crops in Nigeria. 1.3 Understand the basis on which pasture and forage crops are classified e.g. (a) On duration of use basis. (b) On nutrients composition basis.	Describe and explain the classification of the common pasture and forage crops of Nigeria.		Classify the various pasture crops in the locality. Make an album of major pasture and forage crops.	Help students classify forage crops.	Specimens of pasture and forage crops.
3	1.4 Understand the factors affecting the nutritional value and productivity of pasture.	Explain the factors affecting nutritional value and productivity of pasture.		See different types of pasture and forage crops in the field and estimate their feeding value.	Teach students in the field to evaluate pasture and forage.	Fields of grass and forage crops.

	General Objective 2.0 Understand how to establish pastures and forage crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4	2.1 Understand the concept and importance of establishment of a new pasture or forage crop.	Explain the concept and importance of establishment of a new pasture or forage crop.	White board, markers Lesson note Slide Projector LCD projector.	Over 4 weeks establish a small sized pasture/legume sward under rain fed and/or irrigation conditions.	Guide the students in the establishment of their crop.	Pasture and forage seeds, suitable plots of land
5	2.2 Know the methods of planting pasture and forage crops.	Explain the methods of successful establishment of pastures and forage crops.				
6	2.3 Understand the difference in usefulness, value and longevity between pure stands and mixed pastures.	Discuss the advantages and disadvantages of pure stands and mixed pastures.				
	General Objective 3.0: Understand the improvement and management practices of pastures and forage crops.					
7	3.1 Know how to assess pasture land to decide if	Explain how to assess pasture land to decide if	White board, markers Lesson note			

	renovation, improvement or reseedling is needed.	renovation, improvement or reseedling is needed.	Slide Projector LCD projector.			
8	3.2 Understand the objectives of renovating or improving pasture.	Discuss the objectives of renovating or improving pasture.				
	3.3 Know the methods of improving/renovating old pasture or forage crops.	Describe the methods of improving/renovating old pastures or forage crops.		Know the practical steps in pasture renovation programs and improvement of natural grassland.	Demonstrate the practical steps in pasture renovation programs and improvement of natural grassland.	Fields, implements, machinery.
9	3.4 Identify and evaluate problems of pasture management.	Discuss problems of pasture management and explain how to evaluate their impact on production.		See problems of pasture management on commercial farms.	Accompany students.	Suitable visit venues.
10	3.5 Understand the principles of	Explain the principles of		Get hands-on experience of pasture	Demonstrate how to	Fields and equipment.

11	Pasture maintenance and management. 3.6 Know the methods of forage crop management and associated factors.	pasture maintenance and management. Explain the methods of forage crop management and associated factors.		maintenance and management a. roguing. b. fertilizer application c. control of pests. Get hands-on experience of forage crop maintenance and management	practically maintain and manage pastures. Demonstrate forage crop maintenance and management techniques.	Fields and equipment.
General Objectives: 4.0 Understand how to make good quality hay and silage.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	4.1 Outline the advantages of pasture and forage crops preservation and storage. 4.2 Differentiate between hay, silage, pasture and bush forage.	Explain the need for fodder conservation and discuss the choices available to farmers and the merits of each type.	White board, markers Lesson note Slide Projector LCD projector.	See different examples of fodder conservation on farms in the area.	Accompany students.	Suitable visit venues.

13	<p>4.3 Understand hay making under the following: Benefits of hay and hay making. Characteristics of quality hay Types of hay. Methods of preparing and curing hay.</p> <p>4.4 Identify various additives and preservatives used in storing hay.</p>	Discuss the processes involved in hay making and explain what quality aspects are important.		<p>See the processes involved in hay making. Build a hay barn</p>	<p>Demonstrate the processes involved in hay making. Show students how to construct a hay barn.</p>	Fields, building materials.
14	4.5. Understand the procedures of silage making, the biology and chemistry of silage fermentation and the characteristics of quality silage.	Explain the procedures of silage making, the biology and chemistry of silage fermentation and the characteristics of quality silage.		Construct a silage pit. Make silage.	Demonstrate how to construct a silage pit and how to make silage.	Fields, construction materials, plastic sheets.
15	4.6 Know the factors affecting	Explain the factors affecting the supply of hay and silage.				

	the supply of hay and silage. 4.7 Understand the problems of marketing hay and silage.	Explain the problems of marketing hay and silage.				
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PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 212 - Agro-Climatology

DURATION: 60 Hours (2 Hours Lectures, 2 Hours Practical

UNITS: 4.0

GOAL: This course is designed to enable students to understand climatology as it affects agricultural production in the tropics.

General Objectives:

On completion of this course the student will be able to:

- 1.0 Understand simple definitions and concepts in weather and climate.
- 2.0 Understand the different weather and climatic measuring instruments.
- 3.0 Understand the factors influencing climate of an area.

- 4.0 Understand the impact of weather and climate on different realms.
- 5.0 Understand the role of temperature in determining weather conditions.
- 6.0 Understand the basic pressure patterns and the predominant winds in West Africa.
- 7.0 Understand the various locations of ocean currents affecting West Africa and Africa.
- 8.0 Understand the causes of rainfall and aridity.
- 9.0 Understand the Agro-climatic regions of Nigeria and West Africa.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: AGRO-CLIMATOLOGY			COURSE CODE: AGT 212		CONTACT HOURS: 60 HOURS (2 hrs Lectures: 2 hrs Practicals)	
GOAL: This course is designed to enable students to understand climatology as it affects agricultural production in the tropics.						
COURSE SPECIFICATION:						
	General Objective: 1.0. Understand simple definitions and concepts in weather and climate.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Understand the following terms: - weather - climate - humidity - evaporation and evapo-transpiration - pressure and pressure pattern - insulation - aridity. - precipitation	Define the climate terms listed in 1.1	White board, markers, LCD projectors and slide projectors, laptop computer	Make visual weather observations over a 2 week period and keep a weather diary.	Help students make simple visual weather observations.	Diary for each student.

2	1.2 Understand the relationships between weather and climate. 1.3 Understand the concept of climate as a natural resource.	Explain the relationships between climate and weather and stress the importance of considering climate as a resource.				
	General Objective: 2.0. Understand the different weather and climatic measuring instruments.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Know the layout of a typical meteorological station. 2.2 Identify all common meteorological instruments in the institution's meteorological station: i. rain gauge; ii. anemometer iii. thermometer (both minimum and maximum and earth thermometers) iv. solarimeter etc. 2.3 Understand what variable each	Explain the layout and functions of a meteorological station and explain what each instrument measures and how that information is used for agriculture.	White board, markers, LCD projectors and slide projectors, laptop computer	See the instruments working in the meteorological station.	Organize students' trip to meteorological station and demonstrate the function of various meteorological instrument	Meteorological station.

4	instrument in 2.2 above measures. 2.4 Understand the technology of meteorological instruments. 2.5 Know how to measure various weather parameters using the instruments in 2.2 above.	Explain how the measuring instruments work and how they should be used for taking measurements.		Installation and dismantling of meteorological instruments. Learn how to physically take measurements.	Show students how to install and dismantle meteorological instruments. Demonstrate to students how to measure weather variables	
	General Objective: 3.0. Understand the factors influencing climate of an area.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	3.1 Know the definition of the following:- - air masses; - ocean currents - lowland; - uplands; - valleys; - plateau. 3.2 Understand the ways in which each of the factors in 3.1 above would affect and influence climate and agriculture over a wide area.	Describe the factors listed in 3.1 and explain how they affect climate. Describe the relationship between climate and vegetation	White board, markers, LCD projectors, laptop computer and slide projectors, climatic map of Nigeria	Visit different topographies and take measurements to determine micro-climate differences. Relate these to the farming systems in the area.	Accompany and help students on their field trip.	Suitable visit venues.

6	3.3 Identify the existence of a micro-climate in an area.					
	3.4 Understand the need for afforestation and the dangers inherent in indiscriminate deforestation.	Explain the importance of trees in climate and weather determination.		See first hand afforestation projects.	Organize visit to afforestation station.	
	General Objective: 4.0. Understand the impact of weather and climate on different realms.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	4.1 Understand the impact of weather and climate on:- i. man; ii. water cycle; iii. agriculture; iv. pests and diseases; 4.2 Know how to modify or supplement local weather.	Explain to the students the impact of weather and climate on:- i. man; ii. water cycle; iii. agriculture; iv. pests and diseases. Explain how weather can be modified.	White board, markers, LCD projectors, laptop computer and slide projectors	See the effect of weather on the factors in 4.1	Organize student excursion to different ecologies to appreciate the role of climate/weather on the environment.	Suitable visit venues.
	General Objective: 5.0. Understand the role of temperature in determining weather conditions.			Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

8	5.1 Know the definition of temperature fields. 5.2 Understand Isotherms and know their distribution North and South of the Equator in Nigeria and West Africa.	Define temperature fields and isotherms. Use relevant maps to show students the distribution of Isotherms. Link these to farming systems.	White board, markers, LCD projectors, laptop computer and slide projectors, maps			
General Objective: 6.0. Understand the basic pressure patterns and the predominant winds in West Africa.				Practical Contents:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	6.1 Know the high and low pressure belts of Africa and that of West Africa in particular. 6.2 Sketch and annotate the different types of prevailing winds in different seasons of the year in West Africa.	Use maps to describe and explain pressure belts, prevailing winds.	White board, markers, LCD projectors, laptop computer and slide projectors, maps	Over the course of several weeks during the academic year, students should take wind speed and direction measurements, as well as measuring atmospheric pressure, temperature and rainfall and keep a detailed weather diary.	Help students to keep their detailed weather diary.	
10	6.3 Explain the significance of wind direction as major	Explain wind direction and type as major				

	determinant of the West African weather condition. 6.4 Explain the ways in which temperature, pressure and prevailing winds affect weather and climate in the West African region.	determinants of weather. Explain to the students the ways in which temperature, pressure and prevailing winds affect weather and climate in the West African region				
WEEK	General Objective: 7.0. Understand the various locations of ocean currents affecting West Africa and Africa.			Practical Contents:		
11	7.1 Sketch and annotate the different ocean currents around Africa and how they occur. 7.2 Understand the influence on agriculture of these current around West Africa and the neighbouring areas.	Use maps to describe the different ocean currents around Africa and how they occur. Explain to students the influence of these currents on agriculture around West Africa.	White board, markers, LCD projectors, laptop computer and slide projectors, maps			
Week	General Objective: 8.0. Understand the causes of rainfall and aridity.			Practical Contents:		

12	8.1 Understand the roles of:- i. evaporation from water surface to high altitudes; ii. water condensation; iii. high and low pressure areas and their effects; iv. the direction of air flow.	Explain to the students the roles of:- i. evaporation from water surface to high altitudes; ii. water condensation; iii. high and low pressure areas and their effects; iv. the direction of air flow.	White board, markers, LCD projectors, laptop computer and slide projectors			
13	8.2 Understand the causes of varying rainfall and aridity during different seasons of the year and how these affect agricultural activities.	Explain the causes of varying rainfall and aridity during different seasons of the year and how these affect agricultural activities.				
Week	General Objective: 9.0. Understand the Agro-climatic regions of Nigeria and West Africa.			Practical Contents:		
14	9.1 Identify the various agro-climatic regions of Nigeria. 9.2 Apply monthly or seasonal weather statistics in a selected	Use maps and sketches to show the students various agro-climatic regions. Show them how to manipulate	White board, markers, LCD projectors, laptop computer and slide			

15	<p>zone for agricultural planning.</p> <p>9.3 Identify certain indicative clouds and their natural effects on rainfall.</p> <p>9.4 Delimit Nigeria into monthly rainfall zones and explain the implications for agriculture.</p> <p>9.5 Draw, read and interpret rainfall, pressure, wind movements and other line columnal charts for agricultural purposes.</p> <p>9.6 Interpret readings from weather measuring instruments.</p>	and evaluate data for planning purposes.	projectors, maps	Draw, read and interpret rainfall, pressure, wind movements and other line columnal charts for agricultural purposes.	Assist students to draw, read and interpret rainfall, pressure, wind movements and other line columnal charts for agricultural purposes.	Maps and data.
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PROGRAMME: AGRICULTURAL TECHNOLOGY (NATIONAL DIPLOMA)

COURSE: EDD126 INTRODUCTION TO ENTREPRENEURSHIP

DURATION: 45 HOURS (3 HOURS LECTURES)

UNITS: 3.0

GOAL: This course is designed to create general entrepreneurship awareness in the student with a view to inculcating in him the spirit of self-reliance.

General Objectives:

On completion of this course the student will be able to:

1. Understand the basic concept of entrepreneurship
2. Understand the roles of entrepreneurship in personal and national growth and development
3. Know how to set business goals
4. Know how to identify business opportunities
5. Know how to draw single business plans.

PROGRAMME: NATIONAL DIPLOMA AGRICULTURAL TECHNOLOGYt			
Course: INTRODUCTION TO ENTREPRENEURSHIP	Code:EDD126	Credit Hours:	hours 3
Semester: 2	Pre-requisite:	Theoretical: Practical:	1 hours/week 33 % 2 hours/week 67 %
Course main Aim/Goal This course is designed to create general entrepreneurship awareness in the student with a view to inculcating in him the spirit of self-reliance. General Objectives:			

Theoretical Content	Practical Content
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Week	Specific Learning Outcomes	Teacher's Activities	Resources	Specific Learning Outcomes	Teacher's Activities	Resources
	General Objective 1: . Understand the basic concept of Entrepreneurship					
1-4	<p>1.1 Explain the terms: i) Entrepreneurship ii) Entrepreneur iii) Enterprise iv) Self Employment v) Wage Employment</p> <p>1.2 Compare: i) Wage Employment and Entrepreneurship ii) Self Employment and Entrepreneurship</p> <p>1.3 Identify the facilities and opportunities available for self employment.</p> <p>1.4 Identify successful entrepreneurs in Nigeria</p> <p>Evaluate the role of entrepreneurship in wealth creation.</p>	<p>Explain the terms related to entrepreneurship.</p> <p>ii. Compare wage employment and self employment with entrepreneurship.</p> <p>iii. Identify opportunities for self employment</p> <p>iv. Explain the role of entrepreneurship in wealth creation.</p> <p>v. Give assignment</p> <p>vi. Organize a visit to an entrepreneur's organization.</p>	Textbooks			
	General Objective 2: Understand the roles of entrepreneurship in personal and national growth and development					

5-7	<p>2.1 Explain how entrepreneurship leads to the creation of:</p> <p>i) Self confidence ii) Self Expression iii) Wage Employment for others iv) Self Employment</p> <p>2.2 Identify resources and constraints of entrepreneurship.</p> <p>2.3 Explain how entrepreneurship leads to import substitution and utilization of local resources.</p> <p>2.4 Explain how entrepreneurship leads to equitable distribution of industries.</p> <p>2.5 Explain the spirit of Achievement Motivation Test (A.M.T.)</p>	<p>Explain the role of entrepreneurship to national development.</p> <p>ii. Explain resources and constraints of entrepreneurship.</p> <p>iii. Explain the spirit of Achievement Motivation Test (AMT).</p> <p>iv. Invite a successful entrepreneur to give a talk to the students</p>	Textbooks	Explain the role of computer and information technology in entrepreneurship	<p>Explain with the aid of a computer and application packages:-</p> <p>E-mail</p> <p>Internet, website</p> <p>Create:</p> <p>Spreadsheet</p> <p>Invoice</p> <p>Purchase order etc.</p>	<p>Computer and accessories</p> <p>Lotus 123</p> <p>Dbase</p> <p>Internet facility</p>
<p>General Objective 3: Know how to set business goals</p>						

8-10	<p>1 Evaluate strengths, weaknesses opportunities and threat (SWOT Analysis).</p> <p>3.2 Explain the personal characteristics of an entrepreneur.</p> <p>3.3 Explain the Entrepreneurial Tasks:</p> <p>i) Leadership ii) Decision-making iii) Business Planning iv) Time Management</p> <p>Self Management</p>	<p>Explain SWOT analysis and relate it to the organization visited.</p> <p>ii. Explain characteristics of an entrepreneur.</p> <p>iii. Explain the entrepreneurial tasks.</p> <p>iv. Conduct Test</p>	Textbooks	Explain the Entrepreneurship	<p>Demonstrate, using appropriate application package:</p> <p>Business planning</p> <p>Time Management etc.</p>	<p>Computer and accessories</p> <p>Lotus 123 package</p> <p>Text Book</p>
	General Objective 4 Know how to identify business opportunities					
11-12	<p>1 Define business opportunity.</p> <p>4.2 Identify the process of product/service selection.</p> <p>4.3 State the process of exploring opportunities</p>	<p>Explain business opportunities and process of exploring them.</p> <p>ii. Explain the process of product/service selection</p>	Textbooks	Explain the process of exploring opportunities	<p>Demonstrate using appropriate application package.</p> <p>Product selection product tracking order tracking</p>	<p>Computer and accessories</p> <p>Dbase</p> <p>Lotus 123</p> <p>Text Book</p>
	General Objective 5: Know how to draw simple business plans					

13-15	<p>5.1 Define the concept of business plan.</p> <p>5.2 Explain the process of preparing preliminary project proposal.</p> <p>5.3 Explain the process of preparing a detailed) business plan.</p> <p>5.4 Conduct a modest business plan on a selected venture (The written business plan should be assessed as part of the continuous assessment).</p>	<p>. Explain the concept of business plan and project proposal.</p> <p>ii. Guide students in preparing a modest business plan.</p> <p>iii. Give assignment.</p>	Textbooks	<p>Explain the process of preparing preliminary project proposal.</p> <p>Explain the process of preparing a detailed business plan.</p> <p>Conduct a modest business plan on a selected venture</p>	<p>Guide students in preparing preliminary project.</p> <p>Demonstrate, using appropriate packages.</p> <p>Sales forecasting</p> <p>Business plan</p> <p>Time sheet analysis</p> <p>Employee tracking</p> <p>Loan Amortization etc.</p> <p>Explore internet for:</p> <p>Company profile</p> <p>Product catalogue</p>	<p>Computer complete with accessories and:</p> <p>Lotus 123</p> <p>Dbase</p> <p>Internet connection</p> <p>Text book</p>
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					Product nformation	
					URL Management	

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 214 - Industrial Crops II

DURATION: 60 Hours (2 Hours Lectures, 2 Hours Practicals)

UNITS: 4.0

GOAL: This course is designed to acquaint students with the agronomy and Agro-techniques of different types of tree crops.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Identify different types of industrial tree crops.**
- 2.0 Identify areas of production of various industrial tree crops.**
- 3.0 Understand the botany of important industrial tree crops.**
- 4.0 Explain the production techniques of industrial tree crops in Nigeria.**
- 5.0 Understand the production cycle of major industrial tree crops in Nigeria.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: INDUSTRIAL CROP PRODUCTION			COURSE CODE: AGT 214		CONTACT HOURS: 60 HOURS	
GOAL: This course is designed to acquaint students with the agronomy and Agro-techniques of different types of tree crops.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Know different types of industrial tree crops.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.4 Identify the following tree crops cocoa, rubber, coffee, oil palm, kola, raffia palm, cashew, coconut tea etc.	Describe the following tree crops cocoa, rubber, coffee, oil palm, kola, raffia palm, cashew, coconut tea etc.	White board, markers, slide and LCD projectors, laptop computers.	Identify the following tree crops cocoa, rubber, coffee, oil palm, kola, raffia palm, cashew, coconut etc; and their economic products .	Guide students to identify the following tree crops cocoa, rubber, coffee, oil palm, kola, raffia palm, cashew, coconut etc. in established plantations.	Samples.

2	1.5 Understand the origin and history of each crop in 1.1 above. 1.6 Understand their adaptation to Nigerian climatic conditions.	Explain the origin and history of each crop in 1.1 above. Explain their adaptation to Nigeria climatic condition.				
WEEK	General Objective: 2.0 Identify areas of production of various industrial tree crops					
3	2.1 Identify producing areas of the various industrial tree crops. 2.2 Identify main producing areas of industrial tree crops in Nigeria.	Discuss and identify producing areas of the various industrial crops.	White board, markers, slide and LCD projectors, laptop computers.	See commercial examples of tree plantations.	Accompany students.	Suitable visit venues.
4	2.3 Compare figures for: i. main producing areas ii. marginal areas. 2.4 Know the production trends of the main industrial tree crops producing areas in Nigeria.	Discuss and compare figures for: i. main producing areas ii. marginal areas.				
WEEK	General Objective: 3.0 Understand the botany of important industrial tree crops.					
5	3.1 Know the botany of each industrial tree crop listed in 1.1 above under the following heading:	Describe the botany of each industrial crop listed in 1.1	White board, markers, slide and LCD projectors,	See the botanical structures of industrial crops	Explain practically the botany of each industrial crop	Samples.

6	i. taxonomy ii. morphology iii. anatomy iv. structure and forms of fruits and seeds. 3.2 List the types of varieties of industrial tree crops in 1.1 above. Know the improved recommended varieties of the tree crops in 1.1 above.	above under the following heading: i. taxonomy ii. morphology iii. anatomy iv. structure and forms of fruits and seeds. List the types of varieties of industrial crops in 1.1 above. Discuss varietal improvement and quality enhancement.	laptop computers.	Identify varieties of industrial tree crops	Assist students to identify varieties of industrial tree crops	Samples.
WEEK	General Objective: 4.0 Understand and explain the production techniques of industrial tree crops in Nigeria.					
7	4.1 Understand the following cultivation practices for industrial tree crop production: i nursery preparation ii. planting date, spacing, iii. use of poly pots in the nursery.	Describe the cultural practices for industrial tree crops as at 4.1.	White board, markers, slide and LCD projectors, laptop computers.	Watch and carry out cultural practices for industrial crops over 6 weeks to match lecture program.	Show and demonstrate cultural practices for industrial crops over 6 weeks to match lecture program.	College Farms, plants, implements, sprays, relevant machinery.
8	iv. nursery management practices e.g. weeding, shading, watering etc.					

<p>9</p>	<p>v. site selection .vi .land preparation vii. Lining out and pegging. ,holing and transplanting. vii .plantation management practices a. pruning objectives and methods b) principles of .crop protection: spraying, painting of cut surfaces and crack in trunks.</p>					
<p>10</p>	<p>ix weed control: weeding (ring weeding, avenue slashing), use of common crops used in plantations and their characteristics.</p>					
<p>11</p>	<p>x .manuring and fertilizer application. Mulching, pruning of diseased branches of industrial tree crops.</p>					

12	4.2 Carry out spraying of chemicals of different types rates on types of diseases and pests of industrial tree crops.					
13	4.3 Understand harvesting, farm-level processing techniques, grading and marketing of processed produce. 4.4 Maintain implements for harvesting,					

WEEK	General Objective: 5.0 Understand the production cycle of major industrial tree crops in Nigeria.					
14	5.1 Describe the life cycle of major industrial tree crops e.g. cocoa, kola nut, coffee, citrus, oil palm, rubber, locust bean tree etc.	Discuss the life cycle of major industrial tree crops e.g. cocoa, kola nut, coffee, citrus, oil palm, rubber, locust bean tree etc.	White board, markers, slide and LCD projectors, laptop computers.			
15	5.2 Appreciate and profitability the yield capacity of the major industrial crops in 5.1.	Discuss the yield potential and profitability of major industrial crops.				

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 215 - Soil Fertility and Crop Nutrition

DURATION: 60 Hours (2 Hours Lectures, 2 Hours Practicals)

UNITS: 4.0

GOAL: To acquaint the students with the nature and characteristics of soils and plant nutrition.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the concept of crop nutrition.
- 2.0 Understand individual soil characteristics affecting plant growth.
- 3.0 Understand soil depth, textural and structural soil attributes and how they affect fertility.
- 4.0 Understand the influence of soil salinity and acidity on soil nutrient availability.
- 5.0 Understand soil moisture and its importance to nutrient availability and uptake.
- 6.0 Understand soil organic matter and its effects on soil nutrition.
- 7.0 Understand soil organisms and their impact on the fertility of soils.
- 8.0 Understand the principles and practice of crop nutrition management.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: SOIL FERTILITY AND CROP NUTRITION			COURSE CODE: AGT 215		CONTACT HOURS: 60 HRS	
GOAL: To acquaint the students with the nature and characteristics of soils and plant nutrition.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the concept of crop nutrition.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	2.1 Know plant nutrients and their forms of availability. 2.2 Understand the characteristics of a well nourished plant. 2.3 Understand the characteristics of a mal-nourished plant. 2.4 Identify nutritional deficiencies in crops.	Enumerate and explain plant nutrients and their availability. Show pictures of well nourished plants and compare with those that exhibit deficiency.	White board, markers, projector, laptop computer. Soil map	See well nourished and poorly nourished plants in the field.	Demonstrate well nourished and poorly nourished plants in the field.	Plants in fields.
2	2.5 Identify factors that affect crop nutrition. 2.6 Identify nutrient deficiencies in crops due to various causal factors.	Explain plant nutrition, including nutrient deficiencies, identify their symptoms and causes of the deficiencies in crops.		Examine plants exhibiting nutrient deficiencies.	Demonstrate plants exhibiting nutrient deficiencies.	Plant samples, hand lenses.

WEEK	General Objective: 2.0 Understand individual soil characteristics affecting plant growth.					
3	2.1 Understand soil characteristics influencing plant nutrition. 2.2 Categorize the characteristics in 2.1 above into physical and chemical attributes.	Explain soil characteristics influencing plant nutrition and categorize them.	White board, markers, projector, laptop computer.	See plants growing under various soil conditions e.g. compacted, acidic, waterlogged, stony, shallow etc.	Demonstrate plants growing under various soil conditions e.g. compacted, acidic, waterlogged, stony, shallow etc.	College farms.
WEEK	General Objective: 3.0 Understand soil depth, textural and structural soil attributes and how they affect fertility.					
4	3.1 Understand soil depth and its importance in contributing to the soil nutrient reserve.	Explain the importance of soil depth.	White board, markers, projector, laptop computer.	Over 2 weeks identify effect of soil depth, texture and structure on root growth and development	Guide students to identify the various soil textural classes and soil types Guide students to identify soil profiles and measure root development.	Sieves, soils, pH meter, chemicals, textural triangle, spades, augers.
5	3.2 Understand the importance of structure and texture of soil in :- i. soil moisture retention ii. soil aeration iii. permeability of soil water iv. influence on root-nutrient availability v. root anchorage	Define and explain soil texture and structure and their influence on soil moisture, aeration, permeability and nutrient supply.				

WEEK	General Objective: 4.0 Understand the influence of soil salinity and acidity on soil nutrient availability.					
6	4.1 Understand the concepts of soil salinity and acidity. 4.2 Know the causes of salinity and acidity 4.3 Understand how soil acidity affects nutrient availability.	Explain soil salinity and acidity, their causes and how they affect nutrient availability	White board, markers, projector, laptop computer.	Over 2 weeks go and see examples of acidity and salinity problems on farms and other land use areas.	Accompany students	Suitable visit venues.
7	4.4 Know the impact of corrective treatments on soil salinity and acidity and how this affects nutrient availability to crops.	Explain the effect of liming on acid soils, or leaching on saline soils, and how they affect nutrient availability				
WEEK	General Objective: 5.0 Understand soil moisture and its importance.					
8	5.1 Review the definition of “soil moisture” and its importance to plant nutrition. (previously in AGT 113) 5.2 Review the different classes of soil moisture. 5.3 Review available forms of soil moisture and the unavailable forms.	Explain the relationship between soil moisture and nutrient content of soil. Explain the importance of soil moisture on nutrient	White board, markers, projector, laptop computer.	Observe the different forms of soil water in the lab.	Guide students to identify and understand forms of available water.	Soils. seeds, pots, fertilizers.

9	5.4 Be aware of the importance of soil moisture on nutrient availability to crops by simple experiment.	availability to crops Explain how to carry out simple experiments demonstrating the effect of soil moisture on nutrient availability		Carry out simple experiments to show how soil water content and quality affects nutrient availability.	Demonstrate simple experiments.	Soils, test tubes, fertilizer materials.
WEEK	General Objective: 6.0 Understand soil organic matter and its effects on soil properties.					
10	6.1 Review the sources of soil organic matter. (previously in AGT 113) 6.2 Revise the factors affecting the quantity of organic matter in the soil. 6.3 Review the following common types of organic matter and understand how each contributes to soil fertility: i. green manure ii. farm yard manure iii. compost.	Briefly explain the various sources / types of fresh organic matter, indicating factors affecting quantity of OM in the soil and link these to soil fertility and plant growth.	White board, markers, projector, laptop computer.	Identify various sources of OM and understand the practical effects of organic matter on soil .	Over 2 weeks show students different types of soil with varying types and levels of organic matter and compare and contrast crop growth and development.	Suitable visit venues.

11	6.4 Review the importance of stable humus to soil fertility and plant growth. 6.5 Understand the effect of levels of organic matter on soil health.	Explain the nature and characteristics of humus and its effect on soil properties, especially nutrition.				
WEEK	General Objective: 7.0 Understand soil organisms and their impact on the fertility of soils.					
12	7.1 Revise the macro-fauna of the soil:- i. earthworms ii. squirrels and rodents (mammals) iii. snakes, termites, crickets etc. (previously in AGT 113) 7.2 Understand the functions of the macro-fauna of the soil in relation to nutrient availability. 7.3 Revise the macro-flora of the soil and how they contribute to soil fertility	List and explain the functions of the major soil macro fauna and flora and show how each influences soil fertility.	White board, markers, projector, laptop computer microscope, nets, slides.	Over 2 weeks identify soil micro and macro fauna and flora and observe their effects on soil nutrition.	Guide students to identify the soil micro and macro fauna and flora and their effects on soil nutrition.	Microscope, nets, slides, petri- dishes.
13	7.4 Revise the types of micro-flora of the soils:- i. bacteria ii. algae iii.fungi	List and explain the functions of the soil micro and macro flora and show how				

	iv.actinomycetes. and understand how each affects soil fertility. 7.5 Understand the overall influence of soil organisms on soil productivity.	each influences soil fertility. Explain the overall role of soil organisms on soil productivity				
Week	General Objective: 8.0 Understand the principles and practice of crop nutrition management.					
14	8.1 Understand the basic nature of fertilizers. 8.2 Be able to identify the different types of fertilizer and their source:- i. nitrogen fertilizer ii. phosphorus fertilizer iii potash fertilizer iv magnesium fertilizer v sulfur fertilizer vi trace elements	List and explain the various types of fertilizers	White board, markers, projector, laptop computer.	See examples of different types of fertilizers used on farm for increased crop productivity.	Show students different types of fertilizer used to increase productivity.	Fertilizers, growing crops.
15	8.3 Learn about the methods of applying fertilizer to the soil. 8.4 Know how to assess the fertilizer requirement of crops.	Explain the methods of fertilizer application to the soil.		Apply fertilizers to fields, protected crops etc.	Demonstrate fertilizer application methods.	Fertilizer materials, application machinery.

	<p>8.5 Learn how to calculate the amount of fertilizers needed, given the area, recommended rate and kind of fertilizer material.</p> <p>8.6 Understand how to handle, transport and store fertilizers.</p>	<p>Explain how to assess fertilizer requirement of crops.</p> <p>Explain fertilizer calculations based on recommendation for crops.</p> <p>Explain the correct and safe ways to handle fertilizers.</p>				
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Suggested assessment:

5 in-class or practical tests @ 20% each = 100%

PROGRAMME: National Diploma in Agricultural Technology

COURSE: AGT 216 - Farm Soil Management

DURATION: 75 HOURS (2 Hours Lectures, 3 Hours Practicals)

UNITS: 5.0

GOAL: This course is designed to enable students understand the general principles and practices of farm soil management.

GENERAL OBJECTIVES:

On completion of this course the student should be able to:

- 1.0 Understand the importance of soil conservation.**
- 2.0 Understand the nature and effects of wind erosion.**
- 3.0 Understand the nature and effects of erosion by water.**
- 4.0 Understand the principles and practices of sustainable cultivations.**
- 5.0 Understand the principles and practices of water conservation and supply.**
- 6.0 Understand the sustainable management of irrigation systems.**
- 7.0 Understand the effect of climate change on soil management.**
- 8.0 Understand the sustainable management of field drainage systems.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE: FARM SOIL MANAGEMENT				COURSE CODE: AGT 216		CONTACT HOURS: 75 HRS
GOAL: This course is designed to enable students to understand the principles and practices of farm soil management.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the importance of soil conservation.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Understand the term erodibility. 1.2 Learn the causes and effects of soil erosion and its effect on crop production.	Explain the term erodibility and describe the causes and effects of soil erosion on crop production.	White board, markers, projector, laptop computer.	See the macro effects of soil erosion on crop production.	Accompany students.	Suitable visit venues.
2	1.3 Learn about the basic methods of erosion control.	Outline the basic methods of erosion control.		See existing examples of soil erosion control.	Accompany students.	
WEEK	General Objective: 2.0 Understand the nature and effects of wind erosion.					
3	2.1 Understand in detail the causes of wind erosion. 2.2 Understand in detail the effects of wind erosion on crop production.	Define wind erosion. State the causes of wind erosion. List and explain the effects of wind erosion on crop production.	White board, markers, projector, laptop computer.	See the detailed micro effects of wind erosion on crop production.	Take students to the field to see the effects of wind erosion on crop production.	Private farms.

4	2.3 Learn about the methods of control and prevention of wind erosion	Explain the various methods of wind erosion control e.g. soil mulching, cultivation techniques, windbreak construction, inter-row planting etc.		Learn how to practically control wind erosion of soils by constructing windbreaks, mulching soils etc	Demonstrate how to practically control wind erosion of soils by constructing windbreaks, mulching soils etc	Fields, materials.
WEEK	General Objective: 3.0 Understand the nature and effects of erosion by water.					
5	3.1 Understand in detail the causes of water erosion. 3.2 Understand in detail the effects of water erosion on crop production.	Define water erosion. State the causes of water erosion. List and explain the effects of water erosion on crop production.	White board, markers, projector, laptop computer.	See the detailed micro effects of water erosion on crop production.	Take students to the field to see the effects of water erosion on crop production.	Private farms.
6	3.3 Learn about the methods of control and prevention of water erosion	Explain the various methods of water erosion control e.g. soil cultivations, planting direction,		Learn how to practically control water erosion of soils by correct groundwater management and cultivations.	Demonstrate how to practically control water erosion of soils by correct groundwater management	Fields, materials.

		drainage and water diversion.			and cultivations.	
WEEK	General Objective: 4.0 Understand the principles and practices of sustainable cultivations.					
7	4.1 Understand the concept of sustainable soil management. 4.2 Know the causes of soil damage. 4.3 Understand how soil damage affects crop growth.	Explain sustainable soil management. Explain how soil can be damaged by cultivations and what effect this has on crop production.	White board, markers, projector, laptop computer.	See examples of soil damage problems caused by poor cultivation techniques on farms and other land use areas.	Accompany students.	Suitable visit venues.
8	4.4 Learn about the methods of soil damage repair e.g. sub-soiling, surface loosening.	Explain the methods of soil damage repair.		See repair operations in the field.	Demonstrate repair operations in the field.	Fields and machinery.
WEEK	General Objective: 5.0 Understand the principles and practices of water conservation and supply.					
9	5.1 Revise the principles of soil water storage and movement and learn how these are affected by farmer intervention when cropping and cultivating.	Explain how soil water is affected by farm practices such as cultivations and crop rotations.	White board, markers, projector, laptop computer.	See how different crops and cultivation methods affect soil water content.	Demonstrate how different crops and cultivation methods affect soil water content.	Suitable sites. Spades, augers etc.

10	5.2 Learn about new techniques of growing crops to maximize water conservation e.g. Direct drilling, Min-Till, strip cropping, mulching, plastic sheeting, soil management to improve infiltration rate etc.	Explain new techniques of growing crops to maximize water conservation		See new techniques in action to help increase water conservation.	Accompany students.	Suitable venue sites
WEEK	General Objective: 6.0 Understand the sustainable management of irrigation systems.					
11	6.1 Understand the importance of optimizing the use of applied water in crop production. 6.2 Understand the practicalities of irrigation scheduling.	Explain the importance of optimizing the use of applied water in crop production. Show students different methods of scheduling.	White board, markers, projector, laptop computer.	Produce an irrigation balance sheet for a specific crop over a period of several months.	.Demonstrate how to produce an irrigation balance sheet and how this is used to schedule water application on crops.	Rain gauges, calculators, meteorological data e.g transpiration rates.
12	6.3 Investigate new techniques and technologies for maximizing water conservation when irrigating e.g tail water return systems, new	Explain new techniques and technologies for maximizing water conservation when irrigating		See new technologies in action on farm. .	Accompany students.	Suitable visit venues.

	developments in water application machinery.	e.g. tail water return systems, new developments in water application machinery.				
WEEK	General Objective: 7.0 Understand the effect of climate change on soil management.					
13	7.1 Understand how changes in temperature and rainfall patterns will affect the soil's ability to sustain crop production. 7.2 Understand how soil management techniques will need to change to allow for climate change.	Explain how changes in temperature and rainfall patterns will affect the soil's ability to sustain crop production. Understand how soil management techniques will need to change to allow for climate change.	White board, markers, projector, laptop computer.	Continue with irrigation balance sheets.		
Week	General Objective: 8.0 Understand the sustainable management of field drainage systems.					
14	8.1 Understand the role that drainage plays in	Explain the role that drainage plays in	White board, markers, projector,	See examples of drainage water harvesting etc.	Accompany students.	Suitable visit venues.

15	<p>sustainable soil management. 8.2 Understand the concept of drainage water harvesting, treatment and storage.</p> <p>8.3 Learn about new technologies for more efficient drainage.</p>	<p>sustainable soil management. Explain the concept of drainage water harvesting, treatment and storage.</p> <p>Explain new technologies for more efficient drainage.</p>	laptop computer.	See examples of new drainage technology.	Accompany students.	Suitable visit venues.
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YEAR II SEMESTER FOUR

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 222 POULTRY PRODUCTION

DURATION: 60 HOURS (2 HOUR THEORY, 2 HRS PRACTICALS)

UNITS: 4.0

GOAL: This course is designed to enable students acquire a basic knowledge of poultry production.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the different breeds of poultry.**
- 2.0 Understand the role of the poultry industry in the economy.**
- 3.0 Understand the principles of commercial poultry production.**
- 4.0 Understand poultry housing and construction.**
- 5.0 Understand basic management practices in a poultry enterprise.**
- 6.0 Understand basic health management practices in a poultry enterprise.**
- 7.0 Understand production technologies of poultry produce.**
- 8.0 Understand the need for record keeping in the poultry industry.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: POULTRY PRODUCTION			COURSE CODE: AGT 222		CONTACT HOURS: 60 HRS	
GOAL: This course is designed to enable students acquire a basic knowledge of poultry production.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the different breeds of poultry.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know the scope of poultry keeping as an industry. 1.2 List the different breeds of poultry in Nigeria. 1.3 Classify the different breeds of poultry in Nigeria and worldwide. 1.4 Know each breed of poultry in 1.2 above.	Discuss the various breeds of poultry	White board, marker, slide and LCD projectors	Identification Of different breeds of poultry	Guide students to identify different breeds of poultry	Different breeds of poultry

	General Objective: 2.0 Understand the role of the poultry industry in the economy.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2	2.1 Understand the importance of poultry and its products in the Nigerian economy. 2.2 Know the reasons for poultry keeping. 2.3 Understand the factors militating against poultry production in Nigeria. 2.4 List the various types of poultry enterprise in Nigeria.	Lead discussions on the importance of poultry and its products in the Nigerian economy Explain the factors militating against poultry production in Nigeria.	board, marker, slide and LCD projectors	Know the different breeds of poultry and how to classify them	Assist students to know the different breeds of poultry	Different breeds of poultry LCD Projectors maps chart
	General Objective: 3.0 Understand the principles of commercial poultry production.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	3.1 Identify the hybrids used for production of table birds and eggs.	Assist students to identify	Maps charts	Understand the different	Discussion s on the different	Poultry farm eggs battery cages chickens

4	3.2 Learn the systems of commercial egg production e.g. battery, cages, deep litter etc. 3.3 Understand the criteria for choosing any particular system of poultry production. 3.4 Be aware of the advantages and disadvantages of each system in 3.2 above.	layers, broilers, growers etc Lead discussion on advantage of battery or deep litter system.	poultry birds eggs	operating systems for production	operation systems	
	General Objective: 4.0 Understand poultry housing and construction.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	4.1 Explain the environmental factors to be considered in building a poultry house e.g. heat production, moisture and ventilation. 4.2 List some important considerations in poultry house construction e.g. foundations, floors, walls, roofs, etc. 4.3 Determine and design adequate structure and space for a known number of birds.	Discuss and explain different poultry house designs & influence of environment.	Lecture notes	Criteria for choosing a suitable housing design	Assist students in good site identification and construction of a poultry house	Building materials charts
	General Objective: 5.0 Understand basic management practices in a poultry enterprise.					

Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6	5.1 Know the definitions of: i) sexing ii) caponizing, iii) delousing iv) de-beaking v) culling etc. in poultry management. 5.2 Carry out the operations in 5.1 above in a poultry unit.	Explain and discuss sexing caponizing, delousing debeaking culling etc	Lecture notes etc.	Practice sexing, caponizing debeaking	Acquaint student with skills in sexing, caponizing, debeaking etc	Poultry birds Disinfectants Debeaker
General Objective: 6.0 Understand basic health management practices in a poultry enterprise.						
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	6.1 Know epizootic conditions in poultry. 6.2 Understand the following processes: i) vaccination; ii) deworming. 6.3 Know the method of caponization. 6.4 Understand the merits and demerits of caponization. 6.5 Carry out caponization on birds.	Discuss and explain vaccination deworming methods of caponization merits and demerits of caponization	Lecture notes etc.	Practice deworming.	Acquaint student with skills in deworming	Poultry birds, drugs, disinfectants, delouser, dewormer, cotton wool, knives.

8	6.6 Learn about disease in poultry (nutritional and parasitic).					
9	6.7 Identify the symptoms of diseases in poultry. 6.8 Identify and understand the effect of ecto and endo-parasites in poultry. 6.9 Learn the preventive and control measures for ecto and endo-parasites. 6.10 Identify birds with disease problems (nutritional and pathogenic).	List symptoms of disease condition in poultry. Discuss parasites & their control in poultry.	Sick birds, ectoparasites, endoparasites, drugs disinfectants, delousers dewormer	Practice common disease diagnosis	Acquaint student with skills in common disease diagnosis , control and prevention.	Sick poultry birds, drugs disinfectants, deloused dewormer ectoparasites endoparasites.
10	6.11 Know the definition of prophylaxis. 6.12 Learn the methods of prophylactic measures in poultry management e.g. sanitation, vaccination etc.					
11	6.13 Understand what a vaccine is. 6.14 Know of the different types of vaccines. 6.15 Know all necessary vaccinations required by poultry.	Lecture on vaccinations .	Lecture notes		Assist students to carry out vaccination and how to store vaccines	Vaccines, needles syringe, fridge/freezers, cotton wool, diluents measuring cylinder

	6.16 Prepare a vaccination programme. 6.17 Identify the sources of supply of vaccines. 6.18 Store vaccines to maintain viability. 6.19 Understand the importance of adequate vaccines at appropriate intervals.					
12	6.20 Understand the value of antibiotics. 6.21 Learn how to store drugs. 6.22 Identify source of poultry drugs. 6.23 Understand the role of veterinarians.	Lecture on antibiotics.	Lecture notes	Demonstrate the procedures for antibiotics administration	Assist students in drug administration	Drugs, chickens needles syringes measuring cylinder
	General Objective: 7.0 Understand production technologies of poultry produce.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	7.1 Know types of poultry egg grades. 7.2 Sort eggs into the different grades using mechanical and visual/manual grader.	Describe & demonstrate egg grading process	Lecture notes, eggs.	Acquaint students with skill in egg grading	Demonstrate egg grading	Egg grader eggs
	General Objective: 8.0 Understand the processes involved in bird dressing.					

Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
14	8.1 Understand all the processes involved in bird dressing from slaughtering to evisceration and packing. 8.2 Understand the importance of cleanliness during processing. 8.3 Dress chicken. 8.4 Identify a suitable market for whole and dressed birds.	Describe slaughtering and processing in poultry	Lecture notes etc.	Acquaint students with skill in slaughtering and processing poultry	Demonstrate slaughtering and processing poultry	Poultry processing equipment Chickens, knives, hot vats table, defeathering machines
	General Objective: 9.0 Understand the need for record keeping in poultry industry.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
15	9.1 Understand the importance of record keeping in poultry industry. 9.2 List the types of records to be kept in poultry business. 9.3 Prepare a format for each type of record.	Discuss importance of record keeping design different records for different activities	Logbooks , markers, rulers.	Know the importance of record keeping in an enterprise.	Assist student to design a good record book and how to enter records.	Logbooks, markers, rulers.

PROGRAMME:

NATIONAL DIPLOMA

IN AGRICULTURAL TECHNOLOGY

COURSE:

AGT 223 FARM POWER AND MECHANIZATION

DURATION: 60 HOURS (1 HOURS LECTURE 3 HOURS PRACTICE/FIELD WORK)

UNITS: 4.0

GOAL: This course is designed to enable the student understand various farm power and machinery sources, their methods of operation and utilization for increased agricultural out put.

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:-

- 1.0 Know sources of energy on the farm.
- 2.0 Know types of farm engines.
- 3.0 Understand tractors and their operation
- 4.0 Understand the general construction and operation of common types of tillage machinery
- 5.0 Understand the general construction and operation of common types of planting and transplanting machinery
- 6.0 Understand the general construction and operation of common types of machines for applying organic manures and artificial fertilizers.
- 7.0 Understand the general construction and operation of common types of hand sprayers, boom sprayers and crop dusters.
- 8.0 Know the general construction and operation of common types of mowers, forage harvesters, pick-balers and Combine harvesters.
- 9.0 Understand the need for proper processing and storage of crops.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: FARM POWER AND MECHANIZATION			COURSE CODE: AGT 223		CONTACT HOURS: 60 HRS	
GOAL: This course is designed to enable the student understand various farm energy sources, their methods of generation and utilization for increasing agricultural output.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Know sources of energy on the farm.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 List the various sources of power on the farm e.g. human; work animals; mechanical; wind; water; electrical; solar; biomass. 1.2 Compare the various farm energy sources based on the efficiency and cost of generation	Explain the various sources of farm power and their suitability for various agricultural applications	Chalk or magic board, cardboard drawings; information on potential power outputs	Observe and compare the application of different power sources in practical situations	Visits to observe different energy sources in use	Various powered farming operations
	General Objective: 2.0 Know types of farm engines.					
2	Farm engines. 2.1. Learn the constructional features of both two and four stroke engines and explain their working principles 2.2 Differentiate between the principle of operation	Explain the differences between two and four-stroke petrol and diesel engines Explain the different	Chalk or magic board, cardboard drawings of different engines types Chalk or magic board,	2.1. Appreciate the constructional features of both two and four stroke engines 2.2. Appreciate the differences	Demonstrate the operation of both two and four-stroke engines Demonstrate both diesel and	Test engines in workshop Test engines in workshop

	of diesel (compression ignition) and petrol (spark ignition) engines.	operating principles of diesel and petrol engines and their use in agriculture	cardboard drawings;	between diesel and petrol four-stroke engines	petrol four-stroke engines	
General Objective: Understand tractors and their operation						
3	3.1 Recognize the various types and makes of farm tractors, including wheeled and tracked machines from different manufacturers e.g. Massey Ferguson, Steyr, John Deere, Fiat 3.2 Learn the constructional features of farm tractors such as steering, engine, transmission, final drive, implement control system.	Explain the need for different types of farm tractors and illustrate their differences and main constructional components.	Chalk or magic board, cardboard drawings; Manufacturers information sheets	3.1. Identify different farm tractors and their uses 3.2. Identify the main constructional components of farm tractors	Guide the students in the identification of different tractors and their uses Guide the students in the identification of the main tractor components	Different tractor types Different tractor types
4	3.3 Appreciate the mechanisms for selecting farm tractors based on their power ratings for specific jobs such as tillage, planting etc.	Explain the importance of correct tractor selection for different agricultural operations	Chalk or magic board, cardboard drawings; Manufacturers information sheets	3.3 Safely operate a farm tractor. 3.4 Carry out routine maintenance of	Instruct the students in the safe operation of a farm tractor Explain the maintenance	Tractors for driving Tractor Workshop tools

				the farm tractor such as oiling, greasing, cleaning of air filters, etc.	requirements for farm tractors	
General Objective: 4.0 Understand the general construction and operation of common types of tillage machinery.						
5	4.1 Recognise and appreciate the need for different draft cultivation implements, and their methods of operation	Describe the need for, and general operating practices of different draft cultivators	Chalk or magic board, line diagrams of different implements, including subsoilers, moldboards; disc; chisel and ridging ploughs, harrows etc	4.1 Appreciate the differences between draft cultivation implements, and their methods of operation	Demonstrate the different operating practices of draft cultivators	Different cultivators Tractor Field space for demonstration
6	4.2 Recognise the different ground and power driven cultivators and harrows Know the general construction with simple line diagrams of ground driven and power driven harrows and cultivators.	Describe the need for, and general operating practices of different ground and power driven cultivators and harrows	Chalk or magic board, line diagrams of different cultivators	4.2 Appreciate the differences between various ground and power driven cultivators and harrows	Demonstrate the different operating practices of ground and power-driven draft cultivators	Different cultivators Tractor Field space for demonstration

	General Objective: 5.0 Understand the general construction and operation of common types of planting and transplanting machinery.					
7	5.1 Appreciate the different types of planters, seed drills and transplanters.	Describe the general construction and operation of common types of planters, seed drills and transplanters	Chalk or magic board; simple line diagrams of common machines.	5.1. Recognise the different types of planters, seed drills and transplanters.	Explain and demonstrate the differences between different types of drills and planters	Different drills and transplanters Component parts of implements
8	5.2 Understand the importance of correct calibration of seed drills used for different crops. .	Explain the importance of correct calibration of seed drills used for different crops.	Chalk or magic board; Calibration charts	5.2 Be able to calibrate a seed drill for specific crops	Demonstrate calibration techniques and guide the students to do their own calibration	Seed Drills Calibration charts Calibration equipment: balance scales, bucket, etc
	General Objective: 6.0 Understand the general construction and operation of common types of machines for applying organic manures and artificial fertilizers.					
9	6.1 Understand the need for different machines for applying organic manures and artificial fertilizers.	Describe the construction and operation of machines for applying organic manures and artificial fertilizers.	Chalk or magic board; simple line diagrams of common machines	6.1 Understand the construction and operation of common types of manures and fertilizer distributors	Describe the working principles of common types of machines for applying organic manures and artificial fertilizers	Different machines used for the application of manures and artificial fertilisers

	General Objective: 7.0 Understand the general construction and operation of common types of hand sprayers, boom sprayers and crop dusters.					
10	7.1 Appreciate the general construction and operation of common types of hand sprayers, boom sprayers and crop dusters.	Describe the working principles of common types of hand sprayers, boom sprayers and crop dusters.	Chalk or magic board; simple line diagrams of common machines	7.3 Understand the need for correct calibration and maintenance of crop sprayers	Explain the maintenance requirements of common types of hand sprayers, boom sprayers and crop dusters.	Crop sprayers and dusters Calibration equipment Spare parts for equipment
	General Objective: 8.0 Know the general construction and operation of common types of mowers, forage harvesters, pick-up balers and combine harvesters.					
11	8.1 Appreciate the range of machinery used for mowing and forage harvesting	Describe the general construction and operating practices of mowers and foragers.	Chalk or magic board; simple line diagrams of common machines	8.1. Recognise the different mowers and forage harvesters and their methods of operation	Explain and identify the main features of mowers and forage harvesting machinery	Mowers Forage harvester Mower and forager component parts Manufacturers information
12	8.2. Appreciate the different types and operating methods of pick-up balers	Describe the general construction and operating principles of balers	Chalk or magic board; simple line diagrams of common machines	8.2. Recognise the main features and operating practices of balers	Explain the operation of balers and identify their main component parts	Balers Baler component parts: eg knotters Manufacturers information
13	8.3. Appreciate the method of operation of combine harvesters	Describe the general construction and	Chalk or magic board; simple line	8.3. Understand the operation of	Explain the operating principles of	Combine harvester

		operation of combine harvesters.	diagrams of common machines	combine harvesters	combine harvesters	Combine components such as threshing drum and concave, sieves, straw walkers, etc Manufacturers information
General Objective: 9.0 Understand the need for proper processing and storage of crops.						
14	9.1. Appreciate the need for effective storage and processing of agricultural crops – grains, cereals, tubers, fruits and vegetables	Explain the unique qualities of agricultural products and the need for effective storage and processing	Chalk or magic board; diagrams of different storage facilities	9.1. Understand the main methods and facilities for storage of local agricultural crops	Visit to a range of different crop storage facilities and explain how to manage them effectively	Local storage facilities Drawings of typical facilities
15	9.2. Understand the main methods of primary processing of local crops	Explain the methods of primary processing of agricultural crops	Chalk or magic board; diagrams of different processing equipment	9.2. Understand the operation of different processing equipment	Demonstrate the operation of different processing machinery for local agricultural crops	Range of different processing equipment Component parts of machines

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 224 GENETICS AND BREEDING

DURATION: 30 Hours (1 HOUR THEORY, 1 HOUR PRACTICAL)

UNITS: 2.0

GOAL: This course is designed to enable the students understand the importance of inheritance and its application in agricultural production.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the meaning of genetics and breeding.
- 2.0 Understand the principles of Mendelian theory.
- 3.0 Understand genes as the fundamental unit of inheritance.
- 4.0 Understand epistasis.
- 5.0 Understand the principles of reproduction.
- 6.0 Understand the role of hormones in reproduction and causes of reproductive failure.
- 7.0 Understand the principles of selection and how it gives rise to more desirable offspring.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY		
COURSE TITLE: GENETICS AND BREEDING	COURSE CODE: AGT 224	CONTACT HOURS: 30 (1 hour lecture, 1 hour practical)
GOAL: This course is designed to enable the students understand the importance of inheritance and its application in agricultural production.		

COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the meaning of genetics and breeding.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know the definitions of genetics and breeding. 1.2 Learn the various stages of mitosis and meiosis. 1.3 Learn the significant differences between mitosis and meiosis.	Define genetics and breeding. Describe the various stages of mitosis and meiosis and explain the significance of mitosis and meiosis.	LCD projectors, slide projectors, white board, markers, laptop computers	See the processes in 1.2 in action	Demonstration.	Microscopes, tissues, stains etc.
2	1.4 Understand the genetic significance of mitosis and meiosis. 1.5 Identify each stage in 1.2 above on the slide.					
	General Objective: 2.0 Understand the principles of Mendelian theory.					
3	2.1 Understand Mendelian laws of inheritance.	Explain Mendelian laws of inheritance.	As above	See examples of the Mendelian ratio.	Carry out simple crosses to verify Mendelian ratio. This will take several weeks to complete.	Fruit flies.
4	2.2 Verify by experiments Mendelian law as a basis for inheritance. 2.3 Carry out simple crosses to verify Mendelian ratio.					

	General Objective: 3.0 Understand genes as the fundamental unit of inheritance.					
5	3.1 Know the definitions of genes and chromosomes.	Define genes and chromosomes.	As above			
	3.2 Understand dominance and recessiveness with one pair of genes involved.	Explain dominance and recessiveness with one pair of genes involved.				
6	3.3 Understand incomplete dominance, sex influence on inheritance with examples of gene action.	Explain incomplete dominance, sex influence on inheritance with examples of gene action.				
	General Objective: 4.0 Understand epistasis.					
7	4.1 Know the definition of epistasis.	Define epistasis.	As above			
	4.2 Understand the concept of hybrid vigour in epistasis.	Describe hybrid vigour in epistasis.				
8	4.3 Understand how gene inhibition takes place.	Describe how gene inhibition takes place.				
	General Objective: 5.0 Understand the principles of reproduction.					
9	5.1 Learn the processes of reproduction in simple farm birds and animals.	Describe reproduction in	As above			

		simple farm birds and animals.				
	General Objective: 6.0 Understand the role of hormones in reproduction and causes of reproductive failure.					
10	6.1 Know the definition of hormone. 6.2 Understand the function of the different hormones produced during reproduction.	Define hormone. Describe the function of the different hormones produced during reproduction.	As above			
11	6.3 Understand the different factors responsible for reproductive failure and how these can be overcome.	Describe the different factors responsible for reproductive failure.				
	General Objective: 7.0 Understand the principles of selection and how it gives rise to more desirable offspring.					
12	7.1 Understand the following: i) natural selection ii) artificial selection iii) selection for dominant gene iv) selection for a recessive gene.	Explain the followings: i) natural selection ii) artificial selection iii) selection for dominant gene iv) selection for a recessive gene.	As above	Identify good traits using phenotype and production records.	Demonstrate to students how to identify good traits using phenotype and production records.	Animals, records.
13						
14			As above			

15	<p>7.2 Understand the following breeding methods:</p> <ul style="list-style-type: none"> i) inbreeding ii) out-breeding iii) cross breeding iv) line breeding etc. <p>Unit review with students.</p>	<p>Explain and discuss the following breeding methods:</p> <ul style="list-style-type: none"> i) inbreeding ii) out-breeding iii) cross breeding iv) line breeding etc. 		Breeding Methods	Demonstrate the various methods of breeding	
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PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 225 - BEEF AND DAIRY PRODUCTION

DURATION: 45 HOURS (1 HOUR THEORY, 2 HRS PRACTICALS)

UNITS: 4.0

GOAL: This course is designed to acquaint students with the principles and practice of beef and dairy cattle production.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Know the history and development of beef and dairy cattle industry in Nigeria.
- 2.0 Understand the external features of different breeds of beef and dairy cattle.
- 3.0 Understand the techniques of beef and dairy cattle production.
- 4.0 Know the techniques of milking and milk handling.
- 5.0 Know the common diseases and parasites of beef and dairy cattle.
- 6.0 Know farm record keeping and marketing of beef and dairy products.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: BEEF AND DIARY PRODUCTION		COURSE CODE: AGT 225			CONTACT HOURS: 45 HRS	
GOAL: This course is designed to acquaint students with the principles and practice of beef and dairy cattle production.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Know the history and development of beef and dairy cattle industry in Nigeria.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

1	<p>1.1 Know the origin of beef and dairy cattle farming in Nigeria.</p> <p>1.2 Understand the past, present and future role and development of the beef and dairy cattle industry in Nigeria.</p> <p>1.3 Learn about the distribution of various breeds of beef and dairy cattle in Nigeria, tropical & temperate regions.</p>	<p>Outline the origin of beef and dairy cattle farming in Nigeria.</p> <p>-Describe the past, present and future role and development of the beef and dairy cattle industry in Nigeria.</p> <p>-Describe the distribution of various breeds of beef and dairy cattle in Nigeria.</p> <p>-Give & grade assignment.</p>	<p>-Distribution Charts.</p> <p>-Cattle Charts.</p> <p>-Slides</p>	<p>-Know the development of the beef and dairy cattle industry in Nigeria.</p> <p>- Know breeds of beef and dairy cattle in Nigeria & temperate regions.</p>	<p>-Take students on field trip.</p> <p>-Guide students to identify cattle breeds locally available.</p> <p>-Grade report.</p>	<p>-Beef & dairy herds.</p>
	<p>General Objective: 2.0 Understand the external features of different breeds of beef and dairy cattle.</p>					

2	2.1 Classify beef and dairy cattle according to: i) kingdom ii) phylum iii) class iv) order v) family vi) genus vii) species.	-Classify beef and dairy cattle according to: i) kingdom ii) phylum iii) class iv) order v) family vi) genus vii) species.	-Animal taxonomy chart. -Slides. -Cattle charts.	-Know the taxonomy of beef & dairy cattle. -Identify the breeds of cattle in Nigeria.	-Take students on field trip and assist them to identify different breeds of cattle available. -Grade reports.	-Beef and dairy cattle breeds.
	2.2 Recognize some breeds found in the temperate and tropical regions of the world. 2.3 Identify the different breeds using their individual characteristics.	Describe some breeds found in the temperate and tropical regions of the world. -Give & grade assignments.				
3.	2.4 Know some common terminologies used in the beef and dairy cattle production e.g i) breed ii) yearling	List and define some common terminologies used in the beef and dairy cattle production e.g. i) breed ii) yearling		Know the various terminologies in beef and dairy production	Take students on field trip to identify as many of these terminologies. -Grade reports.	Cattle herds.

	iii) cow, bull, calf, heifer etc. iv) freemartin v) chuts etc.	iii) cow, bull, calf, heifer etc. iv) freemartin v) chuts etc.				
4	2.5 Draw and label the external features of typical cattle. 2.6 Recognize the differences between beef and dairy cattle.	Describe and illustrate the external features of typical cattle. Identify the differences between beef and dairy cattle.	-Cattle charts. -Slides.	-Know the external features of cattle. -differentiate between beef and dairy cattle	-Take students on field trip and assist them to identify the external features of a typical cattle and show them differences between beef and dairy cattle.	-Beef and dairy cattle.
	General Objective: 3.0 Understand the techniques of beef and dairy cattle production.					

5	<p>3.1 Know the factors to be considered when establishing a beef and dairy cattle herd.</p> <p>3.2 Identify the possible solutions to some of the unfavorable factors in establishing a beef and dairy farm.</p> <p>3.3 Know the different systems of beef production.</p> <p>3.4 Understand intensive, semi-intensive and extensive systems of cattle production.</p>	<p>Lecture:</p> <ul style="list-style-type: none"> -Describe the factors to be considered when establishing a beef and dairy cattle herd. -Identify the possible solutions to some of the unfavorable factors in establishing a beef and dairy farm. -Define systems of beef production. -Describe intensive, semi-intensive and extensive systems of cattle production. 		<ul style="list-style-type: none"> -Know the factors important to establishing a beef and dairy cattle herd. -Know the solutions to the factors unfavorable to the establishment of beef and dairy cattle herd. -Differentiate between intensive, semi-intensive and extensive systems of cattle production. 	<ul style="list-style-type: none"> -Take students on field trip to see these factors. -Assist students to identify the intensive, semi-intensive and extensive systems of cattle production. -Grade report. 	<p>Cattle farms</p> <ul style="list-style-type: none"> -Equipment -Feeders. -Waterers. -Feed. -Records.
6	<p>3.5 List types of beef and dairy cattle production e.g. stocker</p>	<ul style="list-style-type: none"> -List types of beef and dairy cattle production e.g. stocker 	<ul style="list-style-type: none"> -Slides. -Cattle Charts. 	<ul style="list-style-type: none"> -Identify types of beef and dairy cattle production. 	<ul style="list-style-type: none"> -Take students on field trip. - Assist students to identify the 	<ul style="list-style-type: none"> -Cattle farm.

7	<p>programme, cow-calf, purpose etc.</p> <p>3.6 Know the types of beef and dairy production in 3.5 above.</p> <p>3.7 Understand the criteria used for selecting each type of beef and dairy cattle production.</p> <p>3.8 Identify and choose a system for a beginner, a capital intensive programme (commercial farm) etc.</p>	<p>programme, cow-calf, purpose etc.</p> <p>-Describe the types of beef and dairy production.</p> <p>-State criteria for selecting each type of beef and dairy cattle production.</p> <p>-Identify and choose a system for a beginner, a capital intensive programme (commercial farm) etc.</p>		<p>-Know the types of beef and dairy production.</p> <p>-Know the important criteria for selecting a type of beef and cattle production.</p>	<p>types of beef and dairy cattle programmes</p> <p>-Assist students to select different types of production.</p> <p>-Grade report.</p>	
	<p>3.9 Know the definition of selection as it applies to dairy and beef production.</p> <p>3.10 Learn the economic and non-economic traits in beef and dairy cattle.</p>	<p>Define selection.</p> <p>-List economic and non-economic traits in beef and dairy cattle.</p> <p>-List the reasons for the selection of beef and dairy cattle.</p>	<p>-Charts.</p> <p>-Slides.</p> <p>-Beef cattle.</p> <p>-Dairy cattle.</p>	<p>-Know the purpose for selection in beef and dairy cattle.</p> <p>-Identify economic and non-economic traits in beef and dairy cattle.</p>	<p>-Assist students to carry out practical on the farm and grade them.</p>	<p>-Cattle farm.</p>

8	<p>3.11 Learn the reasons for the selection of beef and dairy cattle.</p> <p>3.12 Understand heritability, hybrid vigour, inbreeding.</p> <p>3.13 Know the various selection methods e.g</p> <p>a) individual merit selection method</p> <p>b) pedigree information</p> <p>c) progeny testing</p> <p>d) showing winning selection method.</p>	<p>-Explain the reasons for the selection of beef and dairy cattle.</p> <p>-Define heritability, hybrid vigour, in-breeding.</p> <p>3.13 Describe the various selection methods e.g</p> <p>a) individual merit selection method</p> <p>b) pedigree information</p> <p>c) progeny testing</p> <p>d) showing winning selection method.</p>	-Slides	<p>-Know the importance of heritability, hybrid vigour and in-breeding.</p> <p>- Differentiate between the selection methods.</p>	-Take students on field trip.	<p>-Heifers</p> <p>-Cows</p>
	3.14 Understand beef and dairy cattle breeding under the listed topics.	<p>-Describe beef and dairy cattle breeding under the listed topics.</p> <p>a)mating methods</p>		<p>-Know the various breeding terminologies.</p>		

	a) mating methods b) mating ratio c) heat period d) signs of heat e) bull testing f) model beef and dairy breeding programme g) gestation period. h) signs of parturition i) parturition j) weaning period. 3.15 Identify animals and heat. 3.16 Know how to prepare a five year breeding programme. 3.17 Categorize the sources of foundation and breeding stock in order to identify the most reliable source.	b) mating ratio c) heat period d) signs of heat e) bull testing f) model beef and dairy breeding programme g) gestation period h) signs of parturition i) parturition j) weaning period. -Identify animals and heat. -Prepare a five year breeding programme. -Categorize the sources of foundation and breeding stock in order to identify the most reliable source.		-Identify animals on heat. -Identify good foundation stock and reliable breeders.	-Guide students to identify animals on heat.	
9	3.18 Identify the various types of houses and equipment needed	Describe the various types of houses and equipment needed	-Charts. -Slides.	Identify the various types of	Take students on field trips. -Guide students to identify the	-Wire. -Planks/wood. -Carpentary kits.

	<p>in a beef, and dairy farm e.g</p> <p>Housing: stall or stanchion barns, loose housing, fee stall or sheds, milk houses or milkrooms/milk parlours/milk paddocks.</p> <p>Equipment: Feeding equipment, watering equipment, feeding racks and bunks loading chutes, manure spreader, milk cones and utensils milk cooler, milking machine etc.</p> <p>3.19 Design a typical beef and dairy house.</p> <p>3.20 Construct simple feeding and watering equipment.</p>	<p>in a beef, and dairy farm e.g</p> <p>i)Housing: stall or stanchion barns, loose housing, fee stall or sheds, milk houses or milkrooms/milk parlours/milk paddocks.</p> <p>ii)Feeding equipment, watering equipment, feeding racks and bunks loading chutes, manure spreader, milk cones and utensils milk cooler, milking machine etc.</p>		<p>houses and equipment needed in a beef and dairy farm.</p> <p>e.g.Housing: stall or stanchion barns, loose housing, fee stall or sheds, milk houses or milkrooms/milk parlours/milk paddocks.</p> <p>e.g. Equipment Feeding equipment, watering equipment, feeding racks and bunks loading chutes, manure spreader, milk cones and utensils milk cooler, milking machine etc.</p> <p>-Draw typical beef and dairy house.</p> <p>-Construct simple feeding and</p>	<p>various types of houses and equipment needed in a beef and dairy farm.</p> <p>-Assist students to draw a typical beef and dairy house.</p> <p>-Assist students to construct simple feeding and watering equipment.</p>	<p>-Milking equipment.</p> <p>-Milking house.</p>
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10				watering equipment.		
	3.21 Learn the digestive system of cattle as an example of a ruminant with a complicated stomach. 3.22 Identify grasses and legumes for cattle feeding. 3.23 Prepare a pasture album. 3.24 Assess the nutritional value of the grasses in 3.22. 3.25 Understand the factors that affect the nutritional value of a pasture. 3.26 Establish a pasture. 3.27 Plan a grazing programme. 3.28 Graze animals. 3.29 Conserve forage by making hay and silage. 3.30 Know what concentrates are.	Describe the digestive system of cattle as an example of a ruminant with a complicated stomach. -Identify grasses and legumes for cattle feeding. -Pasture album. -Specify the nutritional value of the grasses. -Describe the factors that affect the nutritional value of a pasture. -Plan a grazing programme. -Conserve forage by making hay and silage. -Define concentrates and Identify types of concentrates. -Prepare balanced rations, for dry cows, milking	-Charts. -Slides.	-Identify grasses and legumes for cattle feeding. -Make a pasture album. -Know how to establish a pasture. -Plan a grazing programme -Know how to graze. -Prepare balanced rations for dry cow, milking cows, weaners etc	-Assist students to carry out the following operations: i) Identify grasses and legumes for cattle feeding. ii) Prepare a pasture album. iii) Plan a grazing programme. iv) Graze animals. v) Prepare balanced rations for dry cow, milking cows, weaners etc -Grade report.	-Grasses. -Legumes. -Plots. -Beef and dairy cattle.

11	<p>3.31 Identify types of concentrates. 3.32 Prepare balanced rations, for dry cows, milking cows, dairy cows, weaners etc.</p> <p>3.33 Understand the following management operations i) identification ii) dipping/spraying iii) dehorning iv) castration v) Weighing. 3.34 Know how to perform the operations in 3.33 above. 3.35 Carry out the operations in 3.33 above. 3.36 Manage cow and calf from calving to weaning.</p>	<p>cows, dairy cows, weaners etc. -Give and grade assignments.</p> <p>Describe the following management operations i) identification ii) dipping/spraying iii) dehorning iv) castration v) Weighing. -Management of cow and calf from calving to weaning.</p>	<p>-Identification kits. -Dehorning kits. -Castration kits. -Weighing scales. -Chemical.</p>	<p>-Know the following management operations i) Identification. ii) Dipping / spraying. iii)Dehorning. iv) Castration. v) Weighing. -Manage cow and calf from calving to weaning.</p>	<p>-Assist students to carry out the following management operations: i) Identification. ii) Dipping / spraying. iii)Dehorning. iv) Castration. v) Weighing. -Manage cow and calf from calving to weaning.</p>	<p>-Castration kits. -Identification kits. -Dehorning kits. -Chemicals.</p>
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	General Objective: 4.0 Know the techniques of milking and milk handling.					

12.	<p>4.1 Identify milk and milk products.</p> <p>4.2 Know the internal structure of the udder.</p> <p>4.3 Understand milk let down.</p> <p>4.4 Prepare and milk cow using different techniques.</p> <p>4.5 Know and understand the factors that affect the quantity and quality of milk.</p> <p>4.6 Prepare typical milk production record.</p> <p>4.7 Know how to process and store milk correctly.</p>	<p>Identify milk and milk products.</p> <p>-Describe the external features and internal structure of the udder.</p> <p>-Explain milk let down.</p> <p>-Milk cow using different techniques</p> <p>-Describe the factors that affect the quantity and quality of milk.</p> <p>-Prepare typical milk production record.</p> <p>-Process and store milk correctly.</p>	<p>-Charts.</p> <p>-Slides.</p>	<p>Differentiate between milk and its products. -</p> <p>Know the external features and internal structures of the udder.</p> <p>- Know the principles for milk let down -</p> <p>Know the factors affecting quantity and quality of milk.</p> <p>- Know how to produce a milk record.</p> <p>-Know how to process and store milk</p>	<p>Take students on Field trips and Assist them to Prepare milk Record, process Milk and store and grade reports</p>	<p>Dairy cows,milking palour, water milking utensils refrigerator</p>	
	<p>General Objective: 5.0 Know the common diseases and parasites of beef and dairy cattle.</p>						

13	<p>5.1 List diseases and parasites of cattle.</p> <p>5.2 Classify the diseases in 5.1 above e.g bacterial, rural, protozoan, ecto and endoparasites, nutritional etc.</p> <p>5.3 Understand how to prevent diseases through i) management ii) vaccination</p> <p>5.4 Draw up vaccination programme for cattle.</p> <p>5.5 Understand control of cattle diseases using drugs.</p>	<p>list diseases and parasites of cattle.</p> <p>Classify diseases of cattle -Discuss the prevention s of these diseases applying management, vaccination. ---Draw up a vaccination schedule for cattle.</p> <p>Describe control of disease using drugs</p>	<p>-Slides</p> <p>-Charts</p>	<p>-Know cattle diseases & parasites</p> <p>-Know the classes of cattle diseases</p> <p>Know drugs for diseases control</p> <p>-Know disease prevention methods</p>	<p>- Assist students to identify cattle diseases & parasites</p> <p>-Grade reports</p>	<p>- Diseased cattle</p>
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Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
General Objective: 6.0 Know farm record keeping and marketing of beef and dairy products.						
14	6.1 Learn the various production and accounting records in cattle production. 6.2 Understand the importance of adequate record keeping in cattle farms. 6.3 Design breeding milking and accounting records for beef and dairy enterprise.	-Lecture - List the various production and accounting records in cattle production. - Explain the importance of adequate record keeping in cattle farms. - Design breeding milking and accounting records for beef and dairy enterprise.	-Slides -Charts	-Know the production and accounting records in cattle production - Know the important of records on cattle farm - Develop breeding, milking and accounting records in cattle enterprise - Identify cattle markets	-Take students on field trip -Assist them to develop appropriate records -Assist them to identify standard conformation in beef and dairy cattle -Grade practicals	-Notebook -Cattle market
15	6.4 Identify cattle markets. 6.5 Know standard beef and dairy cattle conformations. 6.6 Identify animals with proper conformation.	- Marketing beef and dairy products Identify cattle markets. - Describe standard beef and dairy cattle conformations. - Identify animals with proper		- Know standard beef and dairy cattle conformation -Know how to trade in cattle		

	6.7 Sell or buy animals with the proper conformation.	- Sell or buy animals with the proper conformation				
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PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 226 - HORTICULTURAL CROP PRODUCTION.

DURATION: 60 Hours (2 HOURS THEORY, 2 HOURS PRACTICALS).

UNITS: 4.0

GOAL: This course is designed to acquaint students with the principles and practice of horticulture.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the scope of horticulture and classify horticultural crops.**
- 2.0 Understand the different methods of propagating horticultural plants.**
- 3.0 Understand the principles of soil sterilization for horticultural crop nurseries**
- 4.0 Understand the principles and techniques of fruit crop cultivation, orchard establishment and maintenance.**
- 5.0 Understand the principles and practice of cultivating various types of vegetables**

6.0 Understand the principles and practices of ornamental horticulture.

PROGRAMME:NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: Horticultural Crop Production		COURSE CODE: AGT 226	CONTACT HOURS:2HOURS THEORY ;2HOURS PRACTICALS.			
GOAL: This course is designed to acquaint students with the principles and practices of horticulture.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the scope of horticulture and classify horticultural crops.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Outline the scope of horticulture. 1.2 List the unique characteristics of horticultural plants. 1.3 Understand the role of horticulture in the Nigerian economy.	Define the term Horticulture. Outline and explain the scope, unique characteristics and economic roles of horticultural crops.	Lecture notes, Marker board	See examples of horticultural enterprises	Accompany students	Suitable visit venues
2	1.4 Identify the different types of			See examples of common	Guide the students to see	Crops.

	horticultural plants. 1.5 Classify common horticultural crops on the following basis: i..life-cycles of the plants ii.structures and forms of the plants. iii. uses of the plant and parts used.	Identify and classify horticultural crops with relevant examples. .		horticultural crops .	examples of horticultural crops in each of the classes.	
	General Objective: 2.0 Understand the different methods of propagating horticultural plants.					
3	2.1 Identify the differences between vegetative and sexual propagation. 2.2 Compare and contrast the advantages and disadvantages of vegetative and sexual propagation. 2.3 Understand the process of germination and know the factors affecting seed germination.	Explain sexual and vegetative propagation of horticultural crops. Outline and explain the advantages and disadvantages of sexual and vegetative propagation. Describe the process of seed germination and explain the factors affecting seed germination.	Lecture materials	See examples of sexual and vegetative propagation.	Demonstrate.	Seeds of peppers, okra, cucumber, etc. Suckers of pineapple .
4	2.4 Identify the qualities of a good seeds.	Outline and explain qualities of a good seed and methods of testing		Carry out laboratory work on seed		Okra seeds, jute mallow seeds, water, white cloth, etc

	<p>2.5 List and learn the methods of testing seed viability.</p> <p>2.6 Know the process of pre-conditioning seeds to stimulate germination.</p> <p>2.7 Know factors affecting viability of seeds.</p>	<p>seed viability, e.g. germination test .</p> <p>Describe methods of breaking the dormancy of seeds e.g. soaking in water, hot water treatment, etc.</p>		<p>viability using a given sample of seeds.</p> <p>Pre-condition seeds to stimulate germination. See examples of seeds meant for planting. Attempt to break dormancy of seeds.</p>		
5	<p>2.8 Learn the different methods of sowing seeds:-</p> <p style="padding-left: 40px;">a. sowing in situ</p> <p style="padding-left: 40px;">b. sowing in the nursery.</p>	<p>Describe the following methods of sowing seeds:</p> <p>i. in-situ.</p> <p>ii. drilling.</p> <p>iii. broadcasting.</p> <p>iv. raising of seedlings in the nursery.</p>		<p>Practice methods of sowing seeds of horticultural crops. Raise seedlings in the field using the methods in 2.8 above.</p>	Demonstrate	<p>Seeds, fields or plots.</p> <p>Sowing equipment</p>
6	<p>2.9 Understand the natural means of vegetative propagation:-</p> <p style="padding-left: 40px;">a. suckers</p> <p style="padding-left: 40px;">b. rhizomes</p>	<p>Describe the following methods of natural vegetative propagation:</p> <p>i. suckers.</p> <p>ii. rhizomes.</p> <p>iii. tubers.</p>		<p>Propagate plants by vegetative methods:</p> <p>a. cuttings</p> <p>b. layering</p>	Demonstrate	<p>Plants, pots, compost.</p>

	c. tubers d. bulbs e. corms 2.10 Know the various methods of artificial propagation: a. cutting b. layering c. grafting d. budding.	iv. corms. v. bulbs. Explain the following artificial methods of vegetative propagation: i. use of cuttings. ii. layering. iii. grafting iv. budding.		c. grafting d. budding.		
	General Objective: 3.0 Understand the principles of soil sterilization for horticultural crop nurseries.					
7	3.1 Understand the concept of soil sterilization and its objectives. 3.2 Know the methods of sterilizing soil : 1) steam method 2) chemical 3.3 List and learn the uses of sterile soil, and techniques.	Define soil sterilization and outline its objectives Describe the two major methods of soil sterilization: i. heat methods. ii.chemical methods. State the uses of sterile soils .	Lecture materials.	Practice soil sterilization and explain methods of sterilizing soil for nursery planting .	Demonstrate	Soil samples,water, sawdust, kerosene stove.
	General Objective: 4.0 Understand the principles and techniques of fruit crop cultivation, orchard establishment and maintenance..					

8	4.1 Identify economic fruits and fruit trees. Learn their botanical and common names and their importance to the Nigerian economy.	Classify fruit crops into: a .fruits e.g .pineapple and pawpaw. .b. fruit trees .e.g. citrus and mango. Explain their importance in Nigeria.	Lecture materials.	See examples of fruits and fruit trees.	Accompany students	Suitable visit venues.
	4.2 Identify the different varieties of each fruit in 4.1 above and learn their growth requirements.	Describe the agronomy of the fruits and fruit trees.		See examples of different varieties of fruit.	Demonstrate.	Varietal examples.
	4.3 Understand the principles and practices of orchard establishment: i.raising of seedlings and suckers in the nursery. ii.land clearing. iii.marking-out. iv.holing. v.transplanting.	Describe the principles and practices of orchard establishment.: i. nursery practices. ii .land preparation iii. transplanting		Learn the techniques of establishing fruit orchards. Establish an orchard/fruit garden to reflect the principles of orchard establishment	Demonstrate.	Land, plants, equipment.
10	4.4.Learn maintenance practices in established orchards of fruits listed in 4.1 above: i.weeding.	Describe maintenance practices of the fruits in the orchard through : i. weeding. ii.pruning. iii.crop protection		Practice maintenance techniques in established orchards..	Demonstrate.	Established crops, tools.

11	ii. pruning iii. diseases and pest control. .iv. fertilizer application and manuring .	iv. fertilizer application. Explain their importance in fruit crop cultivation.		Explain post-harvest handling of fruits.		
	4.5 Know how to harvest and post harvest handle the fruits in 4.1 above.	Describe harvesting practices and post-harvest handling of the fruits		Practice harvesting and handling fruits.	Demonstrate.	Crops, equipment.
General objective : 5.0. Understand the principles and techniques of vegetable growing.						
12	5.1 Learn how to identify a site for the establishment of a vegetable garden bearing in mind the following:- a. soil type b. water availability c. climate d. topography e. accessibility f. disease and pest g. market.	Describe the growth requirements of local and exotic vegetables. Identify and explain vegetable growing enterprises: i. home gardening. ii. market gardening. iii. truck gardening. iv. vegetables for processing. v. vegetable forcing.	Lecture materials.	Visit local vegetable growers to see soil types, topography etc.	Accompany.	Suitable visit venues.
13	5.2 Know names of vegetables of economic importance in Nigeria	Identify local and exotic vegetables and their improved varieties and		See different varieties of vegetables.	Demonstrate.	Plants, plots, equipment.

14	<p>and learn the nutritional value of vegetables.</p> <p>5.3 Identify the different varieties of each vegetable in 5.2 above.</p> <p>5.4 Describe the growth requirements of the vegetables listed in 5.2 above.</p> <p>5.5 Know the cultural practices involved in the production of the vegetables in 5.2 above.</p> <p>5.6 Know the symptoms of diseases and pests associated with the vegetables in 5.2 above.</p> <p>5.7 Understand harvesting and post harvest handling of vegetables.</p>	<p>explain why they are important to the human diet.</p> <p>Describe the cultural and maintenance practices of growing local and exotic vegetables.</p> <p>Explain the importance of disease and pest control in vegetables. Show how to harvest vegetables and prepare for market.</p>		<p>Experience planting and growing vegetables in plots.</p> <p>See pest and disease control in action. Gain practical experience of harvesting and preparing vegetable crops.</p>	Demonstrate.	Crops, sprays and sprayers, harvesting and preparation equipment.
	<p>General Objective: 6.0 Understand the principles and practices of ornamental horticulture.</p>					

15	6.1. Identify common ornamental plants 6.2. Classify ornamental plants according to: a. life-cycles. b. functional roles. 6.3 Understand the definition of a nursery and know the different types of nurseries. 6.4 Identify suitable sites for a nursery listing criteria for the selection. 6.5 Learn the best layout of buildings in the nursery. 6.6 Establish and manage pot plants and cut flowers. 6.7 Establish and manage plants for landscape design.	Identify common ornamental plants and flowers in the environment. Classify ornamental plants into: a. life-cycle e.g. annuals and perennials. b. functional roles. e.g. hedges, accents etc Describe the technologies of nursery practices in ornamental horticulture.		See a working nursery on a visit and then get hands on experience of planting, pruning, tending and harvesting nursery plants.	Demonstrate.	Suitable visit venue, plants, pots, compost, water, feed, pruning shears, harvesting equipment.
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PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 227 - BASIC FISHERIES TECHNOLOGY

DURATION: **45 HOURS (2 HOUR THEORY, 1 HRS PRACTICALS)**

UNITS: **3.0**

GOAL: **This course is designed to introduce the student to the basic principles of fish farming.**

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the development of fisheries in Nigeria.**
- 2.0 Understand the relationship between hydrography and fisheries.**
- 3.0 Know the essential requirements for the establishment of a fish farms.**
- 4.0 Understand the construction procedures of a pond.**
- 5.0 Understand the culture of brackish and freshwater fish.**
- 6.0 Know the harvesting process of fish in ponds.**
- 7.0 Know fish preservation, processing and distribution methods.**

	1.7 Know the physical, chemical and biological properties of aquatic environment.	Emphasise importance of environmental balance		Learn importance of ecological balance in nature.		
3	<p>1.8 Understand the role of small scale fishery enterprises within the fishery industry of Nigeria.</p> <p>1.9 Understand the role of artisan fishery sectors in fish production in Nigeria.</p> <p>1.10 Understand the role of industrial fisheries sectors in fish production in Nigeria.</p> <p>1.11 Identify the problems of the various sectors in 1.2 and 1.3 above.</p>	Explain the significance of the divisions that exist between the different fishery sectors based on scale and coastal vs inland	Lecture Student discussion and interaction	<p>Produce an investigative report on a chosen fishery sector</p> <p>Successfully use the internet web sites to source information</p>	Prepare and deliver coursework brief with clear assessment criteria	<p>Internet facility</p> <p>Fishery sector data</p> <p>Access to library</p>
	General Objective: 2.0 Understand the relationship between hydrography and fisheries.					
4	2.1 Know the various parts of the ocean.	Convey the importance of a knowledge of	Oceanography information and mapping	Carry out directed study using an	Produce directed study guidance notes	<p>DVD</p> <p>Study location Notes</p>

	2.2 Know the various types of ocean currents. 2.3 Understand the effect of ocean currents on fisheries. 2.4 Know the definition of up-welling and its effects on fish production.	ocean characteristics to the fish industry	of relevant ocean areas	interactive dvd which demonstrates the critical characteristics and behaviour of oceans	Provide a study location	
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	General Objective: 3.0 Know the essential requirements for the establishment of fish farms.					
5	3.1 Understand the scope of aquaculture. 3.2 Know the pre-requisites for establishing an aquacultural enterprise. 3.3 Understand the function of ponds. 3.4 Classify ponds according to: i. volume of water supply ii. species of fish stocked iii. usage iv. source of water supply.	Impress upon the students the importance of the practicalities of preparation required in establishment Discuss appropriate fish types	Example ponds and water sources Diagrams	Appreciate the diversity of pond types List the characteristics desirable in ideal pond fish production Understand the importance of fish choice	Organise a visit to enable students to see examples of pond sites Briefing to prepare them for week 7 exercise	Transport Instructions and background for visit locations Questionnaire

6	3.5 Understand the following essential cultural requirement: i. soil type ii. quality of water necessary	Emphasise soil type implications Distinguish between different water qualities and their attributes	Lecture Explanations Illustrations	Distinguish between soil types and examine physical properties Determine water quality attributes	Set up a laboratory dem. Students to have access to a range of soil types. Water testing opportunity	Lab facility Soil samples Water samples Testing instructions
	General Objective: 4.0 Understand the construction procedures of a pond.					
7	4.1 Carry out a simple pond survey. 4.2 Know the following operations:- i. excavation of the pond ii. laying out the pond bottom iii. construction of the draining installation (sluice gate/muck) 4.3 Participate in the construction of a fish pond.	Provide guidance on new pond site creation requirements Instruct in site survey techniques Drainage methods	Illustrations Equipment examples Mapping examples	Assist to create a pond or other fish farm site from a crude site. Practice use of survey instrumentation	Prepare and issue instructions for new site location and exercise expectations	Land area Survey instruments Construction equipment Exercise instructions <u>Construction exercise to continue week 8</u>

8	Pond liming and fertilization 4.4 Know the following: i. aims and action of liming and fertilization. ii. general rule for using fertilizers and lime. iii. actions, types and quantity of lime.	State the circumstances which would necessitate such interventions. Provide actual examples and consequences	Action DVD Sample fertilizing and liming agents	Activity above week 7 continued to completion	Activity above week 7 continued to completion	Activity above week 7 continued to completion
9	4.5 Understand the importance of measuring the following in a pond:- i. pH ii. temperature iii. O ₂ iv. CO ₂ 4.6 Understand the effects and importance of factors in 4.5 above on fish.	Expand the lecture and discussion to include stressing the import of maintaining the correct fish environment for maximum productivity.	Illustrations of incorrect examples Teaching aids	Experiment to determine the various water quality conditions specified in lecture room scenario	Prepare lab session to facilitate the testing of pH, O ₂ and CO ₂ concentrations of a range of pond water samples	Pond samples Experimental protocols, chemicals, reagents and analytical equipment Lab location Brief
	General Objective: 5.0 Understand the culture of brackish and freshwater fish.					
10	5.1 Understand the need for management of fish ponds/farm. 5.2 Know the culture of blackfish and freshwater fish	Compare and contrast in some detail the cultural differences between species	Pictures /slides to identify species and	To appreciate the growth and development stages through accessing	Organise a practical for students to research growth and	Charts Diagrams Internet access

11	species e.g. tilapia and hetrotis under the following:- i. distribution/occurrence ii. selection of species from culture. iii. spawning and growth of the fingerlings. iv. problem of over population v. stocking system.	Itemise the issues of management specified to facilitate student learning. Include informal discussions	their characteristics	diagrammatic representation and committing such with labeling to notes	development forms and stages.	Instructions for directed study
	5.3 Know the techniques available for fish feed production. 5.4 Identify different types of fish feed and feed stuff. 5.5 Identify diseased fish based on physical appearance and behaviour. 5.6 Manage a sizeable fish farm of about 0.5 hectares.	Explain, using power point, the importance of correct fish nutrition and link to the more efficient conversion by fish into growth and meat yield	Classroom teaching facilities and projection equipment.	Understand the practical formulation and technical production methods used in the manufacture of quality fish feed	Arrange visit to a fish feed manufacturing facility. Produce student brief and risk assessment.	Feed mill and equipment Example formulations Feed samples Briefing sheet
	General Objective: 6.0 Know the harvesting process of fish in ponds.					
12	6.1 Identify common fishing equipment used in Nigeria. 6.2 Know how to catch fish by draining the pond water. 6.3 Understand the process involved in catching fish without draining water e.g.	Help students appreciate the various methods used to catch and harvest fish. State clearly advantages and	Illustrated literature DVD	Witness and appreciate the skills and practical techniques required in the	Organise an opportunity for students to watch a demonstration of various	Fishing tackle including variety of net types Confined fish locations,

	by using various nets, scoop net, fillet, seine net, cast net, dyke, drum etc. 6.4 Drain and harvest fish from the pond.	disadvantages and the particular circumstances under which each might be used Informally discuss		commercial use of various harvesting methods	techniques including : Drainage Net design types	harvesting opportunity
13	6.5 Identify the different fishing craft such as raft, canoes, dinghy etc. 6.6 Know the various types of materials used for boat/craft construction e.g. wood, steel, glass fibre etc. 6.7 Know the difference between outboard and inboard motors.	Use power point illustrations to convey the diversity of fishing vessel designs. Relate to purpose.	As above	Witness a practical demonstration of fishing vessels Appreciate the range of construction materials used	Organise visit to a boat maker or a demonstration of boat harvesting techniques	Fishing craft Boat motors Net attachments Samples of boat making materials
	General Objective: 7.0 Know fish preservation processing and distribution methods.					
14	7.1 Understand the importance of proper fish handling and preservation in marine and freshwater fisheries. 7.2 Learn and understand the terms: Freshwater,	Distinguish between marine and fresh water scenarios Discuss terminology	Power points Samples of differently processed fish food products for human consumption	Familiarise with variety of methods of preservation – the specialized handling and processing with a view to	Facilitate a study trip to a handling, processing, preservation or auction activity. Devise a 2-week	Visit location Coursework briefing document Organisation background

	freezing, chilling, smoking, salting canning.			producing a high value marketable and saleable product	coursework case study for students based on a choice.	Information.
15	<p>7.3 Know the distribution and marketing channels in Nigeria.</p> <p>7.4 Understand the role of packaging and storage in fisheries.</p> <p>7.5 Identify tools and equipments used in fish processing and preservation e.g. kiln, cold room, refrigerator etc.</p>	<p>Stress the importance of processing techniques linked to best marketing opportunities</p> <p>Engage students in debate</p>	As above	Activity above continued to completion	Activity above continued to completion	As above

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 228 - INTRODUCTION TO ANIMAL HEALTH

DURATION: 45 HOURS (1 HOUR THEORY, 2 HRS PRACTICAL)

UNITS: 3.0

GOAL: This course is designed to acquaint students with the basic principles of animal diseases control.

General Objectives:

On completion of this course the student should be able to:

- 1.0 Understand the classification of animal diseases.**
- 2.0 Identify sick and healthy animals.**
- 3.0 Understand the procedures in post-mortem examination.**
- 4.0 Identify common disease caused by bacteria, viruses, protozoa, and nutritional disorder.**
- 5.0 Understand the life cycle and symptoms of helminthes and ectoparasites.**
- 6.0 Identify the general prevention and control of diseases in animals.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO ANIMAL HEALTH			COURSE CODE: AGT 228		CONTACT HOURS: 45 HRS	
GOAL: This course is designed to acquaint students with the basic principles of animal diseases control.						
COURSE SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Understand the classification of animal diseases.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know the definition of disease. 1.2 Understand the following:- <ul style="list-style-type: none">• infection• endemic• epidemic• pandemic• sporadic• contagious• acute• chronic• mild• etiology• symptoms• pathogenicity.	Define disease. Explain the following:- <ul style="list-style-type: none">• infection• endemic• epidemic• sporadic• pandemic• sporadic• contagious• acute• chronic• mild• etiology• symptoms• pathogenicity.	board, marker, slide and LCD projectors			
2	1.3 Understand the classification of diseases according to causative agents e.g. bacteria; virus,	Classify diseases according to causative agents e.g. bacteria; virus, protozoan,				

	protozoan, fungi and helminthes.	fungi and helminthes.				
	General Objective: 2.0 ‘Identify sick and healthy animals.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Understand the importance of being able to identify sick animals from the herd.	Describe specific characteristics of sick animals from healthy ones.		Identify sick animals from the herd. Examine physically the eyes, nostrils, mouth, head, neck, ear, legs, anus and other parts of the animals body for disease symptoms.	Assists students to identify sick animals from the herd and examine physically the eyes, nostrils, mouth, head, neck ear, legs, anus and other parts of the animals body for disease symptoms.	Thermometer, Stethoscope, Otoscope, Retinoscope.
4	2.2 Learn the specific characteristics of sick animals from healthy ones. 2.3 Examine physically the eyes, nostrils, mouth, head, neck ear, legs, anus and other parts of the animals body for disease symptoms.					
	General Objective: 3.0 Understand the procedures in post-mortem examination					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	3.1 Understand the importance of post-mortem examination in	Discuss & explain the purpose and	Same as above.	Identify the changes in the digestive,	Assist students to identify the changes in the	Knives, Scissors, Scalpel, Bone

6	the treatment and prevention of animal diseases and disorders.	procedure of post mortem examination.		respiratory, reproductive tracts, cranium, kidney, liver, lungs, heart in slaughtered or dead pigs, goat, cattle and chicken.	digestive, respiratory, reproductive tracts, cranium, kidney, liver, lungs, heart in slaughtered or dead pigs, goat, cattle and chicken.	Cutter, Forceps, Axe, File
	3.2 Understand and be able to identify the changes in the digestive, respiratory, reproductive tracts, cranium, kidney, liver, lungs, heart in slaughtered or dead pigs, goat, cattle and chicken. 3.3 Read out temperature of animal faces, urine and blood.	Explain the changes in the digestive, respiratory, reproductive tracts, cranium, kidney, liver, lungs, heart in slaughtered or dead pigs, goat, cattle and chicken.		;Read out temperature of animal faces, urine and blood.	Assist students to read out temperature of animal faces, urine and blood.	
7	3.4 Analyze faeces, urine and blood for micro-organisms and other diseases symptoms.			Analyze faces, urine and blood for micro-organisms and other diseases symptoms.	Assist students to analyze faces, urine and blood for micro-organisms and other diseases symptoms.	
	General Objective: 4.0 Identify common disease caused by bacteria, viruses, protozoa, and nutritional disorder.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

8 & 9	4.1 Know common diseases of animals caused by bacteria e.g. tuberculosis, mastitis etc. i. virus e.g. foot and mouth disease, Rinderpest. ii. diseases caused by protozoa e.g. trypanosomiasis, coccidiosis. iii. nutritional diseases e.g milk fever, hypocalcaemia.	Describe common diseases of animals caused by bacteria e.g. tuberculosis, mastitis etc. i. virus e.g. foot and mouth, rinderpest. ii. diseases caused by protozoa e.g. trypanosomiasis, coccidiosis. iii. nutritional diseases e.g milk fever, hypocalcaemia.	Same as above	Methods of sample collection and laboratory analysis to identify virus, bacteria etc	Practical demonstration of sampling methods and analysis	Infected animals, lungs and Udder.
10 & 11	4.2 Understand the diseases in 4.1 above under the following:- i. etiology ii. symptoms iii. mode of transmission iv. prevention and control.	Describe the diseases in 4.1 above under the following:- iv. etiology v. symptoms vi. mode of transmission prevention and control.				
	General Objective: 5.0 Understand the life cycle and symptoms of helminthes and ectoparasites.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

12	5.1 Know the types of helminthes and ectoparasites. 5.2 Understand the life-cycles of helminthes and ectoparasites.	Describe the types and life-cycles of helminthes and ectoparasites.	As above	Identify the types of helminthes and ectoparasites.	Assist students to identify the types of helminthes and ectoparasites.	Micro-biology equipment for analysis
13	5.3 Understand the host-parasite relationship of helminthes and ectoparasites and the effect this has on livestock production..	Describe host-parasite relationship of helminthes and ectoparasites and explain how this affects livestock productivity.				
	General Objective: 6.0 Know the general prevention and control of diseases in animals.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
14	6.1 Learn the measures usually adopted for disease prevention in animals e.g. good management, proper sanitation, dipping/spraying, foot bath and vaccination.	List and describe the measures usually adopted for disease prevention in animals e.g. good management, proper sanitation, dipping/spraying, foot bath and vaccination.	Same as above	Know disease prevention measures and early disease diagnosis	Carry out common disease prevention measures on the farm.	School Farm.
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	6.2 Understand the importance of veterinary services in livestock production.	Describe the importance of veterinary services in livestock production.		Students to visit a veterinary practice to see them at work.	Accompany on visit.	Veterinary practice.
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PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 229 - FARM MANAGEMENT

DURATION: 30 HOURS (2 HOURS OF THEORY)

UNITS: 2.0

GOAL: This course is designed to introduce students to the basic principles of farm management and accounting.

GENERAL OBJECTIVES:

On completion of this course, the student should be able to:-

- 1.0 Understand the nature and scope of farm management.
- 2.0 Understand production and cost functions.
- 3.0 Understand the concept of diminishing returns and opportunity cost.
- 4.0 Understand the three stages of production and the economic stage of production.

- 5.0 Understand the procedures for deciding upon the level of output and input.**
- 6.0 Understand the importance of keeping adequate record of farm activities.**
- 7.0 Understand the preparations of financial reports or statements.**
- 8.0 Understand the need and importance of planning in agriculture.**
- 9.0 Understand the need for evaluating performance in agriculture.**
- 10.0 Understand the various measures of efficiency and size.**
- 11.0 Understand the importance of effective agricultural resources use.**

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: FARM MANAGEMENT			COURSE CODE: AGT 229		CONTACT HOURS: 30 HRS	
GOAL: This course is designed to introduce students to the basic Principles of farm management and accounting.						
COURSE SPECIFICATION:					Practical Contents:	
	General Objective: 1.0 Understand the nature and scope of farm management.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

1	1.1 Know the characteristics of agriculture that influence farm management.	Explain how the peculiar characteristics of agriculture influence farm management.	LCD projector, slide projector, white board, markers, laptop computers			
	1.2 Understand the social and economic environment that makes for an effective and successful farm management performance.	Explain giving examples how the social and economic environment makes for an effective and successful farm management.				
	1.3 List the tools of farm management.	List the tools of farm management and discuss the importance of				
	1.4 Understand the importance of economics, accounting and mathematics as tools of farm management.	economics, accounting and mathematics as tools of farm management.				
	1.5 Know the difference between risk and uncertainty.	Differentiate between risk and uncertainty.				
2	1.6 Learn of the peculiar problems faced by Farm Managers (e.g. what to produce etc)	Discuss the problems of farm management and their possible solutions.				
	1.7 Know the steps involved in solving	Explain and discuss the 8 problem solving steps				

	(average, variables and marginal costs function). 2.4 Understand the concepts of short run and long run in production. 2.5 Construct a hypothetical data showing a response to a single variable input.	(average, variable and marginal costs function). Explain how the concepts of short run and long run in production affect farm decision making.				
	General Objective: 3.0 Understand the concept of diminishing returns and opportunity cost.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4	3.1 Understand the relevance of the law of diminishing returns in agricultural production. 3.2 Understand the concept of opportunity cost and its implication in farm decision making.	Describe and explain with examples the law of diminishing returns in agricultural production. Explain opportunity cost, scarcity, choice, list of preference in relation to opportunity cost.	As above			
	General Objective: 4.0 Understand the three stages of production and the economic stage of production.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

5	4.1 Know the three stages of production. 4.2 Learn the features of the three stages of production. 4.3 Understand the reasons to support the choice of stage two as the economic state of production.	Using a graph describe and discuss the three stages of production. Explain how the graph shows which stage to stop increasing input or level of production	As above			
	General Objective: 5.0 Understand the procedures for deciding upon the level of output and input.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6	5.1 Learn and understand the criteria used in determining the optimum level of output. 5.2 Identify the criteria used in determining the optimum level of inputs.	Explain and describe the criteria used in determining the optimum level of output.	As above			
	General Objective: 6.0 Understand the importance of keeping adequate record of farm activities.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7	6.1 Know the definition of a farm record.	Define farm record and explain the advantages of	As above			

8	<p>6.2 Understand the advantages of a good farm record system.</p> <p>6.3 Identify types of farm records.</p> <p>6.4 Know whole farm record system.</p> <p>6.5 Know how to record farm activities in farm records book (ledger).</p> <p>6.6 Identify the output and uses of whole farm record system.</p> <p>6.7 Know the definition of an enterprise record.</p> <p>6.8 Understand the advantages and disadvantages of keeping records by enterprise.</p> <p>6.9 Design an appropriate enterprise record system.</p>	<p>a good farm record system.</p> <p>Give practical examples of different formats of farm records.</p> <p>Discuss whole farm records</p> <p>Design enterprise records and discuss their importance</p>				
9	<p>6.10 Understand the meaning of the term 'double entry system'.</p> <p>6.11 Know the definition of farm accounts.</p> <p>6.12 Know the basic types of accounts.</p>	<p>Discuss accounting/ financial records.</p> <p>Discuss basic types of accounts Practice double entry, debit and credit analysis.</p>				

	6.13 Understand the use of accounting equation to keep track of revenue and expenses. 6.14 Identify and apply the rules of debit and credit. 6.15 Learn the debit and credit analysis of a given transaction. 6.16 Record farm activities in farm record books. 6.17 Identify the types of information in farm management. 6.18 Identify the sources of information in farm management. 6.19 Categorize farm transactions. 6.20 Determine the appropriate accounts to be debited or credited.	Discuss the role of effective communication in farm management Describe farm transactions and the different categories				
	General Objective: 7.0 Understand the preparations of financial reports or statements.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

10	<p>7.1 Know the difference between income statement and balance sheet.</p> <p>7.2 Understand the importance of each.</p> <p>7.3 Identify the various categories of accounts used to prepare financial report (income statement and balance sheet).</p> <p>7.4 Construct a balance sheet and income statement.</p> <p>7.5 Know the definition of depreciation.</p> <p>7.6 Identify depreciable assets.</p> <p>7.7 Distinguish between the methods used for calculating asset depreciation.</p>	<p>Discuss factors that influence farm income. Explain, using examples, a balance sheet and an Income statement</p> <p>Explain the purpose of estimating depreciation</p> <p>Describe various methods of calculating depreciation using practical examples</p>	As above			
11	<p>7.8 Calculate an asset annual depreciation.</p> <p>7.9 Know the definition of inventory.</p> <p>7.10 Learn the various inventory valuation methods.</p> <p>7.11 Understand the difference between partial and complete budgeting.</p>	<p>Describe the purpose of valuation and the different methods of estimating the value of an asset.</p> <p>Explain giving examples different types of budgets</p>				

	7.12 Know the steps involving in partial and complete budgeting. 7.13 Understand the concept of time value of money in budgeting (compound and discounting procedures).	Explain the advantages and disadvantages of working with budgets Enumerate giving examples of discounting procedures				
	General Objective: 8.0 Understand the need and importance of planning in agriculture.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	8.1 Know the definition of farm planning. 8.2 Know how to identify the need for planning. 8.3 Learn how to use the tools for planning.	Discuss farm planning. Describe the process of planning farm activity	As above			
	General Objective: 9.0 Understand the need for evaluating performance in agriculture.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	9.1 Know the definition of performance. 9.2 Understand the need for evaluating and appraising farm projects.	Describe & explain methods of appraisal and evaluation of farm projects	As above			

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	relationship to appraisal of farm projects. 10.7 Know how to measure costs and benefits in relation to farm appraisal involving:- i. market prices; ii. valuating non-marginal changes iii. distribution; iv. use of shadow prices.	Describe methods of calculating financial success.				
	General Objective: 11.0 Understand the importance of effective agricultural resources use.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
15	11.1 Understand the theory of equilibrium in factor markets. 11.2 Understand the impact of agricultural labor markets on productivity. 11.3 Know the effect of the use of capital inputs on farms. 11.4 Understand the impact of land acquisition on the economics analysis of agricultural progress.	Discuss and explain the theory of equilibrium in factor markets. Explain the impact of labour on farm productivity. Explain the effect of the use of capital inputs on farms. Explain the impact of land acquisition policy on	As above			

	11.5 Know the influence of size of farms on resource management.	the analysis of agricultural progress. Explain the economy of size of farms on resource management and profitability.				
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PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

COURSE: AGT 230 - AGRICULTURAL EXTENSION AND RURAL SOCIOLOGY

DURATION: 45 HOURS (3 HOURS LECTURES)

UNITS: 2.0

GOAL: This course is designed to acquaint students with the methods of selling modern methods of farming to adult and young farmers.

GENERAL OBJECTIVES:

On completion of this course, the student will be able to:-

- 1.0 Know the scope and need for extension work in agriculture.
- 2.0 Understand the principle of agricultural extensions.
- 3.0 Understand the role of communication in extension.
- 4.0 Understand the concept of innovation and adoption in extension.
- 5.0 Understand the importance of audio-visual aids in extension teaching.
- 6.0 Understand the methods of creating teaching situations for adult learners.

- 7.0** Understand the roles of local leaders in agricultural extension.
- 8.0** Understand the principles of extension administration.
- 9.0** Know the role of Agricultural Research Institutes in extension work.
- 10.0** Understand basic sociological concepts and elements making up the social systems.
- 11.0** Understand the organization and functioning of Nigerian rural institutions.
- 12.0** Understand the agents of social change and barriers to social change in Nigeria.

PROGRAMME: NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY						
COURSE TITLE: AGRICULTURAL EXTENSION			COURSE CODE: AGT 230		CONTACT HOURS: 30 HRS	
GOAL: This course is designed to acquaint students with the methods of selling modern methods of farming to adult and young farmers.						
COURS SPECIFICATION:				Practical Contents:		
	General Objective: 1.0 Outline the scope and need for extension work in agriculture.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Know the definition of agricultural extension. 1.2 Know the history of agricultural extension in the world. 1.3 Understand the objectives of extension. 1.4 Know the various components of	Explain what agricultural extension means. Outline the history of agricultural extension in the world. Explain the objectives of extension. List the various components of agricultural extension viz:	Lecture materials.			

	<p>agricultural extension viz: method, extension, communication, extension administration and operation, extension programme planning and execution.</p> <p>1.5 Understand the reason for the wide difference between available scientific knowledge in farming and rural farmers' level of knowledge which needs to be bridged.</p> <p>1.6 Be aware of the mass adoption of improved farm practices when the knowledge, attitude and skills of farmers are changed through agricultural extension education.</p>	<p>method, extension, communication, extension administration and operation, extension programme planning and execution.</p> <p>Explain the reason for the wide difference between available scientific knowledge in farming and rural farmers' level of knowledge which needs to be bridged.</p> <p>Explain the mass adoption of improved farm practices when the knowledge, attitude and skills of farmers are changed through agricultural extension education.</p>				
2	<p>1.7 Understand the circumstances under which adults learn: when the method of</p>	<p>Help students to evaluate the circumstances under which adults learn: when</p>				

	<p>learning is made informal; the learning process is not made cumbersome; the teacher is acceptable to them; the language and the approach adopted by the teacher are understood; the content of the learning is assessed to relate to their immediate problems and would solve them; the teacher (extension agent) is assessed to be knowledgeable and capable of transmitting information effectively.</p>	<p>the method of learning is made informal; the learning process is not made cumbersome; the teacher is acceptable to them; the language and the approach adopted by the teacher are understood; the content of the learning is assessed to relate to their immediate problems and would solve them; the teacher (extension agent) is assessed to be knowledgeable and capable of transmitting information effectively.</p>				
	<p>General Objective: 2.0 Understand the principle of agricultural extensions.</p>					
3	<p>2.1 Learn the following features of extension education: i. as a means to help people to help themselves; ii. as geared towards the clientele in their village where they live and work.</p>	<p>Explain the following features of extension education: i. as a means to help people to help themselves; ii. as geared towards the clientele in their village where they live and work.</p>	As above			

	<p>iii. use of different methods to convey information; iv. use of local leaders and existing institutions; v. involvement of the local village dwellers in planning extension programmes.</p> <p>2.2 Know the three important methods of contacting clienteles e.g. individual, group and mass media methods.</p> <p>2.3 Know how to apply each of the methods listed in 2.2 above according to the need of particular situations.</p> <p>2.4 Identify instruments and equipment that may be used in each method adopted in 2.3 e.g.</p> <p>i. individual contact method uses spoken language handbills, bulletins.</p> <p>ii. Group contact method using extension demonstration plots, maps, loudspeaker etc.</p>	<p>iii. use of different methods to convey information; iv. use of local leaders and existing institutions; v. involvement of the local village dwellers in planning extension programmes.</p> <p>List the three important methods of contacting clienteles e.g. individual, group and mass media methods.</p> <p>Explain when each of the methods listed in 2.2 should be used according to the need of particular situations.</p> <p>Help students identify instruments and equipment that may be used in each method adopted in above e.g.</p> <p>i. individual contact method uses spoken language handbills, bulletins.</p> <p>ii. Group contact method using extension demonstration plots, maps, loudspeaker etc.</p> <p>iii. Mass media method using radio, television, talking drum, film strip etc.</p>				
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	iii. Mass media method using radio, television, talking drum, film strip etc.					
	General Objective: 3.0 Understand the role of communication in extension.					
4	3.1 Know the definition of extension communication. 3.2 Learn the different elements in communication e.g. communicator, the message and the receiver of the message. 3.3 Understand the role of each of the elements in 3.2 above, in communication. 3.4 Know the characteristics of each element in 3.2 above in extension communication.	Define extension communication. List the different elements in communication e.g. communicator, the message and the receiver of the message. Describe the role of each of the elements in 3.2 in communication. Explain the characteristics of each element in 3.2 in extension communication.	As above			
	General Objective: 4.0 Understand the concept of innovation and adoption in extension.					
5	4.1 Understand the concepts of innovation and adoption in extension education. 4.2 Know the characteristics of agricultural innovations/improved technologies.	Explain innovation and adoption in extension education. List the characteristics of agricultural innovations/improved technologies. Discuss the general attitudes of rural farmers to	As above			

6	<p>4.3 Be aware of the general attitudes of rural farmers to innovations and how this attitude affects their rate of adoption in agriculture.</p> <p>4.4 Know the different categories of adopters of agricultural innovation e.g. innovators, early adopter, late adopters, laggards or non- adopters.</p> <p>4.5 Understand the specific attitudes of each category stated in 4.4 above to innovation adoption.</p> <p>4.6 Learn the socio-cultural, economic and environmental variables that may influence the rate of innovation adoption among farmers in a community.</p> <p>4.7 Understand the expected socio-economic effects of mass adoption of agricultural innovations.</p> <p>4.8 Learn the steps that a normal adopter goes through before finally adopts an innovation in</p>	<p>innovations and how this attitude affects their rate of adoption in agriculture. Identify the different categories of adopters of agricultural innovation e.g. innovators, early adopter, late adopters, laggards or non- adopters. Describe the specific attitudes of each category stated in 4.4 to innovation adoption.</p> <p>List the socio-cultural, economic and environmental variables that may influence the rate of innovation adoption among farmers in a community. Describe the expected socio-economic effects of mass adoption of agricultural innovations. Explain the steps that a normal adopter goes through before finally adopts an innovation in agriculture e.g. awareness, trial etc.`</p>				
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	agriculture e.g. awareness, trial etc.`					
	General Objective: 5.0` Understand the importance of audio-visual aids in extension teaching.					
7	5.1 Understand the role of audio-visual aids in extension. 5.2 Learn about the common audio-visual aids used in extension teaching e.g. film strips maps overhead projector etc. 5.3 Know how to communicate with people using visual and audio-visual materials players, television, posters, free hand sketches, maps and models.	Describe the role of audio-visual aids in extension. Identify the common audio-visual aids used in extension teaching e.g. film strips maps overhead projector etc. Show how to communicate with people using visual and audio-visual materials players, television, posters, free hand sketches, maps and models. Demonstrate how to take photographs of interesting agricultural materials and scene and develop and print pictures for exhibition. Show students how to maintain and service audio visual equipment. Teach how to sketch and model agricultural scenes for exhibition and teaching.	As above			
8	5.4 Take photographs of interesting agricultural materials and scene and develop and print pictures for exhibition. 5.5 Know how to maintain and service audio visual equipment. 5.6 Sketch and model agricultural scenes for exhibition and teaching.					

	General Objective: 6.0 Understand the methods of creating teaching situations for adult learners.					
9	6.1 Understand the definition of the term teaching situation. 6.2 Know the various situations under which teaching and learning by adults can take place e.g. on extension demonstration plots, during study tours, field days etc. 6.3 Know how to plan and execute a successful field trip. 6.4 Know how to plan for and participate in agricultural shows and farmers festivals. 6.5 Learn how exhibits are displayed to visitors and how fairs and shows can pass for a learning situation.	Define the term teaching situation. List the various situations under which teaching and learning by adults can take place e.g. on extension demonstration plots, during study tours, field days etc. Describe how to plan and execute a successful field trip. Describe how to plan for and participate in agricultural shows and farmers festivals. Describe how exhibits are displayed to visitors and how fairs and shows can pass for a learning situation.	As above			
	General Objective: 7.0 Understand the roles of local leaders in agricultural extension.					
10	7.1 Understand what a local leader does. 7.2 Know the methods and roles of local leadership	Describe a local leader. Describe the methods and roles of local leadership among various tribes in Nigeria.	As above			

	<p>among various tribes in Nigeria.</p> <p>7.3 Understand the merits and demerits of the use of local leaders in agricultural extension e.g. abuse of power, inaccessibility etc.</p> <p>7.4 Know the definition and role of the para-professional in local extension.</p> <p>7.5 Understand how paraprofessionals are trained for extension.</p> <p>7.6 Know the various types of leaders in extension e.g. Democratic leaders, Authoritarian leader Charismatic leader.</p> <p>7.7 Understand the value of intensive and continual training of leaders to improve their technical competence on the job.</p>	<p>Discuss the merits and demerits of the use of local leaders in agricultural extension e.g. abuse of power, inaccessibility etc.</p> <p>Define the term para-professional in local extension.</p> <p>Describe how paraprofessionals are trained for extension.</p> <p>Discuss the various types of leaders in extension e.g. Democratic leaders, Authoritarian leader Charismatic leader.</p> <p>Explain the value of intensive and continual training of leaders to improve their technical competence on the job.</p>				
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	General Objective: 8.0 Understand the principles of extension administration.					
11	8.1 Know the roles of top personnel in extension	Identify top personnel in extension administration				

	<p>administration e.g. extension specialist, subject matter specialists e.g. entomologists, soil scientists etc.</p> <p>8.2 Understand the roles of intermediate and village level extension agents in extension work.</p> <p>8.3 Know the main tasks of an extension administrator.</p> <p>8.4 Know the advantages of training and retraining extension workers.</p> <p>8.5 Know the different types of training opportunities open to extension work e.g. the training and visit system (T & V).</p> <p>8.6 Understand the “Up-Down” and “Down-Up” approaches in extension-development.</p> <p>8.7 Understand the effectiveness of the extension system in Nigeria.</p> <p>8.8 Know how a successful extension programme could</p>	<p>e.g. extension specialist, subject matter specialists e.g. entomologists, soil scientists etc.</p> <p>Explain the roles of intermediate and village level extension agents in extension work.</p> <p>List the main tasks of an extension administrator.</p> <p>List the advantages of training and retraining extension workers.</p> <p>Describe the different types of training opportunities open to extension work e.g. the training and visit system (T & V).</p> <p>Discuss the “Up-down” and “Down-UP” approaches in extension-development.</p> <p>Estimate the effectiveness of the extension system in Nigeria.</p> <p>Describe how a successful extension programme could be initiated, executed and appraised.</p> <p>Define planned programme and work plan.</p>				
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	<p>be initiated, executed and appraised.</p> <p>8.9 Know the definition of planned programme and work plan.</p> <p>8.10 Distinguish between planned programme and work plan.</p> <p>8.11 Understand when to use the methods of appraising extension programmes e.g. everyday observation, informal studies.</p>	<p>Distinguish between planned programme and work plan.</p> <p>Describe the methods of appraising extension programmes e.g. everyday observation, informal studies and explain when they are best used..</p>				
	<p>General Objective: 9.0 Know the role of Agricultural Research Institutes</p>					
12	<p>9.1 Understand the roles of Agricultural Research Institutes in the production of agricultural technologies and extension work..</p> <p>9.2 Know how to access the latest information from the appropriate arm/unit in Agricultural Research Institute for use by farmers.</p> <p>9.3 Communicate research findings from Research</p>	<p>Explain the roles of Agricultural Research Institutes in the production of agricultural technologies and extension work.</p> <p>Show students how to access the latest information from the appropriate arm/unit in Agricultural Research Institute for use by farmers.</p> <p>Explain how to communicate research</p>	As above			

	Institutes to farmers and monitor its use. 9.4 Know how to identify farmers' problems and relay back to appropriate unit in the Agricultural Research Institute.	findings from Research Institutes to farmers and monitor its use. Explain how to identify farmers' problems and relay back to appropriate unit in the Agricultural Research Institute.				
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				Practical Contents:		
	General Objective: 10.0 Understand basic sociological concepts and elements making up the social systems.					
Week	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13	7.1 Understand the definition of society. 7.2 Understand the concept of social organization. 7.3 Know the major social systems and values:- viz: law abiding;	Define society. Explain social organization. List and describe major social systems and values:- viz: law abiding; devotion to duty;	As above			

	devotion to duty; humility; piety etc. 7.4 Learn the social norms and beliefs of Nigerian society. 7.5 Understand the impact of Nigeria socio-cultural values on innovations 7.6 Understand:- social stratification; social class; caste system; ethnocentrism; cultural lag.	humility; piety etc. Classify and describe social norms and beliefs with respect to Nigerian society. Outline the impact of Nigeria socio-cultural values on innovations Explain:- social stratification; social class; caste system; ethnocentrism; cultural lag.				
	7.7 Know basic details of the following rural family types in Nigeria: Monogamy, polygamy, polyandry etc. 7.8 Know the different marital relationships in rural Nigeria e.g. patrilocal, matrilineal; abuncle – local etc. 7.9 Understand the roles of churches, mosques, peer groups, farmers' associations, council of obas	Describe the following rural family types in Nigeria: Monogamy, polygamy, polyandry etc. Describe the different marital relationships in rural Nigeria e.g. patrilocal, matrilineal; abuncle – local etc. Explain the roles of churches, mosques, peer groups, farmers' associations, council of obas and chiefs in the rural social system.				

	and chiefs in the rural social system.					
	General Objective: 11.0 Understand the organization and functioning of Nigerian rural institutions.					
14	<p>8.1 Learn all the tribal groupings in Nigeria.</p> <p>8.2 Know the areas occupied by the tribal groupings listed in 8.1 on a map of Nigeria.</p> <p>8.3 Know the characteristics of the unit family among the following tribal groups in Nigeria:-</p> <p>Hausa, Ibo, Yoruba; Fulani Edo; Efiki; Ibibio, Gwari; Ijaw; Tivs; Igalas; Birons; Angas; Idomas; The Jukuns.</p> <p>With regard to pattern of marriage; rearing of children; inheritance; extended family system.</p>	<p>List all the tribal groupings in Nigeria.</p> <p>Locate the areas occupied by the tribal groupings listed in 8.1 on a map of Nigeria.</p> <p>Describe the characteristics of the unit family among the following tribal groups in Nigeria:-</p> <p>Hausa, Ibo, Yoruba; Fulani Edo; Efiki; Ibibio, Gwari; Ijaw; Tivs; Igalas; Birons; Angas; Idomas; The Jukuns.</p> <p>With regard to - pattern of marriage; - rearing of children; - inheritance; extended family system.</p>	As above			
	General Objective: 12.0 Understand the agents of social change and barriers to social change in Nigeria.					
15	9.1 Know the process of social change in society.	Outline the process of social change in a society.	As above			

	<p>9.2 Understand the factors that affect the rate of social change in a society. e.g. Education, illiteracy, religion, culture, imported culture, etc.</p> <p>9.3 Know the agents of social change in Nigeria e.g. tourism, education, agriculture etc.</p> <p>9.4 Understand how religious rural belief affects agricultural production in Nigeria e.g. sacred bushes; native holy days taboo animals and crops etc.</p>	<p>Outline the factors that affect the rate of social change in a society. e.g. Education, illiteracy, religion, culture, imported culture, etc.</p> <p>List and describe agents of social change in Nigeria e.g. tourism, education, agriculture etc.</p> <p>Explain how religious rural belief affects agricultural production in Nigeria e.g. sacred bushes; native holy days taboo animals and crops etc.</p>				
	<p>9.5 Know the culture – based barriers to rural social, change e.g. Tradition, beliefs, relative values etc.</p> <p>9.6 Understand social barriers to change in the rural community e.g. responsibilities, social structure.</p> <p>9.7 Know psychological barriers to social change in</p>	<p>Explain the culture – based barriers to rural social, change e.g. Tradition, beliefs, relative values etc.</p> <p>Discuss social barriers to change in the rural community e.g. responsibilities, social structure.</p> <p>Explain psychological barriers to social change in</p>				

	rural communities e.g. attitudes of rural people to government personnel, towards gifts etc. 9.8 Understand communication as a factor in rural social change e.g. language, picture, learning problems.	rural communities e.g. attitudes of rural people to government personnel, towards gifts etc. Illustrate communication as a factor in rural social change e.g. language, picture, learning problems.				
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AGRICULTURAL TECHNOLOGY
MINIMUM LIST OF EQUIPMENT: NATIONAL DIPLOMA ONLY

1.0 Laboratory: General Biology/Pathology/Entomology

1.0 General Biology

See list of Equipment for

STB 111

STB 112

STB 121

STB 122

1.1 Microbiology and Pathology:

ITEM	QUANTITY	REMARK
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Autoclave	1	
Refrigerator	1	
Platinum wire loops	30	
Incubator	1	
Anaerobic jar	2	
Lovibond colour comparators	2	
Milk sampling outfit	2	
Colony counter	1	
Centrifuge	1	
Water bath	1	
Electronic balance	2	
Microscopes		
Simple	5	
Compound	5	
Staining troughs	15	
Magnifying glasses	15	
Insect cages and cabinets	5	
Specimen bottles	20	
Insect nets	30	
Lamps	10	
Mist nets	10	
Cool boxes	10	

2.0 Laboratory: General Chemistry/Animal/Plant Nutrition:

2.1 General Chemistry:

See list of Equipment for

BCH 111

BCH 121

2.2 Animal/Plant Nutrition:

ITEM	QUANTITY	REMARK
Oven	1	
Centrifuge	1	
Chemical balance	2	
Desicator	2	
Pestle and mortar	2	
Flask shaker	2	
Kjedhal nitrogen determination apparatus	1	
Grinder/blender	1	
Colorimeter	1	

3.0 Laboratory: Physics:

3.1 See list of Equipment for

BPP 111

BCH 121

4.0 Laboratory: Soil Laboratory:

ITEM	QUANTITY	REMARK
Drying oven soils	1	
pH metre	1	
Electric furnace	1	

Electric balance	2	
Beam balance	2	
Soil sieve (mesh)	2	
Soil sedimentation apparatus	2	
Soil capillary determination	2	
Soil humidity determination apparatus	2	
Soil testing outfit	3	
Soil angers	5	
Humidity cabinet	1	
Soil moisture meter	2	
Soil salt tester	1	

5.0 Drawing Room:

ITEM	QUANTITY	REMARK
Drawing boards and tables	35	
Drafting set	5	
T square	10	
Set square	10	
Protractors	10	
Lettering set	10	

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7.0 Meteorological Station:

ITEM	QUANTITY	REMARK
Stevensons screen	1	
Thermo hydrographs	1	
Maximum and minimum thermometer	2	
Rain gauge	2	
Measuring glasses	2	
Wind vane	1	
Anemometers	2	
Evaporimeters	2	
Hygrometers	2	
Barometers	2	

8.0 Audio Visual Room:

ITEM	QUANTITY	REMARK
Video recorder	2	
Slide projector	2	
Overhead projector	2	
Film projector	2	
Magnetic board	2	

Public address system	1	Dark room
Television set	2	
Cameras	5	
Enlarger	1	
Photo dryer	1	
Photo cutter	1	
Tables for drawing	5	To sit 6 each
Water colours		
Drawing pencils		
Drawing pens		
Display cabinets and boards		

9.0 Pest Control Equipment Store:

ITEM	QUANTITY	REMARK
Knapsack pressure sprayer	2	
Motorized mist sprayer	1	
Handy sprayer	5	
Hand sprayer with container	5	
Flood jet nozzles (1.5 Ok)	4	
Boom sprayer	2	

10.0 Farm Machinery Shed:

ITEM	QUANTITY	REMARK
Tractors	4	
Disc plough	4	
Disc harrows	4	

Disc ridgers	4	
4 wheel trailer	2	
Stump jumper		
Earth scoop	1	
Rotovators	1	
Versafile cultivators	1	
Mould board ridge	2	
Tractor which	2	
Tractor pulley	2	
Versa file seed loader	2	
Seed drill	2	
Combine harvester	2	
Seed cleaner	1	
Seed grader	2	
Hay baler	1	
Cutter bay mower	1	
Rotary slasher	1	
Fertilizer spreader	1	
Cereal thresher	1	
Forage shreader with cut hood	1	
Sub soiler	2	
Versatile mould board plough	3	
Manual maize planter	2	
Spike tooth harrow	1	
Rice planter	2	
Root cutter	1	
Interrow weeder	1	
Manure spreader		

11.0 Crop Storage and Processing:

ITEM	QUANTITY	REMARK
Rice milling machine	1	
Rice thresher	1	
Rice parboil machine	1	
Groundnut decorticator	1	
Maize sheller	1	
Hand oil press	1	
Grain drier	1	
Cassava peeler	1	
Cassava grater	1	
Silos		
Gribs	Various	Size
Yarm barns	Various	Size
Rhumbus	various	size
Refrigerated ware house		

12.0 Nursery Tools Store:

ITEM	QUANTITY	REMARK
Watering system (spraying)	5	
Seed sowers	5	
Root pruners	5	
Plant lifters	5	
Flame weeder and hedgers	5	
G.H.P. pump	5	
Secatours	2	
Planting hoes	10	
Spade	10	
Pick axe	10	

Hand trowel	10	
Wheel barrows	10	
Watering cans	10	
Head pans	10	
Matchets	10	
Cutting knives	10	

13.0 Wood/Metal/Maintenance Workshop:

ITEM	QUANTITY	REMARK
WOOD WORK SECTION		
Working benches with vice	10	
Band saw	2	
Surface planer	2	
Thickness planer	2	
Drilling machine	1	
HAND TOOLS		
Saws, chisel, try square, gauges, rulers, screwdrivers, set of drin bit hammers, pincers, oil stones, planners etc.	15	
METAL WORK SECTION:		
Lathe machine	1	
Pipe benders	3	
Anvils	3	
Micrometers (insides, outside)	1	
Stock and dice set	5	
Drill sets	5	
Electrical hand drills	2	
Hydraulic jack 12 and 15 tons	1	

Tool boxes	5	
Box of drill	4	
Battery charger	1	
Grease gun	2	
Pipe cutters	1	
Scribers	1	
Steel ruler	5	
Mallet sets	2	
Pipe screwing – threading	2	
Arch welding equipment working benches	8	
Arc welder	42	
Electric grinder	2	
Welding gloves	15	
Welding helmet	15	
Wire brush	5	
Welding boots and screen Soldering equipment	15	
Blow torch		
Tin snips	4	
Soldering flux	4	
Sheet metal sheer	4	
Mallet hammer	4	
Hack saw	4	
Oxygen and acetylene bottles	4	
Oxygen and acetylene regulator	2	
Cylinder wrenches	2	
Spark lighter	3	
	5	
MAINTENANCE WORKSHOP		
Tool boxes	5	
Hydraulic jack	2	
Service pit	1	

Tool boxes Teaching model or scraps of Tractors engines Trailers Ploughs Other farm implements.	5	
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14.0 Irrigation Equipments:

ITEM	QUANTITY	REMARK
Sprinkler irrigation kit 2,000	15	
Hoses		
Rotating sprinkler for 5 acres	103	
Big boss irrigation gun for 20 acres	10	
Centre pivot irrigation system for 20 acres	1	
Current meter	2	
Irrigation water tester	2	
Electric motor pump	1	

15.0 Others

ITEM	QUANTITY	REMARK
Feed mill with accessories	1	
Fish pond	1	
Green house	1	

16.0 Crop Farm (Teaching and Commercial)

ITEM	QUANTITY	REMARK
Nursery	5	
Horticultural farm	10	

Orchard	10	
Crop farm		
Tubers	10	
Cereals	100	
Grains		
Fertilizer store	1	
Manure store	1	
Implement store	1	

17.0 Animal farm (Teaching and Commercial)

ITEM	QUANTITY	REMARK
POULTRY		
Laying unit	1000	Capacity
Brooder unit	1000	“
Deep litter	1000	“
Hatchery	1	
Incubators	3	Various sizes
Goat unit	80	“
Sheep un it	80	“
Rabbitry	80	“
Piggery	80	“
Beef cattle	50	“
Dairy cattle	50	
Milking parlour	1	
Slaughter house with slab	1	
Dip slab	1	
Hay barn	1	
Store: to contain equipment for		

Watering and feeding troughs Castration Dehorning Dehooting Teeth cutting Tagging and notching Tattooing Skin and horn branding Slaughtering Dressing and cutting Cold storage		
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Outline Reading List for National Diploma in Agricultural Technology

(NB All titles available on [amazon.com](https://www.amazon.com))

Yousef, MK (1982). *Animal Production in the Tropics*. Praeger

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Ison and Russell (Eds) (2007). *Agricultural Extension and Rural Development*. Cambridge University Press.