

NID in Agriculture (Draft)

NATIONAL BOARD FOR TECHNICAL EDUCATION, KADUNA

NATIONAL VOCATIONAL CERTIFICATE

IN

AGRICULTURE

CURRICULUM AND COURSE SPECIFICATIONS

2007

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

NATIONAL INNOVATION DIPLOMA IN (AGRICULTURE)

2.0 GOAL AND OBJECTIVES:

GOAL: The National Innovation Diploma in Agriculture is designed to produce a self – reliant, skilled and productive agriculturist.

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

- (i) Establish agricultural enterprises in fish, crop and animal production and support services;
- (ii) Create enterprise opportunities in apiary, sericulture floriculture and micro-livestock e.g. Rabbits, cane rat snailery, quails and pigeons.
- (iii) Carry out enterprise ventures in the production of animal feeds.
- (iv) Create enterprises in processing, storage and marketing of Agricultural produce.
- (v) Create enterprises in pest and disease control.

3.0 Entry Requirements for National Innovation Diploma in Agriculture.

The general entry requirements for the NID programme in agriculture 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:

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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 NEW and NABTEB before undertaking the course.
- (c) Post NVEC Final (articulation from VEIs). This candidate must also possess the five credit level passes in the relevant subjects as itemized in 3 (a) above.

STRUCTURE OF PROGRAMME

The National Innovation diploma in Agriculture is a two year programme i.e. four semesters.

Three months supervised industrial work experience (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 Innovation Diploma Examination must be externally moderated. In grading the students, theory shall constitute 30% while Practical is 70%.

ACCREDITATION

Each programme offered at the National Innovation Diploma level shall be accredited by the NBTE before the diplomate can be awarded the diploma certificate. Details about the process of accrediting a programme for the award of the NID 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 NID

Institutions offering accredited programmes will award the National Innovation 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 stress 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.

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As the success of the credit unit system depends on the articulation of programmes 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 their 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 each course, there should be a balance of theory to practice in the ratio of 70:30 or 80:20.

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PROPOSED CURRICULUM TABLE

YEAR 1

SEMESTER I

COURSE CODE	COURSE	LECTURE	TUTORIAL	PRACTICAL	CONTACT HOUR	CREDIT UNIT
STB 112	Morphology and Physiology of living things	1	-	3	60	2
BCH 111	General & Physical chemistry	2	-	3	75	3
MTH 111	Logic & Linear Algebra	2	-	0	30	2
GNS 101	Use of English I	2	-	0	30	2
BPH 111	Mechanics & Properties of matter	2	-	3	75	3
IAE 111	Soil science	1	-	3	60	3
IAE 112	Rural Sociology & Agric. Ext.	2	-	2	60	3
IAE 113	Basic Land Surveying	1	-	3	60	3
AGT 212	Agro-climatology	1	-	0	15	1
	TOTAL	14		18	465	22

- See syllabus for Basic Sciences and Mathematics
- / See syllabus for general studies

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PROPOSED CURRICULUM TABLE

YEAR 1

SEMESTER II

COURSE CODE	COURSE	LECTURE	TUTORIAL	PRACTICAL	CONTACT HOUR	CREDIT UNIT
IAE 121	Cereals and Legumes Production	1	-	3	60	3
IAE 122	Bee Keeping and Sericulture	1	-	2	45	2
AGT 222	Poultry Production	1	-	2	45	2
IAE 124	Horticultural Crop Production	1	-	2	45	2
IAE 125	Ruminant Animal Production	1	-	2	45	2
IAE 126	Fiber Crop Production	1	-	3	60	2
AGT 122	Crop Protection	1	-	2	45	2
IAE 128	Root and Tuber Crop Production	1	-	3	60	3
VCS 102	Introduction to Computer	1	-	2	45	2
JDV 210	Entrepreneurship	2	-	1	45	2
		11		22	495	22

See Agricultural Technology Syllabus

\$ See Computer Science Syllabus

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PROPOSED CURRICULUM TABLE

YEAR 2

SEMESTER I

COURSE CODE	COURSE	LECTURE	TUTORIAL	PRACTICAL	CONTACT HOUR	CREDIT UNIT
AGT 231	Statistics and Field Experimentation	1	-	2	45	2
CME 122	Workshop Practice	-	-	4	60	2
IAE 215	Fish Farming	1	-	3	60	2
IAE 214	Swine Production	1	-	3	60	2
AGT 214	Tree Crops	1	-	2	45	2
IAE 216	Industrial Crop Production	1		2	45	2
AGT 223	Farm power and mechanization	1	-	3	60	2
IAE 218	Feasibility Studies and Farm Development	1	-	2	45	2
AGT 224	Principles of Genetics and Breeding	1	-	0	15	1
GNS 111	Citizenship Education I	1	-	-	15	1
		9	-	27	450	18

- \$ See Syllabus for General Studies
- / See syllabus for Agricultural Technology
- * See syllabus for Agricultural Engineering

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PROPOSED CURRICULUM TABLE

YEAR II

SEMESTER II

COURSE CODE	COURSE	LECTURE	TUTORIAL	PRACTICAL	CONTACT HOUR	CREDIT UNITS
IAE 221	Feed Production (Livestock/Fisheries)	2	-	3	75	3
IAE 222	Animal products processing	1	-	3	60	3
IAE 223	Principles of Animal Health	1	-	3	60	2
AGT 225	Crop Processing and Storage	1	-	3	60	3
IAE 225	Pasture and Forage Crops Production	1	-	2	45	2
AGT 229	Farm Management	1	-	-	15	1
IAE 227	Principles of Irrigation and Drainage	1	-	3	60	2
IAE 228	Micro livestock Production	2	-	3	75	3
IAE 229	Project	-	-	-	-	4
		10	-	20	450	23

Programme: National Innovation Diploma In Agriculture

Module: IAE 111 Soil Science

Duration: 60 hours

Unit: 3 Credit Unit

Goal: To acquaint students with the origin, properties and characteristics of soil and plant nutrition.

General Objective:

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

- 1.0 Understand rocks and minerals as parent materials of soils.
- 2.0 Know 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 Know soil organic matter
- 7.0 Know soil organisms and their impact on nature of soils.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: SOIL SCIENCE			COURSE CODE: IAE 111		CONTACT HOURS: 60 HOURS (1 hr lecture: 3 hrs practical)	
GOAL: To acquaint students with the origin, properties and characteristics of soil and plant nutrition.						
COURSE SPECIFICATION: Theoretical Contents:				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 diseases different types of rock.	- Lesson Notes. - chalkboard.	1.1 Identify common types of rock and their mineral constituents 1.2 Draw different rock samples 1.3 Describe types of rock	- Initiate a walking trip	Rock and Soil samples
	1.2 Explain the processes of weathering (i) Physical weathering (ii) Chemical weathering (iii) Biological Weathering	- Draw students' attention to processes of weathering and to its agents.	- Lesson notes - Chalkboard.			

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General Objective: 2.0 Know the physical characteristics of soils.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2	<p>2.1 Define soil, state soil Characteristics and how they affect soil fertility</p> <p>2.2 Explain the meaning of soil texture, its importance, and the different textural classes of soils.</p> <p>2.3 Describe soil structure and explain its importance</p> <p>2.4 Describe the different ways of improving soil structure</p> <p>2.5 Describe clay, sand and silt in relation to their properties.</p> <p>2.6 Describe the significance of air, temperature and water in the soil.</p>	<p>Define and explain its characteristics.</p> <p>Discuss soil texture and its importance</p> <p>- Explain textural triangle</p> <p>- sensitize students on the importance of soil structure and describe.</p> <p>- Discuss the significance of air, water and</p>	<p>- Lesson notes</p> <p>- Chalkboard</p>	<p>- Identify different types of soil</p> <p>- Identify different textural classes.</p> <p>- Identify soil as a material source.</p> <p>- Demonstrate the different types of soil structure.</p> <p>- Demonstrate the differences between sand, silt and clay.</p> <p>Draw different textural classes</p>	<p>- Guide students to collect soil for identification.</p> <p>- Guide students to sort out different soil structure.</p> <p>- guide students to identify sand, silt and clay</p>	<p>Soil Samples</p> <p>Soil Samples</p>

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	<p>2.7 Define soil depth and its importance as soil nutrient house.</p> <p>2.8 Describe the properties of soil in:</p> <p>(i) soil moisture retention.</p> <p>(ii) Soil aeration.</p> <p>(iii) Permeability of soil water.</p> <p>(iv) Influence on root-nutrition availability.</p> <p>(v) Root anchorage.</p>	<p>temperature in the soil.</p> <p>- Guide students to know ways of improving soil structure.</p> <p>- Differentiate between sand, silt and clay.</p> <p>- Demonstrate soil depth.</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
3-4	<p>3.1 Explain soil colloids and principles of ionic exchange</p> <p>3.2 Explain cat ion exchange</p> <p>3.3 Explain soil aeration</p>	<p>Explain to students soil colloidal properties cat ion exchange, soil aeration and porosity.</p>	<p>- Lesson notes</p> <p>- Chalkboard</p>	<p>Differentiate between alkali and acidic soil.</p>	<p>Guide the students on how to test alkali and acidic soil</p>	<p>Soil samples.</p> <p>P^H meter</p> <p>Conductivity meter.</p>

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	<p>3.4 Enumerate the effects of acidity on soils</p> <p>3.5 List the characteristics of alkali soils</p> <p>3.6 List the effects of alkalinity on soils</p> <p>3.7 Describe the importance and methods of liming</p> <p>3.8 Define saline soil.</p> <p>3.9 Describe how soil salinity affects nutrient availability</p> <p>3.10 Explain the impact of liming on soil acidity and nutrient availability to crops.</p>	<p>Explain soil acidity, its causes and how it affects crop productivity.</p> <ul style="list-style-type: none"> - Define and explain the causes of saline soil. - Enumerate soil nutrient availability as affected by salinity - Enumerate soil nutrient availability as affected by liming. 				
General Objective: 4.0 . Understand soil characteristics.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4-5	4.1 Describe soil characteristics influencing plant nutrition	Explain the most important soil characteristics influencing plant growth e.g. organic.				

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	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
5-6	<p>5.1 Define soil moisture</p> <p>5.2 Define different types of soil moisture</p> <p>5.3 Identify available forms of soil moisture and the unavailable forms.</p>	<p>Discuss soil moisture in relation with plant nutrition</p> <p>Define soil moisture.</p> <p>Discuss the different forms of soil moisture.</p>	<p>- Chalkboard.</p> <p>- Lesson notes.</p>	<p>Illustrate the importance of soil moisture on nutrient availability to crops by simple experiment.</p>	<p>Guide the students on how to carry out simple experiment in soil moisture and nutrient availability</p>	<p>Soil sample, seed of crops, water ,fertilizer.</p>
	General Objectives: 6.0 Know soil organic matter					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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7-8	<p>6.1 State the origin of soil organic matter</p> <p>6.2 List the factors affecting the quality and quantity of organic matter in the soil.</p> <p>6.3 List and describe the common types of organic matter viz:</p> <p>(i) Green manure (ii) Farm yard manure (iii) Compost</p> <p>6.4 Describe the nature and characteristics of humus</p> <p>6.5 Explain the effect on organic matter on soil properties</p>	<p>Describe different types of soil organic matter.</p> <p>Describe factors affecting the quality and quantity of organic matter.</p> <p>Discuss the effect of organic matter on soil properties.</p>		Prepare compost and farmyard manure	Demonstrate compost and farmyard manure preparation.	<ul style="list-style-type: none"> - plant matter - ash - water - spade - digger.
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General Objective: 7.0 Know soil organisms and their impact on nature of soils. :						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9-12	<p>7.1 Identify the macro-fauna of the soil:</p> <p style="padding-left: 40px;">Earthworms, squirrels and rodents (mammals).</p> <p style="padding-left: 40px;">Snakes, termites, crickets etc.</p> <p>7.2 Describe the functions of the micro-fauna of the soil. e.g. nematodes.</p> <p>7.3 List and describe macro-flora of the soils;</p> <p style="padding-left: 40px;">Roots of higher plant.</p> <p>7.4 List micro-flora of the soils:</p> <p style="padding-left: 40px;">Bacteria\Algae Fungi\Actinomycetes.</p>	<p>Explain the importance of soil organisms.</p> <p>Discuss the function of micro fauna.</p> <p>Describe micro and macro flora found in the soil.</p>	<p>- chalkboard</p> <p>- Lesson notes.</p>	Collect and identify soil macrofauna.	Guide students to identify soil macrofauna.	Termite earthworm crickets.

- Programme:** National Innovation Diploma in Agriculture
- Module:** IAE 112 - Rural Sociology and Agricultural Extension
- Duration:** 60 hours
- Unit:** 3 Credit Units
- Goal:** The course is designed to provide the students with the knowledge of rural social set up and to acquaint them with the methods of packaging and disseminating modern farming techniques.

General Objectives:

On completion of the module, the students should be able to:

- 1.0 Understand basic sociological concepts.
- 2.0 Understand the organization and functioning of Nigerian rural institutions.
- 3.0 Understand the elements of social systems and barriers to social change.
- 4.0 Understand the agents of social change in Nigeria.
- 5.0 Understand the scope and principles of Agricultural extension in agriculture.
- 6.0 Understand the role of communication in extension.
- 7.0 Understand the concept of innovation and adoption in extension.
- 8.0 Understand the principles of extension administration and importance of audio-visual aids.
- 9.0 Understand the methods of creating teaching situations for adult learners.
- 10.0 Understand the roles of local leaders in agricultural extension.
- 11.0 Know the role of agricultural Research Institutes in extension work.

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PROGRAMME:		NATIONAL INNOVATION DIPLOMA				
COURSE: RURAL SOCIOLOGY AND AGRICULTURAL EXTENSION		COURSE CODE: IAE 112		CONTACT HOURS: 60 HOURS		
GOAL: The module is designed to provide the students with the knowledge of rural social set up and to acquaint them with the methods of packaging and disseminating modern farming techniques.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Understand basic sociological concepts.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Explain the concepts in sociology. 1.2 Explain social organization. 1.3 Describe social norms and beliefs.	. Define society. . Define sociology . Define a family. . List and Explain social values/systems. . Explain social stratification, social class, cast system, ethnocentrism, cultural lag.	Chalkboard Lesson note Projector Slide			
General Objective: 2.0 Understand the Organization and Functioning of Nigerian rural Institutions.						
	2.1 Describe the Nigerian rural institution.	. List the ethnic groups in Nigeria.	Chalkboard Lesson note			

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	<p>2.2 Explain the characteristics of the unit family among the various ethnic groups in Nigeria.</p>	<ul style="list-style-type: none"> . Identify the locations of the ethnic groups. . List and Describe the characteristic features of the various ethnic groups. 	<p style="text-align: center;">Projector Slide</p>			
<p>General Objective: 3.0 Understand the elements of social systems and barriers to social change.</p>						
	<p>3.1 Describe rural family types in Nigeria.</p> <p>3.2 Describe marital relationships in rural Nigeria.</p> <p>3.3 Explain religious beliefs in the social system.</p> <p>3.4 Explain the barriers to social change.</p> <p>3.5 Describe psychological barrier to social change in rural communities.</p>	<ul style="list-style-type: none"> . Explain monogamy. . Explain Polygamy . Explain Polyandry. . Explain the following relationships like: <ul style="list-style-type: none"> Patrilocal Matrilocal . Explain the roles of Churches, mosques, peer groups, farmers associations, council of Oba's and Chiefs in the rural social system. <ul style="list-style-type: none"> - Define culture. - Describe social barriers to change in rural community e.g. responsibilities, social services. - Explain 	<p style="text-align: center;">Chalkboard Lesson note</p>			

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		psychological barriers and attitudes of rural people to government personnel.				
General Objective: 4.0 Understand the agents of social change in Nigeria.						
4.1 Describe the agents of social change.	. Outline the process of social change in a society.	Chalkboard Lesson note Projector Slide				
4.2 Explain the factors that affect social change.	. List the factors affecting social change in Nigeria.					
4.3 Explain how religion affects agricultural production in Nigeria.	. List the agents of social change in Nigeria. . Describe how religious beliefs affect agricultural production in Nigeria.					
General Objective: 5.0 Understand the scope and principles of Agricultural extension in agriculture.						
5.1 Explain agricultural extension.	. Define extension.	Chalkboard Lesson notes Projector. Slides.				
5.2 Define the history of agricultural extension in the world.	- Describe how extension originated.					
5.3 Explain the objectives of extension	- List the purpose of Extension.					

	<p>5.4 Explain the components of Agricultural extension.</p> <p>5.5 Explain the gap existing between modern farming and rural farming system.</p> <p>5.6 Outline the reason for mass adoption of improved farm practices by the farmers.</p> <p>5.7 Explain the following features of extension education</p> <ul style="list-style-type: none"> (i) as a means to help people to help themselves (ii) as geared towards the clientele in their village where they live and work. (iii) Uses different methods to convey information (iv) Uses local leaders and existing institutions (v) Involves the local village dwellers in planning extension programmes <p>5.8 List the three important methods of counting clientele e.g. individual, group and mass media methods.</p> <p>5.9 Apply each of the methods listed in 5.8 above according to the need of particular situations.</p>	<ul style="list-style-type: none"> - List the various components of Agricultural extension methods, extension communication, administration, planning Execution. - List the reasons for gap between available scientific knowledge and the rural farmers level of knowledge and the need to bridge it. - List and explain the attribute and factors facilitating mass adoption. 				
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	General Objectives: 6.0 Understand the role of communication in extension.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>6.1 Define extension communication</p> <p>6.2 List the different elements in communication e.g. communicator, the message and the receiver of the message</p> <p>6.3 Describe the role of each of the elements in 6.2 above in communication.</p> <p>6.4 List the characteristics of each element in 6.2 above in extension communication.</p>	<p>Chalkboard</p> <p>Lesson Notes</p>				
	General Objectives: 7.0 Understand the concept of innovation and adoption in extension.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>7.1 Explain innovation and adoption in extension education.</p> <p>7.2 List the characteristics of agricultural innovations/improved technologies</p> <p>7.3 Describe the general attitudes</p>	<p>Define innovation and adoption in extension</p>				

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	<p>of rural farmers to innovations and how this attitude affect their rate of adoption in agriculture</p> <p>7.4 Identify the different categories of adopters of agricultural innovation e.g. innovators, early adopters, late adopters, laggards or non adopters.</p> <p>7.5 Describe the specific attitudes of each category stated in 7.4 above to innovation adoption.</p> <p>7.6 List the socio-cultural, economic and environmental variables that may influence the rate of innovation adoption among farmers in a community</p> <p>7.7 Describe the expected socio-economic affects of mass adoption of agricultural innovations.</p> <p>7.8 List the steps that a normal adopter goes through before finally adopts an innovation in agriculture e.g. awareness trial etc.</p>					
	<p>General Objectives: 8.0 Understand the principles of extension administration and importance of audio-visual aids.</p>					
<p>WEEK</p>	<p>Specific Learning Objective</p>	<p>Teachers Activities</p>	<p>Learning Resources</p>	<p>Specific Learning</p>	<p>Teachers Activities</p>	<p>Learning Resources</p>

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				Objective		
	<p>8.1 Identify top personnel in extension administration e.g. extension specialist: subject matter Specialist, e.g. entomologist, soil scientist, etc.</p> <p>8.2 Explain the roles of intermediate and village-level extension agents in extension work.</p> <p>8.3 List the main tasks of an extension administrator.</p> <p>8.4 List the advantages of training and retraining extension workers.</p> <p>8.5 Describe the role of audio-visual aids in extension.</p>	<p>Discuss the importance of Audio-visual aids in extension.</p>		<p>Identify the common audio-visual aids used in extension teaching e.g. film strips, maps, overhead projector etc.</p> <p>Communicate with people using visual and audio-visual materials, players, television, posters, free hand sketches, maps and models.</p> <p>Take photographs of interesting</p>	<p>Guide students to identify various audio-visual equipments and demonstrate how to play each equipment.</p>	<p>Audio-visual Studio and equipment.</p>

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				agricultural materials and scenes and develop and print pictures for exhibition. Sketch and model agricultural scenes for exhibition and teaching.		
General Objectives: 9.0 Understand the methods of creating teaching situations for adult learners.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	9.1 Enumerate the circumstances under which adults learn: when (i) The method of learning is made informal. (ii) The learning process is not made cumbersome. (iii) The teacher is acceptable to them. (iv) The language and the approach adopted by the teacher are understood. (v) The content of the learning is tailored to relate to their	- List the factors that facilitate the informal learning. - List the rate at which learning process is facilitated with: Plain and simple method. Language of the				

	<p>immediate problems and would solve them.</p> <p>(vi) The teacher (extension agent) is assessed to be knowledgeable and capable of transmitting information effectively.</p> <p>9.2 Define the term teaching situation.</p> <p>9.3 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.</p> <p>9.4 Describe how to plan and execute a successful field trip.</p> <p>9.5 Describe how to plan for and participate in agricultural shows and farmers festivals.</p> <p>9.6 Describe how exhibits are displayed to visitors and how</p>	<p>farmers.</p> <p>Solutions of the farmer's immediate problem.</p> <p>Farmers confidence on the extension agent.</p> <p>Discuss the various teaching methods for adult farmers.</p>				
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	<p>10.8 List the various types of leaders in extension e.g.</p> <p style="padding-left: 40px;">Democratic leaders Armchair leaders Authoritarian leader Charismatic leader</p> <p>10.9 Describe the ways in which the attitudes of leaders to leadership affect extension work.</p> <p>10.10 Explain the value of intensive and continual training of leaders to improve their technical competence on the job</p>					
<p>General Objectives: 11.0 Know the role of Agricultural research Institute in extension work.</p>						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>11.1. List the roles of Agricultural research Institute in the production of agricultural technologies.</p> <p>11.2 Describe the role of research Institutes in extension work.</p>	<p>Outline roles of Research Institutes in agriculture.</p>	<p>Chalkboard</p> <p>Lesson Notes</p>	<p>Collect information from the appropriate arm/unit in agricultural research institutes for use by farmers.</p>	<p>Organize trip to a selected research institute.</p>	<p>- Bus(es)</p> <p>- Research institutes.</p>

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				Communicat e research findings from research Institute to farmers and from farmers to research Institutes.		
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Programme: National Innovation Diploma in Agriculture

Module: IAE 113 Basic Land Surveying

Duration: 60 hours

Unit: 3 Credit Unit

Goal: This course is designed to provide the student with the basic principles and methods in surveying to enable him measure lengths and angles, carryout simple chain surveys and plans tabling, plot layouts and interpret maps.

General Objective:

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

- 1.0 Understand the basic principles and scope of surveying
- 2.0 Know how to use chains and tapes in making linear measurements.
- 3.0 Know the principles of measurement of angles with vernier and optical theodolites and bearings with a magnetic compass.
- 4.0 Know the basic methods used in chain surveying.
- 5.0 Know the principles and field methods for plane table survey.
- 6.0 Know the interpretation of Maps, layouts and simple engineering surveys.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: BASIC LAND SURVEYING		COURSE CODE: IAE 113		CONTACT HOURS: 60 HOURS		
GOAL: This course is designed to provide the student with the basic principles and methods in surveying to enable him measure lengths and Angles, carryout simple chain surveys and plans tabling, plots layouts and interpret maps.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Understand the Basic Principles and Scope of Surveying						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Explain the scope of surveying. 1.2 Explain the basic principles of surveying. 1.3 Describe the various branches of surveying.	. Explain the principle of working from whole to part in survey work. . State the importance of scientific honesty in field observations. . Define errors or misclosures in surveys and describe methods of balancing these errors. . Explain the need and procedure for 'examination' of surveys.	Chalkboard Lesson note Survey equipments		Guide the students to carryout a survey of a field.	-Ranging poles -Measuring tapes. -Chains

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		<ul style="list-style-type: none"> . Describe the various classes of survey and their order of accuracy. . Explain the principle of “economy” of accuracy and its influence on choice of equipment and method. . Explain the principle of “consistency” in surveys. . Distinguish between accuracy and precision. . Name the different branches of surveying and state their aims. 				
General Objective: 2.0 Know how to use chains and tapes in making linear measurement.						
	2.1 Describe the use of chain and tapes in making linear measurement.	<ul style="list-style-type: none"> . Explain the different standards of length and their conversion factors. . Describe the construction, use and care of measuring chains, steel bands or tapes. 	Chalkboard Lesson note Survey equipments Projector Abney level Slide	Demonstrate the use of tapes and range poles in linear measurement	Guide the students to measure length of a field.	Measuring tapes, ranging poles, etc GPS Survey equipments Abney level.

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		<p>. Explain the effect of misalignment; slope, temperature, tension and standardization error on measured distances.</p> <p>. Measure slope using Abney level and describe its principles.</p>				
WEEK	General Objective: 3.0 Understand the Principles of Measurement of Angles with Vernier and Optical Theodolites and Bearings with a magnetic Compass					
	<p>3.1 Describe the various units of angular measurement.</p> <p>3.2 Describe the vernier scale and principles of vernier division.</p> <p>3.3 Explain the difference in the reading procedure between a vernier and optical theodolites.</p>		<p>Chalkboard Lesson note Vernier Optical theodolite Prismatic compass Chain Survey Equipment Projector Slide</p>	Demonstrate how to use prismatic compass, vernier and optical theodolites.	<p>Guide the students to carry out observations with a compass.</p> <p>Demonstrate to the students how to carry out angular measurement using prismatic compass, vernier and optical theodolites.</p>	<p>- vernier - optical theodolites - prismatic compass</p>
	General Objective: 4.0 Know the Basic Methods used in Chain Surveying					

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	<p>4.1 Describe chain surveying.</p> <p>4.2 Explain the methods of chain surveying.</p>	<ul style="list-style-type: none"> . List and identify chain surveying equipment. . State their precautionary measures. . List common errors in chain surveying and their sources. . Explain and sketch basic methods of chain surveying. . List the field problems and explain methods of correcting them. <p>Carryout survey of an area noting all field measures and plotting, survey at a suitable scale and complete drawing to field standards using conventional signs and hand lettering.</p>		<p>Demonstrate the use of chain survey</p>	<p>Demonstrate to the students how to survey an area.</p> <p>Guide the students to sketch basic methods of chain surveying.</p>	<p>Chain survey equipment.</p>
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General Objective: 5.0 Know the Principles and Field methods of Plane Table Survey						
5.1 Describe plane table survey.	. Define plane tabling survey.	1. Chalkboard	Demonstrate the use of plain table survey equipment	Guide the students to carryout a plane table survey.	Chinometer	
5.2 Explain the principles involved in plane table survey.	. State the uses of plane tabling survey. . Identify the various items of plane table survey and equipment and describe their construction, use and care. . Explain with diagrams the principles of radiation, resection and intersection in plane tabling. . Describe methods of estimation used in sketching details in plane tabling. . Describe the method of plane table traverse and state where it becomes necessary. . Explain the principle of the Indian clinometers and the method of heighting using the clinometer.	2. Lesson note 3. Projector 4. Slide		Demonstrate the use of clinometers to the students.	plain table survey equipment	

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		. Carryout plane table survey from measured base line at the scale of 1:1000.				
General Objective: 6.0 Know how to interpret maps, layout and engineering survey						
	<p>6.1 State the uses of different types of maps.</p> <p>6.2 Explain the principles of map scale.</p> <p>6.3 State the relationship between scales or representative fractions and the contour interval.</p> <p>6.4 Define map grids and describe its use.</p> <p>6.5 Scale off grid co-ordinates.</p> <p>6.6 Read and interpret different types of maps, layout plans and diagrams.</p> <p>6.7 Read off directions/bearings between given features.</p>	. Measure distance from maps and plans	<p>Chalkboard</p> <p>Lesson note</p> <p>Projector</p> <p>Slide</p> <p>Maps</p>	<p>Demonstrate map, and layout interpretation</p> <p>Identify map symbols and conventional signs and explain their basis and use.</p> <p>Identify various Nigerian map series and demonstrate the use of a map catalogue.</p> <p>Identify simple planimetric detail of</p>	<p>Guide the students to read and interpret maps.</p>	<p>Maps of different locations and regions.</p>

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				aerial photographs .		
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture

Module: AGT 212 AGROCLIMATOLOGY.

Duration: 15 hours

Unit: 1 Credit Unit

Goals: The course is designed to provide the students with basic knowledge of tropical climate and its effect on agricultural production.

General Objectives:

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

1. Understand the definition and concepts in weather and climate.
2. Know the components of a meteorological station.
3. Know the importance of weather and climate in different realms
4. Know the relevance of climatic elements in agriculture production.
5. Know the factors influencing climatic conditions of an area.
6. Know the Agro-climatic regions of Nigeria.

NID in Agriculture (Draft)

PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: AGROCLIMATOLOGY		COURSE CODE: IAE 114		CONTACT HOURS: 45 HOURS		
GOAL: The course is designed to provide the students with basic knowledge of tropical climate and its effect on agricultural production.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Understand the definition and concepts in weather and climate.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Define weather, climate, humidity, evaporation, transpiration, pressure, isolation, etc.</p> <p>1.2 Explain the relationship between the factors listed in 1.1 above.</p> <p>1.3 Explain the relationship between weather and climatic factors.</p> <p>1.4 Describe climate as</p>	<p>. Explain the concepts in weather and climate.</p> <p>Explain the role of climate in agriculture.</p>	<ul style="list-style-type: none"> - chalkboard - Lesson notes 			

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	natural resource.					
General Objective: 2.0 Know the components of a meteorological station.						
	<p>2.1 Define meteorological station.</p> <p>2.2 List the components of a meteorological station.</p> <p>2.3 Explain the uses of the various equipments in the station.</p>	<p>. Discuss the need and uses of a weather station.</p> <p>Identify most appropriate site for sitting a meteorological station.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson notes 	<p>Identify various weather measuring equipment.</p> <p>Draw a meteorological station.</p>	<p>Organize trip to meteorological station.</p> <p>Guide students to identify all the equipment in the meteorological station.</p>	<p>Meteorological station and equipment.</p>
General Objective: 3.0 Know the importance of weather and climate in different realms						
	<p>3.1 Explain the impact of weather and climate in different regions.</p> <p>3.2 Describe how to modify or supplement local weather.</p> <p>3.3 Explain the factors responsible for climate changes.</p>	<p>. Discuss the impact of weather and climate on man, water cycle, agriculture, pest and disease, trade and industry.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson notes - Clips 	<p>Demonstrate the impact of weather/climate.</p>	<p>Explain the impact of climate and water on soil, farm land, etc. using pictures, video clips, etc.</p>	<p>Video clips</p> <p>Hand bills.</p> <p>Pictures.</p>

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General Objective: 4.0 Know the relevance of climatic elements in agricultural production.						
4.1 Define temperature.	<ul style="list-style-type: none"> - Discuss the effect of climate in agricultural production. <p>Explain temperate/tropical regions.</p> <p>Explain how to measure temperature.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson notes - 	<p>Measure minimum and maximum temperature limits.</p> <p>Measure and record rainfall, wind speed, wind direction, pressure wind relative humidity.</p>	<p>Demonstrate how to measure maximum and minimum temperature limits.</p> <p>Rainfall, wind speed and direction, pressure and relative humidity.</p>	<p>Rain gauge.</p> <p>Anamometer</p> <p>Wind vane etc.</p>	
4.2 Define minimum, optimum and maximum temperature limits						
4.3 Explain the essence of minimal, optimum and maximum temperature limits for each stage of crop growth.						
4.4 Explain why temperature determines growing seasons in temperate regions.						
4.5 Describe how to measure rainfall, pressure, wind speed, wind direction and relative humidity.						
4.6 Describe how to read and interpret various records in the meteorological station.						
4/7 Explain how to maintain the records of climatic factors for						

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	agricultural planning.					
General Objective: 5.0 Know the factors influencing climatic conditions of an area.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>5.1 Describe how air masses, ocean currents, lowland, uplands, valleys and plateau influence the climate of an area</p> <p>5.2 Explain how the conditions in 5.1 above would influence climate.</p> <p>5.3 Enumerate the causes of rainfall and aridity.</p>	<p>Explain what air mass, ocean currents, lowland, upland, valleys and plateaus are.</p> <p>Explain the role of: Evaporation from water surface to high altitudes.</p> <p>-Water condensation.</p> <p>-High and low pressure area.</p> <p>-The direction of air flow.</p>	<ul style="list-style-type: none"> - Lesson notes - Chalkboard - Rain gauge - Slides. 			
General Objective: 6.0 Know the Agro-climate regions of Nigeria.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific	Teachers	Learning

NID in Agriculture (Draft)

				Learning Objective	Activities	Resources
	<p>6.1 Identify the various agro-climate regions of Nigeria.</p> <p>6.2 Enumerate the agro-climatic zones identified in 6.1 above.</p> <p>6.3 List and explain the characteristics of the Agro-climatic zones of Nigeria.</p>		<ul style="list-style-type: none"> - Less notes - Chalkboard. 	Draw the various agro-ecological and vegetation zones of Nigeria.	Organize field trip to different agro climatic zones in the country.	

Programme: National Innovation Diploma In Agriculture
Course: IAE 121 Cereals and Legumes Production.
Duration: 60 hours
Unit: 3 Credit Units.

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Goals: This course is designed to provide the students with the necessary technique needed for cereals and grain legumes production for economic benefit.

General Objectives:

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

- 1.0 Know cereals and grain legumes.
- 2.0 Know varieties of cereal and grain legume crops.
- 3.0 Know the cultural practices for cereals and grain legumes.
- 4.0 Know different pests and diseases of legumes and cereals and their control measures.
- 5.0 Know how to harvest and process grain legumes and cereals crops.
- 6.0 Know how to preserve grain legumes and cereal crops.

PROGRAMME: Cereals and Legumes Production.						
COURSE: CEREALS AND LEGUMES PRODUCTION		COURSE CODE: IAE 121		CONTACT HOURS 60 HOURS		
GOAL: This course is designed to provide the student with the necessary techniques needed for grain legumes production for Economic benefits.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know cereals and grain legumes.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning	Teachers Activities	Learning Resources

NID in Agriculture (Draft)

				Objective		
	<p>1.1 Classify cereals and legumes.</p> <p>1.2 Explain the origin of Legumes and cereals.</p> <p>1.3 Explain the geographical distribution of each cereal and legume crop.</p>	<p>Discuss the following cereals and legume crops.</p> <ul style="list-style-type: none"> - Maize - Rice - Sorghum - Millet - Wheat - Barley. - Finger millet. - Cowpeas. - Groundnut - Soybean. - Bambara groundnut. - Pigeon pen - French beans. <p>Classify the crops listed above.</p> <p>Describe the origin and geographical distribution of cereals legumes.</p> <p>Explain the climatic requirements and</p>	<p>Chalkboard Lesson note Grain Legumes Cereals.</p>	<p>Identify grains of cereals and legumes.</p>	<p>Guide the identification of cereals and legume grains.</p>	<p>Samples of the different legumes and cereal grains.</p>

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		adaptation of legumes and cereal.				
General Objective: 2.0 Know varieties of cereal and grain legume crops						
	2.1 Identify and characterize different varieties of cereals and legumes.	. Describe the varieties of legumes and cereals and characterize them.. .	Chalkboard Lesson note	Identify common varieties.	Produce sample of the varieties for identification based on colour of grains, size of grains, etc.	Samples of different grains of different varieties.
General Objective: 3.0 Know the cultural practices for cereals and grain legumes.						
	3.1 Describe the Land preparation for planting. 3.2 Explain the ecological requirements of grain legumes and cereals.. 3.3 Describe the management of cereals and grain legumes. 3.4 Describe the weed control in cereals and legumes. 3.5 Indicate the rate and method of fertilizer application.	. Explain how land is prepared for planting of grain legumes and cereals. . Explain the ecological requirements of legumes and cereals under temperature, rainfall, soil. . Describe the seed rate and spacing in the field. . Describe planting methods, pattern and number per stand. .Describe management	Chalkboard Lesson note	Identify tillage equipment Identify planting equipment Identify major weeds of cereals and legumes Identify	Guide the students to till the land in preparation for planting of the crops and characterize the actual planting of crops. Guide students on weed identification	- Tillage equipment] - planting equipment. - weed species - weeding equipments. - spraying equipment.

NID in Agriculture (Draft)

		of planted legumes and cereals Discuss weed control in legumes and cereals..		control measures for weeds Identify different fertilizers for cereals and legumes. Carry out different methods of applying fertilizer	and control measures. Show students different samples of fertilizer Demonstrate the different methods of fertilizer application	Fertilizer samples Fertilizer samples Fertilizer applicator
General Objective: 4.0 Know different pests and diseases of legumes and cereals and their control measures.						
	4.1 List the diseases and pests of cereals and grain legumes. 4.2 Outline the control measures for pests and diseases. 4.3 Describe the concept of integrated pest management.	. Highlight the pests and diseases of grain legumes and cereals. . Describe the life cycle of the pests of grain legumes and cereals. . Discuss the casual agents/factors of diseases of grain legumes and cereals.	Chalkboard Lesson note	Identify pests and diseases of cereals and legumes. Carry out control measures of pests and diseases.	Demonstrate the identification of the pests and diseases of the crops. Demonstrate the control of pests and diseases of cereals and	Insect album - sample of diseased plants. - Slides - pictures. -Knapsack

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		<p>. Discuss the nature of damage and the economic importance of diseases of grain legume and cereals</p> <p>. describe control measures to diseases and pests of grain legumes and cereals</p> <ul style="list-style-type: none"> - physical control - chemical control - Biological control - Integrated pest management (IPM). 			legumes.	and other types of sprayers. Chemicals. Light traps.
General Objective: 5.0 Know how to harvest and process grain Legumes and cereals						
	<p>5.1 Describe the harvesting techniques for cereals and legumes.</p> <p>5.2 Describe the processing methods of cereals and grain legumes.</p>	Demonstrate and logically describe the different methods of harvesting each of the cereals and legumes cultivated in the vicinity.	Chalk board Lesson note.	Carry out the harvesting of each of the cereals and legumes	Explain and show the student how to harvest these crops Explain and	Harvesting equipments - slides - pictures video clips.

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		Explain how the cereals and legume crops are threshed, milled or processed.		Carry out the processing of legumes and cereals crops.	demonstrate the threshing, milling and processing of cereals and legumes.	Threshing equipment milling equipment processing equipment - slides - pictures video clips.
General Objective: 6.0 Know how to Preserve Grain Legumes and cereal crops.						
	6.1 Describe the methods of preserving grain legumes and cereals. 6.2 Determine what to use in preserving grain legumes and cereals.	. Describe the ways in which grain legumes and cereals can be stored. . List what can be used to preserve grain legumes and cereals.	Chalkboard Lesson note	Carry out Preservation of grain legumes and cereals	Demonstrate the preservation and storage of legume and cereals.	- storage structures - pictures - video clips - Slides. .

Programme: National Innovation Diploma In Agriculture

Module: IAE 122 Bee Keeping and Sericulture

Duration: 45hours (1 hour theory/3hours practical.

Unit: 2 Credit Units.

Goals: This course is designed to provide the student with the skill and knowledge on bee keeping and silkworm production.

General Objectives:

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

5. Know different types of hives and tools of beekeeping.
6. Know how to construct/maintain hives and beekeeping tools.
7. Know how to attract and capture bee swam/how to start beekeeping (Apiary).
8. Know how to harvest and process honey from the hives.
9. Understand the scope and nature of sericulture.
10. Know the principles of raising and harvesting silk.
7. Know how to manage and preserve silkworm.

NID in Agriculture (Draft)

PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: BEE KEEPING AND SERICULTURE		COURSE CODE: IAE 122		CONTACT HOURS: 45 HOURS		
GOAL: This course is designed to provide the Student with Skills and Knowledge on Bee Keeping and silkworm production						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know different types of hives and tools of beekeeping.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Describe the types of Bee Hives. 1.2 Describe the tools used in Bee Keeping.	- Define Bee Hives. - List the various components of Bee Hives. List and explain the various type of Hives List and explain the uses of tools needed in Bee Keeping such as Hives, smokers, Bee veils, Bee gloves, swam catcher, etc.	11. Chalkboard 12. Lesson note 13. Projector 14. Slide			
General Objective: 2.0 Know how to construct/maintain hives and beekeeping tools.						
	2.1 Explain the design of Bee Hives and other tools. 2.2 Explain how to construct Bee Hives and other tools.	. Identify the materials required to construct Bee Hives and other tools.	Chalkboard Lesson notes	Design and construct Bee Hives and other	Demonstrate how to construct the Bee Hives	Materials for constructing Hives and Boxes.

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	2.3 Describe how to keep and maintain Bee Hives/other tools.	Describe the construction of Bee Hives/other tools. Explain various methods of cleaning and maintenance of Bee Hives and other tools.		tools.	and some other tools or Bee Keeping. Guide students on how to do the construction.	
General Objective: 3.0 Know how to attract and capture bee swam/how to start beekeeping (Apiary)						
	3.1 Describe how a swam catcher works. 3.2 Explain the various components and working of swam catcher. 3.3 List the requirements for starting Bee Keeping.	. Identify a swam catcher. . Demonstrate the usage of a swam catchers.	Chalkboard Lesson notes Swam catcher			
General Objective: 4.0 Know how to harvest and process honey from the hives.						
	4.1 Describe the process of harvesting honey from the Hive. 4.2 Describe the methods of honey processing.	- Explain how to harvest honey from Hives. - Explain the requirements and time of honey harvesting. - Explain how	Chalkboard Lesson note	Harvest Honey from the Hives.	Demonstrate all the steps needed in Honey harvesting and processing Guide the	Smokers, Ladder Bee veils Bee gloves, etc.

NID in Agriculture (Draft)

		to process honey.			students to harvest and process honey.	
General Objective: 5.0 Understand the scope and nature of sericulture.						
	5.1 Explain the nature of silk worm. 5.2 Describe the class/types of silk worm.	. Define silkworm Explain the characteristics of silkworm Classify silkworm.	- Chalkboard Lesson note			
General Objective: 6.0 . Know the principles of raising and harvesting silk.						
	6.1 Describe the process of raising silkworm 6.2 Explain the methods of silkworm culturing. 6.3 Describe the process of harvesting silkworm 6.4 Explain the optimum time of harvesting silk.	- Define silkworm - Explain how silkworms are raised. - Explain the requirements and methods of raising and culturing silkworm.	- Chalkboard Lesson note - Projector - Slide	Culture silk worm	Demonstrate various steps in silkworm culture. Guide students to raise/culture Silkworm.	
General Objectives: 7.0 Know how to manage and preserve silkworm.						
	7.1 Explain the management of silkworm. 7.2 Describe the preservation/storage of silkworm. 7.3 Describe how to identify	- Describe the management of silkworm. - Explain how to preserve silkworm..	- Chalkboard Lesson note	Preserve and store silkworm.	- Demonstrate the effect of poor	Material for preservation and storage of silkworm.

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	and control diseases of silkworm.	<ul style="list-style-type: none">- Describe the storage of silkworm.- Identify diseases of silkworm.			preservation and storage of silkworm.	
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture

Course: AGT 222 Poultry Production.

Duration: 45 hours

Unit: 2 Credit Units.

Goals: This course is designed to provide the students with basic knowledge and skills for commercial poultry production.

General Objectives:

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

1. Know the role of poultry industry in the economy.
2. Know different breeds of poultry and types of production systems.
3. Know the poultry housing and constructions.
4. Know the principles of commercial poultry production.
5. Know the basic management practices in poultry enterprises.
6. Understand the basic health management practices and biosecurity in poultry enterprises.
7. Understand the system of egg grading.
8. Know the process involved in birds slaughter/dressing.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: Poultry Production		COURSE CODE: AGT 222		CONTACT HOURS: 45 HOURS		
GOAL: This course is designed to provide the Student with the basic knowledge and skills for commercial of Poultry Production						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the Role of Poultry Industry in the Economy						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Explain the importance of poultry and its products in the Nigerian Economy.</p> <p>1.2 State the reasons for poultry keeping.</p> <p>1.3 Explain the factors militating against poultry production in Nigeria.</p> <p>1.4 Characterize various types of Poultry enterprises in Nigeria.</p>	<p>. Explain the Advantages of Poultry production..</p> <p>.Explain the factors affecting poultry production.</p> <p>. Discuss the types of poultry enterprise with their merits and demerits.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson notes - Slides - Projector 			
General Objective: 2.0 Know the Different Breeds of Poultry and production systems.						
	2.1 Outline the scope of	. List the different poultry	- chalkboard	Identify	Explain the	Various

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	<p>poultry keeping as an industry.</p> <p>2.2 Identify the different breeds of poultry.</p> <p>2.3 Classify the different poultry breeds.</p> <p>2.4 Describe each breed of poultry.</p>	<p>breeds.</p> <p>. Explain how poultry is classified.</p>	<p>- Lesson notes</p>	<p>official breeds and type of poultry</p>	<p>type of breeds and differentiate</p>	<p>breeds and types of poultry</p>
General Objective: 3.0 Know Poultry Housing and Construction						
	<p>3.1 List the environmental factors to be considered in building a poultry house.</p> <p>3.2 Explain important considerations in poultry house construction.</p> <p>3.3 Design adequate structure and space for a known number of birds.</p>	<p>. Explain the effect of heat, relative humidity and ventilation in poultry housing.</p> <p>. List and explain factors such as; foundation, floor, walls, roofs etc in poultry housing.</p> <p>. Explain bird floor ratio or stocking density.</p>	<p>- Chalkboard</p> <p>- Lesson notes</p> <p>- Slide</p>	<p>Construct a poultry house with the students.</p>	<p>Demonstrate how to construct a poultry house.</p>	<p>Materials for poultry house construction e.g. zinc sheets, wood, Bricks, etc.</p>
General Objective: 4.0 Know the Principles of Commercial Poultry Production						
	<p>4.1 Identify the hybrids used for production of table birds and eggs.</p> <p>4.2 Describe systems of commercial egg production.</p>	<p>. Discuss broiler production.</p> <p>. Discuss management of layer birds.</p>	<p>- Chalkboard</p> <p>- Lesson notes</p> <p>- Battery cage</p> <p>- Slide</p> <p>- Projector</p>	<p>Raise table birds and layers from day old to point of lay or finishing</p>	<p>Organize a Visit to a poultry farm for the students. To guide the</p>	<p>- Day old chick (pullets and broilers).</p> <p>- Chick mash and other feeds.</p>

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	<p>4.3 Explain the criteria for choosing any particular system of poultry production.</p> <p>4.4 Explain the benefits of the systems in 3.3 above.</p>	<p>. Explain battery cage, deep litter, intensive and extensive systems of poultry management.</p>			<p>student to raise poultry farm.</p>	<p>- Brooding materials. - Feeders/drinkers</p>
<p>General Objective: 5.0 Understand Basic Management Practices in Poultry Production Enterprise</p>						
	<p>5.1 Explain management practices in poultry.</p> <p>5.2 Explain the brooding process.</p> <p>5.3 Describe chick and egg handling.</p>	<p>. Explain: - Sexing - Caponizing - Delousing - Debeaking - Culling In Poultry Management. . Discuss the period and length of brooding.</p>	<p>- Chalkboard - Lesson notes - projector - slides</p>	<p>Carry out routine and periodic – procedures in poultry management</p>	<p>Demonstrate debeaking and sexing of birds in the farm for the students to do same.</p>	<p>- disinfectants - Debeakers - Drinkers - Feeders - Chicks crates.</p>
<p>General Objective: 6.0 Understand Basic Health Management Practices and biosecurity in a Poultry Enterprise</p>						
	<p>6.1 Explain Health Management Procedures in Poultry.</p> <p>6.2 Explain different poultry.</p> <p>6.3 Describe the vaccination schedule in poultry.</p>	<p>. Define Epizootic condition in poultry. . Describe vaccination and deworming in birds. .Carry out caponisation on birds.</p>	<p>- Chalkboard - Lesson note - Projector - Slide</p>	<p>Identify sick birds Administer drugs and vaccines.</p>	<p>Ask the students to identify and cull sick and infected birds in a flock. Guide the</p>	<p>- Antibiotics - Vaccines - diluents, etc.</p>

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	6.4 Explain medication for birds.	<ul style="list-style-type: none"> . Describe preventive and control measures for ecto and endo parasites. . Explain how to identify birds with disease problems. . Define prophylaxis. . Explain the value of antibiotics and anti protozoal agents.. . Explain the services of veterinarians. 			<p>students to mix a vial of drug to be administered on birds.</p> <p>Demonstrate the vaccination of birds.</p>	
General Objective: 7.0 Understand the System of Egg grading.						
	<p>7.1 Explain egg grading procedure.</p> <p>7.2 Explain the sorting of eggs for grading.</p> <p>7.3 Describe the various egg grading equipment.</p>	<ul style="list-style-type: none"> . Explain types of poultry egg grades. . Explain why eggs should be graded. . Explain the mechanical and visual manual grader. 	<ul style="list-style-type: none"> - Chalkboard - Lesson note 	Grade eggs.	Guide the students to sort and grade eggs.	Eggs Egg grader Crates, etc.
General Objective: 8.0 Know the Processes Involved in Bird slaughter and Dressing						
	8.1 Describe the process of chicken slaughter and dressing.	. Explain the slaughtering process.		Carry out slaughter	Supervise the dressing of birds after	Birds Knives Hot water,

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	<p>8.2 Explain the importance of hygienic slaughter and dressing processes.</p> <p>8.3 Explain poultry product marketing.</p>	<p>. Explain evisceration.</p> <p>Explain the procedure of packaging of dressed birds.</p> <p>. Identify market outlets for dressed birds.</p>	<p>Lesson notes</p>	<p>and dressing of birds.</p> <p>Package dressed chicken.</p>	<p>slaughtering by students..</p>	<p>etc. Chicken Polyethylene bags. Carton Sealer.</p>
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture
Course: IAE 124 Horticultural Crops Production
Duration: 45 Hours
Unit: 2 Credit Units.

Goals: This course is designed to equip the student with the knowledge, skills and modern techniques in fruits, vegetables, ornamentals and other Horticultural Plants.

General Objectives:

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

1. Know the scope of Horticulture.
2. Understand different methods of propagating horticultural plants.
3. Know the principles and techniques of cultivating fruits and vegetables.
4. Understand the principles and practices of cultivating plants.
5. Know the types of growth regulations used in the Horticulture Industry.
6. Know Pests and Diseases Control in Horticulture.

NID in Agriculture (Draft)

PROGRAMME:		NATIONAL INNOVATION DIPLOMA				
COURSE: HORTICULTURAL CROPS PRODUCTION		COURSE CODE: IAE 124		CONTACT HOURS: 45 HOURS		
GOAL: This course is designed to equip the student with the knowledge, skills and modern techniques in fruits, vegetable, ornamentals and other Horticultural Plants.						
COURSE SPECIFICATION: Theoretical Contents:					Practical Contents:	
General Objective: 1.0 Know the Scope of Horticulture						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Outline the scope of horticulture.</p> <p>1.2 Classify horticultural plants into fruits vegetable, ornamentals and medicinal plants.</p> <p>1.3 List the examples of plants in each group in 1.2 above.</p> <p>1.4 State the factors that affect the distribution of horticultural crops e.g. soil and climatic factors.</p>	<p>. Discuss the scope of horticulture.</p> <p>Discuss the distribution of horticultural plants in Nigeria.</p> <p>Explain factors affecting distribution of horticultural crops.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson note - Projector 	<p>Collect different horticultural plants for identification</p> <p>Identify the common and botanical names of different horticultural plants.</p>	<p>Organize an excursion to a horticultural garden</p>	<p>Life fruits horticultural plants.</p>
General Objective: 2.0 Understand different methods of propagating horticultural plants.						
	2.1 Define propagation of	. Explain sexual	- Lecture Notes	Determine	-	- seeds

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	<p>crops. 2.2 Describe the different methods of propagating horticultural plants e.g. (i) Sexual propagation. (ii) Vegetative propagation. 2.3 State the qualities of a good seed. 2.4 Describe the methods of testing seed viability. 2.5 Describe factors affecting viability of seeds. 2.6 Describe the process of pre-conditioning seeds to stimulate germination. 2.7 Describe the process of germination and the factors affecting it. 2.8 Describe the different methods of sowing seed: - Sowing in situ. - Sowing in nursery 2.9 Describe the process</p>	<p>vegetative propagation. . Explain seed viability. . Explain process of germination.</p>	<p>- Chalkboard</p>	<p>the factors that affect the germination of seeds such as sun light, air, etc. Test Seed viability through floatation methods. Establish and manage a nursery.</p>	<p>Demonstrate budding, layering and grafting of plants. - Demonstrate Seed viability test through floatation methods. - List examples of crops that can be propagated by grafting.</p>	<p>- budded or grafted plant. - Rhizomes - Tuber crops. Bulbs and cuttings.</p>
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	<p>involved in the establishment and management of nursery.</p> <p>2.10 Describe the methods of vegetative propagation by using (cuttings, rhizomes, Tubers, Bulbs, corms).</p> <p>2.11 Describe Layering, grafting and budding.</p> <p>2.12 State the advantages and disadvantages of sexual and vegetative propagation.</p>					
<p>General Objective: 3.0 Know the principles and techniques of cultivating fruits and vegetables.</p>						
	<p>3.1 Identify economic fruits and their botanical names.</p> <p>3.2 Describe the processes involved in the establishment and management of orchards.</p> <p>3.3 Describe the cultural practices in orchards e.g. pruning, mulching, manuring/fertilizer application, shading, etc.</p>	<p>Explain the objectives of the cultural practices.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson notes 	<p>Collect fruits and classify them.</p> <ul style="list-style-type: none"> - Prune plants. - Carry out routine practices in the orchard. - Carry out 	<p>Visit an orchard farm.</p> <p>Demonstrate pruning</p>	<p>Shears, vegetable fruits secauteurs</p>

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	<p>3.4 Identify the pests and major diseases of horticultural crops.</p> <p>3.5 Describe methods of prevention and control of pests and diseases of horticultural crops.</p> <p>3.6 Describe the establishment and management of a vegetable garden e.g. seed, soil preparation, planting, fertilizer application, watering, pest control, etc.</p>	<p>Discuss pests and diseases of horticultural crops.</p> <p>Discuss process of vegetable garden establishment.</p>		<p>all the cultural practices in the orchard.</p> <p>Identify pests and diseases of horticultural crops.</p> <p>Carry out pest control measures.</p> <p>Establish a vegetable garden</p> <p>Carry out all cultural practices in a vegetable garden.</p>		
<p>General Objective: 4.0 Understand the principles and practices of cultivating ornamental plants.</p>						

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	<p>4.1 Define ornamental plants.</p> <p>4.2 Identify tropical ornamental plants.</p>	<p>. Discuss the establishment of ornamental plants.</p>	<p>- Chalkboard</p> <p>- Lesson note</p>	<p>Cultivate ornamental plants.</p>	<p>Demonstrate the methods of cultivating and pruning of ornamental plants.</p>	<p>Ornamental plant.</p>
<p>General Objective: 5.0 Know the Types of Growth Regulators used in the Horticultural Industry</p>						
	<p>5.1 Define growth stimulants.</p> <p>5.2 List growth stimulants.</p> <p>5.3 List and explain the functions of growth stimulants</p> <p>5.4 Describe rooting hormones</p> <p>5.5 Describe mode of action of chemical retardants of plants</p> <p>5.6 Explain allelopathy</p>	<p>Discuss growth stimulants.</p> <p>Discuss growth retardants</p> <p>Discuss rooting hormones.</p>	<p>- Chalkboard</p> <p>- Lesson note</p>	<p>Demonstrate the use of growth and rooting hormones</p>	<p>Guide the student on the use of growth and rooting hormone.</p>	<p>- Growth hormones</p> <p>- rooting hormones.</p>
<p>General Objective: 6.0 Know Pest and disease Control Techniques in Horticulture</p>						
	<p>6.1 List pest and diseases of horticultural plants.</p> <p>6.2 Describe pest and diseases of horticultural plants.</p> <p>6.3 Describe the process of pesticide application.</p>	<p>Explain pest control techniques.</p> <p>. Describe the techniques of controlling pest.</p> <p>. Define pesticides and insecticides.</p> <p>. List safety precautions in insecticide/pesticide</p>	<p>- Chalkboard</p> <p>- Lesson note</p>	<p>Identify pest and diseases of horticultural plants.</p> <p>Apply pesticides on horticultural plants.</p>		<p>- sprayers</p> <p>- Pesticides.</p>

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		application. . Describe the chemical composition of fungicides and herbicides.				
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture

Course: IAE 125 Ruminant Animal Production.

Duration: 45 hours

Unit: 2Credit Units.

Goals: This course is designed to equip the student with skilled knowledge in large and small ruminant for increased production.

General Objectives:

On completion of the course, the student should be able to among other things:

1. Know the breeds of cattle sheep and goat, and their distribution in Nigeria.
2. Understand the nutrition of cattle, sheep and goat.
3. Understand management practices in cattle, sheep and goat production.
4. Know the common diseases and parasites of ruminant animals, their prevention and control.
5. Know how to set up and operate profitable ruminant animal farms.

NID in Agriculture (Draft)

PROGRAMME:		NATIONAL INNOVATION DIPLOMA				
COURSE: Ruminant Animal Production		COURSE CODE: IAE 125		CONTACT HOURS: 45 HOURS		
GOAL: This course is designed to equip the student with skilled knowledge in large and small ruminant for increased productivity.						
COURSE SPECIFICATION: Theoretical Contents:					Practical Contents:	
General Objective: 1.0 Know the breeds of cattle, sheep and goat, and their distribution in Nigeria.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Classify cattle, sheep and goat according to their zoological schemes with brief description of their characteristics.</p> <p>1.2 Distinguish between exotic and indigenous breeds of each of the ruminant animal species.</p> <p>1.3 Locate the agro-ecological distribution of each of the ruminant animal species in Nigeria.</p>	<p>. Show the differences that exist between the breeds of each of these farm animals.</p> <p>. Explain the practical importance of these differences in productivity</p> <p>- Show geographical influence on the spread of these farm animals.</p> <p>- Discuss the socio-economic implication</p>	<p>- Lesson notes</p> <p>- Chalkboard.</p> <p>- Ruminant charts.</p>	<p>Identify the effect of breed on productivity .</p> <p>- Diagrammatically show the distinctive features of cable, sheep and goats.</p>	<p>Take students to visit established farms to sight breeds of each of these ruminant animal species and the conditions under which they are being kept.</p>	<p>- Established farms</p> <p>- Different breeds.</p>

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		of the various breeds.				
General Objective: 2.0 Understand the nutrition of cattle, sheep and goats.						
2.1 Describe the gastro-intestinal tract of ruminant animal species showing species differences		- Explain the implication of the GIT of these farms animals on the type of feed they consume.	- Lesson notes - Chalkboard - Relevant charts.	- Identify different varieties of pasture. - Identify different locally available agro-allied by-products. - Produce album of agro-allied wastes locally available.	Take students to field and allow them to identify various pastures. Take students out to visit crop farms and agro-allied industries processing crop produce to see waste products.	- Open fields - Crop farms. - Agro-allied industries.
2.2 Identify the grasses and legumes (pasture) fed to ruminants.		- Explain the factors affecting the nutritional composition of pasture.				
2.3 Identify differences in these pasture based on their nutritional composition.						
2.4 Appraise the effect of season on the availability of these pasture.		- discuss the utilization of agro-allied by-products in ruminant animal feeding.				
General Objective: 3.0 Understand management practices in cattle, sheep and goat production.						
3.1 Identify routine management practices for cattle, sheep and goats.		- Enumerate both routine and specific management	- Chalkboard - Lesson notes - Relevant charts showing equipment	Carry out routine and daily practices on	-Demonstrate to the students practically how to carry	-Equipment -Record charts -Established
3.2 Itemize periodic						

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	<p>management practices for 3.1 above.</p> <p>3.3 Identify the various equipment needed for these operations.</p> <p>3.4 Describe how to handle equipment and these farm animals when carrying out these practices</p> <p>3.5 Describe the methods of production of these livestock species with the following systems:</p> <ul style="list-style-type: none"> - Intensive - Semi intensive - Extensive - Subsistence. <p>3.6 List the production records to keep.</p>	<p>practices</p> <ul style="list-style-type: none"> - Describe the equipment needed for these management activities. - Explain the factors which determine the type of records to be kept. - Describe the production systems in cattle, sheep and goat production. 	<p>and record formats.</p>	<p>the farm.</p> <p>Carry out periodic management practices.</p> <p>Handle equipment on the farm.</p> <p>Handle farm animals.</p>	<p>out the management practices and handle needed equipment.</p>	<p>farms.</p>
<p>General Objective: 4.0 Know the common diseases and parasites of ruminant animals, their prevention and control.</p>						
	<p>4.1 List common diseases and parasites of cattle, sheep</p>	<ul style="list-style-type: none"> - discuss ruminant animal diseases. 	<ul style="list-style-type: none"> - Chalkboard - Lesson notes 	<p>Identify these</p>	<ul style="list-style-type: none"> - demonstrate to the student 	<ul style="list-style-type: none"> - A livestock farm

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	<p>and goats and their cause agents.</p> <p>4.2 Describe the common features of these diseases and parasites in 4.1 above.</p> <p>4.3 Describe how to treat sick farm ruminants.</p> <p>4.4 Describe how to prevent the outbreak of ruminant diseases and parasites.</p>	<ul style="list-style-type: none"> - Classify them according to their causal agents. - Explain how to identify these diseases. - Describe the preventive and control measures for the various diseases and parasites. - Highlight management practices to prevent diseases outbreak. 	<ul style="list-style-type: none"> - Relevant charts. 	<p>diseases and parasites in a livestock herd.</p> <p>- Treat sick farm animals.</p>	<p>practically identification of these diseases and parasites.</p> <p>- Practical illustration of medication administration</p>	<p>Veterinary drugs.</p>
<p>General Objectives: 5.0 Know how to set up and operate profitable ruminant animal farms.</p>						
	<p>5.1 List the requirements for setting up of a</p>	<p>. Discuss the resources needed in establishing a</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson note 	<p>Set up a small goat</p>	<p>Take the student on</p>	<p>Established farms at</p>

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	<p>ruminant animal farm.</p> <p>5.2 List the management practices in a ruminant animal farm.</p> <p>5.3 Describe the design of a ruminant animal farm.</p> <p>5.4 Describe record keeping procedure in a ruminant animal farm.</p>	<p>ruminant animal farm.</p> <ul style="list-style-type: none"> - Explain the factors to be considered in establishing a ruminant animal farm. - Discuss the structures of the farm. - Discuss the types of housing and stocking density. - Discuss various farm records. 		<p>farm.</p>	<p>excursion to farms for first hand assessment of layout of farms management practices and the usefulness of record Keeping in decision making.</p>	<p>whatever scale of production.</p>
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture

Course: IAE 126 Fiber Crop Production

Duration: 60 hours

Unit: 2 Credit Units.

Goals: This course is designed to provide students with the knowledge of Agronomy of fiber crops for maximum economic benefit.

General Objectives:

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

- 1.0 Know the botanical classification of fiber crops.
- 2.0 Understand the origin and institution of fiber crops.
- 3.0 Identify varieties of fiber crops.
- 4.0 Know the cultural practices for production of fiber crops.
- 5.0 Know the ecological requirements of fiber crops.
- 6.0 Know the different pests and diseases of fiber crops and their control.
- 7.0 Know the practice of harvesting, handling and processing fiber crops.

NID in Agriculture (Draft)

PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: Fiber Crop Production		COURSE CODE: IAE 126		CONTACT HOURS: 60 HOURS		
GOAL: This course is designed to provide students with the knowledge of Agronomy of fiber crops for maximum economic benefit.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the botanical classification of fiber crops						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Explain what fiber crops are. 1.2 Identify fiber crops e.g. cotton, Kenaf, Rossele, Jute. 1.3 Describe the characteristics of fiber crops.	Classify fiber crops Discuss the characteristics of fiber crops.	- chalkboard - Lesson notes	Identify Fiber Crops.	Show students different fiber crops.	- Crops, - Pictures - slides.
General Objective: 2.0 Understand the origin and institution of fiber crops.						
	2.1 Explain the origin and botany of fiber crops. 2.2 Illustrate the geographical distribution of fiber crops in Nigeria.	. Trace the origin of fiber crops in Nigeria. .Discuss the geographical spread of fiber crops.	- Chalkboard - Lesson notes			

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General Objective: 3.0 Identify varieties of fire crops.						
3.1 Identify the characteristics of fiber crop varieties.	. Discuss the varieties of fiber crops	- Chalkboard - Lesson notes	Identify fiber crop varieties.	Show the students variation in varieties of each of the fiber crops.	Crop seeds Pictures Videos Slides.	
General Objective: 4.0 Know the cultural practices for production of fiber crops						
4.1. Describe methods of land preparation for planting of fiber crops.	Explain the tillage practices before planting	- Chalkboard - Lesson notes	Demonstrate Different tillage method.	Demonstrate the tillage of land for planting of fiber crops.	Tillage Implement - Seeds of fiber crops. - Tapes	
4.2 Describe the seed rate and spacing on the field for fiber crops.	Describe how the seeds are planted indicating spacing in the field.		Carry out planting of fiber crops on the field.	Demonstrate and carry out fertilizer application	- Ropes.	
4.3 Describe the planting method, pattern and number per stand for the crops.	Explain the fertilizer rate and describe how to apply it.	Chalkboard Lesson notes.	Apply fertilizer	Demonstrate weed control methods.	Fertilizer application equipment	
4.4 Describe fertilizer rate and its application methods.	Explain how to identify weeds		Control weeds		Weed control implements	
4.5 Describe methods of weed	Explain how to			Ask student to	Herbicides	

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	control in fiber crop production.	control. Weeds.		Identify weeds.	prepare a weed album	Sprayers Water.
General Objective: 5.0 Know the ecological requirements of fiber crops.						
	5.1 Explain the temperature, rainfall, soil and photo-period of fiber crops. 5.2 Explain fiber crops adaptation to; soils..	. Discuss fibers crops in relation to temperature, rainfall, soil type and the length of day needed for its growth. . Explain how fiber crops adapt to soil and climatic changes.	- Chalkboard - Lesson notes			
General Objective: 6.0 Know the different pests and diseases of fiber crops and their control..						
	6.1 List the diseases and pests of fiber crops. 6.2 Describe the control measures for pests and diseases of fiber crops. 6.3 Describe the concept of integrated pest management for fiber crops. 6.4 Apply integrated pest	- Identify and explain the pest and diseases of fibers. - Explain the control measures for the pests and diseases, physical method -chemical	- Chalkboard - Lesson notes.	Identify diseases and pests of fiber. Carry out the control methods of the pests and diseases.	Ask students to make disease and insect album Demonstrate the control methods of diseases.	- Collection of diseased plants. - collection of insects - Slides.

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	management to fiber crops.	method Biological method - Explain the concept of integrated pest management.				- Pictures. - Chemical. - Sprayers.
General Objective: 7.0 Know the practice of harvesting, handling and processing fiber crops.						
	7.1 Describe the harvesting procedure for fiber crops. 7.2 Determine the time for harvest of fiber crops. 7.3 Describe harvesting methods of fiber crops. 7.4 Describe the handling and processing of fiber crops. 7.5 Describe the storage and preservation of harvested fiber crops. 7.6 State economic importance of the products and by-products of fiber	. Describe the method, procedure and time for harvesting fiber crops. Explain how harvested crops are stored or processed. . Identify the products and by-products of fiber crops and their economic importance.	- Chalkboard - Implements - Projector - Slides		Harvest fiber crops on the field. Store fiber crops.	- Harvesting Implementation Projector Slides Video -Storage -Structures -Chemicals - Samples of fiber product.

	crops.					
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Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURAL

Course: AGT 122 CROP PROTECTION

Duration: 45 Hours

Unit: 2 Credit Units.

Goals: The course is designed to provide the students with the basic knowledge of crop diseases and pests, and skill on their methods of control..

General Objectives:

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

- 1.0 Know the general principles of crop protection.
- 2.0 Know plant diseases and their methods of control.
- 3.0 Know insect pests of crops and their methods of control.
- 4.0 Know weeds and the methods of their control.
- 5.0 Know nematode pests of crops and their methods of control.

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6.0 Know vertebrate pests of crops and their methods of control.

PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: CROP PROTECTION			COURSE CODE: AGT 122		CONTACT HOURS: 45 HOURS	
GOAL: The course is designed to provide the students with the basic knowledge of crop diseases and pests, and skill on their methods of control..						
COURSE SPECIFICATION: Theoretical Contents:					Practical Contents:	
General Objective: 1.0 Know the general principles of crop protection.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Describe the importance of crop protection in agriculture. 1.2 List various crop protection methods: - cultural - Biological - Chemical - Mechanical	Discuss basis for crop protection Explain the various crop protection methods.	Chalkboard Lesson Notes.			

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	- Quarantine 1.3 Describe integrated pest management.					
General Objective: 2.0 Know plant diseases and their methods of control						
	2.1 Define the term disease in relation to crops. 2.2 List the common diseases of annual and tree crops in Nigeria. 2.3 List the major plant pathogens: fungi, Bacteria, Viruses. 2.4 List examples of diseases caused by :1.fungi, 2.Bacteria 3.Viruses and their host plants. 2.5 Described effects and spread of the diseases listed in 2.4 above. 2.6 Describe the methods of	Discuss disease in relation to crops. Describe the plant pathogens listed in 2.3. Describe the pathogens and their plant hosts.	Pictures of diseased plants	Identify common crop diseases. Identify different diseases caused by various pathogens.	Guide students in the identification of crop diseases. Guide students to differentiate the pathogens and their diseases	Diseased plants, Microscopes, Magnifying lens

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	disease control caused by different pathogens listed in 2.3 above.					
General Objective: 3.0 Know insect pests of crops and their methods of control.						
	<p>3.1 Describe the characteristic features of a typical insect.</p> <p>3.2 Describe life history of insects (complete and incomplete) metamorphosis.</p> <p>3.3 Describe the nature of damages caused by insect pests to plants:</p> <ul style="list-style-type: none"> - Biting and chewing. - Sucking and piercing. - Boring - Cutting. <p>3.4 Describe common crop pests and the plants they damage.</p> <p>3.5 Describe the methods of controlling insects with emphasis on –</p> <ul style="list-style-type: none"> - cultural 	<p>Explain the characteristic features of a typical insect.</p> <p>Draw different life cycles of some insects.</p> <p>Explain the various mouth parts in insects.</p> <p>Discuss part of plants that are damaged by pest.</p> <p>Discuss various methods of pest control with emphasis on integrated pest management.</p> <p>Discuss contact and systemic mode of action by pesticide.</p>	<p>Chalkboard</p> <p>Lesson notes</p> <p>Charts.</p> <p>Chalkboard</p> <p>Lesson notes</p> <p>Chalkboard</p> <p>Lesson notes</p>	<p>Identify different species of insect pests</p> <p>Draw some species of insects.</p> <p>Collect plant parts damaged by pest. Identify plant parts damaged by pests.</p> <p>identify insect pest</p>	<p>Guide the student to identify insect pests.</p>	<p>Specimen of different life stages of insects.</p> <p>Various plant specimen with pest damages.</p> <p>Various specimen of insect [est.</p> <p>Samples of different pesticides.</p>

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	<ul style="list-style-type: none"> - Biological - Chemical - Quarantine - Integrated. <p>3.6 Explain the mode of action of chemical control – contact and systemic.</p> <p>3.7 Describe the procedure and safety precautions used in chemical control of pests.</p> <p>3.8 Describe integrated pest management.</p>	<p>Enumerate the advantages of IPM></p>		<p>(insect album).</p> <p>Carry out pest control using pesticides.</p> <p>Carry out mixing of pesticide by diluting with water.</p>		<p>Pesticides measuring equipments</p> <p>Water Knapsacks.</p>
<p>General Objective: 4.0 Know weeds and the methods of their control.</p>						
	<p>4.1 Define weeds in relation to crop production</p> <p>4.2 Classify weeds into broad leaves, grasses and sedges.</p> <p>4.3 Explain the effects of weeds on crop plants.</p> <p>4.4 Describe weed control methods -</p> <ul style="list-style-type: none"> - cultural - Biological 	<p>Discuss weeds as they relate to crop production.</p> <p>Explain cultural biological, chemical and integrated weed control methods.</p> <p>Explain different methods of herbicide application and their</p>		<p>Identify common weeds of crops.</p> <p>Differentiate different weed types.</p> <p>Carry out</p>		<p>Various types of weeds.</p>

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	<p>- Chemical and Integrated methods. 4.5 Describe the methods of application of herbicides. 4.6 Describe the modes of action of herbicides. 4.7 Explain factors affecting effectiveness of herbicides –</p> <ul style="list-style-type: none">- herbicide rate/concentration- Soil type.- Rainfall/moisture.- Nature of weeds. <p>4.8 Describe precautionary measures in herbicide use.</p>	<p>selectivity.</p> <p>Discuss hazards associated with the use of herbicides and how to prevent them.</p>		<p>different methods of herbicide application.</p> <p>Distinguish herbicides based on mode of action.</p> <p>Identify different factors affecting herbicides effectiveness.</p> <p>Carry out the procedures used in the chemical control of weeds -</p> <ul style="list-style-type: none">--		
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				<p>- Identify weeds.</p> <p>Identify chemicals for weed control.</p> <p>-Determine application rate.</p> <p>Carry out weed control.</p>		
<p>General Objective. 5.0 Know nematode pest of crops and their methods of control</p>						
	<p>5.1 Define nematodes.</p> <p>5.2 List common nematodes pest affecting crops.</p> <p>5.3 Describe modes of infection, symptoms and damages caused by nematode.</p>	<p>Explain nematode as an invertebrate and their nature.</p>		<p>Examine soil nematode under the microscope.</p> <p>Identify typical nematode in tomatoes</p>	<p>Soil with high organic content</p> <p>Microscope, hand lens.</p> <p>Collection of plant infected with</p>	

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				and beans.	nematode e.g. yam, tomato, bean, etc.	
General Objectives: 6.0 .. Know vertebrate pests of crops and their methods of control.						
6.1 List common crop vertebrate pests rodents, birds, monkey.	Discuss vertebrae pests of crops and their nature of damages they cause.		Identify some vertebrate pests.	Guide the students to collect and identify some vertebrate pests.	Specimen of vertebrate pests e.g. rats, birds.	Drawing or picture of monkey.
6.2 List crops that vertebrate pests listed in 6.1 contribute a major problem to.						
6.3 Describe nature of damages caused by vertebrate pests.						
6.4 Describe methods of controlling vertebrates pests.						

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Programme: National Innovation Diploma In Agriculture
Course: IAE 128 Root and Tuber Crop Production
Duration: 60 hours
Unit: 3 Credit Units.
Goals: This course is designed to provide the Students with the knowledge and skills of producing root and tuber crops.

General Objectives:

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

1. Know the scope of root and tuber crops production
2. Know varieties of roots and tubers crops.
3. Know the cultural practices of root and tuber crops.
4. Know the ecological requirements of root and tuber crops.
5. Know the diseases and pests of root and tuber crops.
6. Understand the practice of harvesting and processing of root and tuber crops.

NID in Agriculture (Draft)

PROGRAMME:		NATIONAL INNOVATION DIPLOMA				
COURSE: ROOT AND TUBER CROP PRODUCTION		COURSE CODE: IAE 128		CONTACT HOURS: 60 HOURS		
GOAL: This course is designed to provide the students with the knowledge and Skills of Producing Root and Tuber Crops						
COURSE SPECIFICATION: Theoretical Contents:					Practical Contents:	
General Objective: 1.0 Know the Scope of Root and Tuber Crops						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Classify roots and tubers. 1.2 Identify tuber and root crops, yam, cocoyam, sweet potatoes, fruits, potato cassava, ginger. 1.3 Identify main producing areas of roots and tubers in Nigeria.	. Classify the above crops on the basis of uses and types. - Discuss the origin and geographical distribution of root and tuber crops. . Explain the adaptation of the crops above to Nigerian	- Chalkboard - Lesson note	Identify varieties of tuber and root crops.	Show samples of the crop to students.	Crop samples.

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		conditions				
General Objective: 2.0 Know the varieties of root and tuber crops.						
2.1 Describe different varieties of root and tuber crops.	. Explain the characteristics of varieties of root and tubers	- Chalkboard - Lesson notes	Identify root and tuber crop varieties.	Guide the students on identification of root and tuber crops varieties.	Samples of the varieties.	
General Objective: 3.0 Know the methods of Propagating Root and Tuber Crops						
3.1 Describe land preparation for planting of root and tuber crops.	. Describe the different tillage methods for root and tubers. Crops.	- Chalkboard - Lesson notes	Prepare land for root and tuber planting.	Demonstrate to students different tillage methods.	Tillage equipment	
3.2 Describe plant spacing and density for root and tuber crops.	Describe and explain the spacing and plant density for root and tuber crops. Explain methods of planting.				- tapes Cutlass Treatment chemicals.	
3.3 Describe planting methods for roots and tu	Explain treatment of planting methods.		Carry out planting of root and tubers.	Demonstrate to students how to plant root and tuber crops.	Hoes. Planting materials.	
3.4 Describe weed control in roots and tubers.	Identify weeds of root and tuber crops.					
3.5 Describe fertilizer rate and application methods.	Explain the weed control measures of roots and tubers.	- Chalkboard - Lesson notes	Identify weeds of roots and tubers.	Ask the students to make a weed album.	- weed species Sprayers Chemicals Water Buckets. Cylinders.	
	Explain the fertilizer requirements of various			Demonstrate the control f		

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		<p>roots and tuber crops.</p> <p>Explain the methods of fertilizer application.</p>		<p>Control weeds in roots and tubers farm.</p> <p>Identify the various fertilizer types and how to apply them.</p>	<p>weeds.</p> <p>Show students different fertilizer types.</p> <p>Demonstrate fertilizer application methods.</p>	<p>- Fertilizer sample.</p>
General Objective: 4.0 Know the ecological requirements of root and tuber crops.						
	<p>4.1 Describe the ecological requirements of roots and tuber crops.</p> <p>4.2 Describe the ecological zones and how they affect root and tuber production.</p>	<p>. Explain the effects of temperature, rainfall, soil texture, soil ph, relative humidity and clouds cover on productivity of root and tuber crops.</p> <p>Explain the distribution of root and tuber crops based on ecological zones</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson note. 			
General Objective: 5.0 Know the diseases and pests of root and tuber crops and their control.						
	<p>5.1 Describe the pests of root and tuber crops.</p>	<p>Identify the pests of root and tuber crops.</p>	<ul style="list-style-type: none"> - Chalkboard - Lesson note. 	<p>Identify common pests and</p>	<p>Guide students on identification</p>	<p>Diseased plant samples</p>

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	<p>5.2 Explain the various diseases of root and tuber crops.</p> <p>5.3 Describe the control measures of the pests and diseases in 5.1 above.</p>	<p>. Identify the diseases of root and tuber crops.</p> <p>. Describe the life cycle of pests and diseases of root and tuber crops.</p> <p>. Identify the casual agents/factors of diseases of root and tuber crops.</p> <p>. Describe the nature of damage and economic importance of pests and diseases of root and tuber crops.</p> <p>. Outline the control measures for pests and diseases of root and tuber crops.</p>	<p>- Maps</p>	<p>diseases of root and tuber crops</p> <p>Identify the casual organisms of diseases.</p>	<p>of pests and diseases of root and tuber crops.</p> <p>Guide students to determine the casual organisms.</p>	<p>Insect album</p> <p>Microscopes</p>
<p>General Objective: 6.0 Understand the Practice of Harvesting and processing of root and tuber Crops.</p>						
	<p>6.1 Describe the harvesting procedures for root and tuber crops.</p> <p>6.2 Describe the processing of root and tuber crops.</p>	<p>Describe types of harvesting methods for root and tuber crops.</p> <p>Explain the Principles guiding time of harvest of the crops.</p>	<p>- Chalkboard</p> <p>- Lesson notes.</p>	<p>Harvest root and tuber crops</p> <p>Process root and</p>	<p>Demonstrate to the students how to harvest root and tuber crops on the field.</p>	<p>- Hoes</p> <p>- Cutlasses</p> <p>other, harvesting equip</p>

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		<p>Harvest root and tuber crops on the field.</p> <p>Describe the different methods of processing the crops above.</p> <p>Describe handling of harvested root and tuber crops before processing.</p> <p>Describe different storage methods of the products above.</p> <p>Identify types of products and by-products of root and tuber crops and their economic importance.</p>		<p>tuber crops.</p>	<p>Describe the processing methods of root and tubers.</p>	<p>ment.</p> <ul style="list-style-type: none"> - Knives - Dry bins, Solar dryers
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Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
Course: AGT 231.STATISTICS AND FIELD EXPERIMENTATION
Duration: 45 Hours
Units: 3.0

Goal: The course is designed to equip the student with the necessary statistical tools to interpret field experiments.

General Objectives

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

- 1.0 Understand the principles of statistics and field experimentation.
- 2.0 Understand the methods of experimental design and statistical analysis in on-farm experiments.
- 3.0 Understand the underlying principles of field experimentation.
- 4.0 Understand how crop research experimental are laid out.
- 5.0 Understand frequency distributions and characteristics of distribution.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
Course: STATISTICS AND FIELD EXPERIMENTATION			Course Code AGT 231		CONTACT HOURS: 45	
GOAL: The course is designed to equip the student with the necessary statistical tools to interpret field experiments					Theoretical: 2 hours/week	
Year:		Pre-requisite:		Practical: 3 hours /week		
Theoretical Content					Practical Content	
General Objective: 1.0: Understand the principles of statistics and field experimentation						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1	1.1 Define field experimentation and its importance to agriculture. 1.2 State the reasons for using statistical analysis to assess numerical evidence	Explain the following terms. Statistics Field Experiment. Discuss the need for statistical analysis in interpretation of research data.	Lesson notes Chalkboard.	Identify experimental plots and pens.	Take students on field trips.	Experimental plots Experimental pens.
General Objective : 2.0: Understand the methods of experimental design and analysis in on-farm experiments						
2-3	2.1 Define the terms: Block Blot Site	Describe experimental designs and their applications	Lesson notes Chalkboard.	Design projects . Analyse data statistically using appropriate statistical	Take the students out to a research farm and	

NID in Agriculture (Draft)

	<p>Treatment Replication Repetition Discards Control Randomization Plot size Gross plot Populations and samples</p>			<p>tools.</p>	<p>demonstrate the term by setting up experiments on-farm.</p> <p>Demonstrate how to pool data together and apply the right statistical tool for analysis.</p>	
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General Objective: 3.0: Understand the underlying principles of field experimentation						
4-5	<p>3.1 State the significance of the following in field experimentation.</p> <p>(a) Choice of site (b) Uniformity of operations © Uniformity of trials (d) Plot sizes and shapes (e) Plot boundaries (f) Sensitive measuring equipment (g) Accurate measurements. (h) defining parameters to measure (i) Keeping records of field operation in at least two different books (j) Methods of randomisation like: i) Table of random numbers ii) Coins iii) Dice iv) Playing cards</p>	<p>Discuss the practical significance of each of the components of field experimentation to obtaining reliable data.</p>				
General Objective : 4.0: Understand how crop research experiments are laid out						
6-7	<p>4.1 Explain how to mark out the field, the plan and the pegging out.</p> <p>4.2 State the necessary pre-plant operations</p> <p>4.3 Describe the labeling of experiments.</p>	<p>Discuss research proposals.</p> <p>Explain the layout, marking area pegging of plots.</p> <p>Discuss the pre-plant operations.</p> <p>Describe how-to label/tag</p>	<p>Lesson notes</p> <p>Chalkboard.</p>	<p>Carry out germination tests on some varieties of seeds.</p>	<p>Demonstrate how to lay out, mark and peg experimental plot.</p>	<p>Measuring tape</p> <p>Marker</p> <p>Tagging plastics</p> <p>Pegs</p>

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		plots and plants and materials to use.				Twine, etc.
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8	4.4 Explain the use of tables, diagrams, charts, graphs and histograms in data presentation.	Discuss the use of diagrams, charts, graphs and histograms in data presentation.	Charts, Lecture notes Chalkboard	Draw diagrams, graphs, etc. and make tables to present experimental data.	Illustrate data presentation from some experiment using diagrams, graphs, tables, etc.	Statistical table Raw data Statistical and analytical soft wares Computers Calculators Statistical table.
General Objective: 5.0: Understand frequency distributions						
9	5.1 Explain the evidence of variation in material data e.g. normal distribution. 5.2 Define the following terms.: Mean Mode Median 5.3 Define the following measures of dispersion: Range Standard deviation Variance	Explain distribution from experimental data.	Lesson notes Chalkboard Charts.	Carry out exercises by using some experimental data	Illustrate frequency distributions using some field data. Process field data to demonstrate how to determine statistical	Raw data Statistical analytical softwares, Computers, calculator, Statistical table.

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	Standard error.				dispersion indices	
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- Programme:** National Innovation Diploma In Agriculture
- Course:** CME 122 BASIC WORKSHOP PRACTICE
- Duration:** 60 hours
- Unit:** 2 Credit Unit
- Goal:** This course is designed to acquaint the student with the use of hand tools, agricultural implements, machine tools, servicing and workshop techniques.

General Objective:

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

- 1.0 Know the use of hand tools.
- 2.0 Know the use of measuring and marking out instruments and tools in the workshop.
- 3.0 Know the methods of producing holes using drilling machines.
- 4.0 Know basic sheet metal shaping operations and the use of lathe and shaping machines.
- 5.0 Understand the functions and uses of milling machines.
- 6.0 Understand the functions and uses of the surface grinding machine.
- 7.0 Understand the principles involves in soldering, brazing, welding, adhesive bonding, fastening and joining.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: BASIC WORKSHOP PRACTICE		COURSE CODE: CME 122		CONTACT HOURS: 60 HOURS (4 hr practical)		
GOAL: This course is designed to acquaint the student with the use of hand tools, agricultural implements, machine tools, servicing and workshop techniques.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective : 1.0 Know the use of hand tools				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-2	<p>1.1 Describe and identify various hand tools in a farm workshop</p> <p>1.2 Perform a variety of tasks e.g. planning, nailing, boring etc using hand tools</p> <p>1.3 Select basic powered hand tools to perform a variety of tasks e.g. Planning, nailing, boring etc.</p> <p>1.4 Identify the relative merits of powered hand tools in terms of speed of production, accuracy and convenience.</p>	<p>List merits and demerits of hand tools.</p>	<p>Chalkboard</p> <p>Lesson notes</p>	<p>Identify and demonstrate the use of hand tools.</p>	<p>Guide and demonstrate to the students the use of hand tools.</p> <p>Demonstrate good</p>	<p>- Assorted hand tools e.g Hammers, chisel, punchers, Hand drills, etc.</p>

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	1.5 Maintain hand tools in a good working condition.				maintenance methods for hand tools.	
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	General Objective: 2.0 Know the use of measuring and marking out instruments and tools in the Workshop :					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3-4	<p>2.1 Identify all measuring and marking out instruments and tools in a workshop</p> <p>2.2 Describe the function of datum lines and center lines</p> <p>2.3 Describe the principle of non-digital micrometer</p> <p>2.4 Describe the principle of the vernier.</p>			<p>Measure and mark out on plane surfaces using the instruments and tools in the workshop</p> <p>Determine the limits of accuracy using external, internal and depths micrometers</p> <p>Determine the limits of accuracy using caliper, height, depth and protractor with vernier scales</p> <p>Identify the different applications of dial and test gauges from point of view of accuracy, robustness</p>	Demonstrate the use of measuring and marking instruments.	<p>Measuring and marking</p> <p>Instruments. Micrometer, vernier</p> <p>Metal rules</p> <p>Metal square pencil</p> <p>Micrometer</p> <p>Venire clipper</p> <p>Screw gauge.</p>

	General Objective: 3.0 Know the methods of producing holes using sensitive drilling machines.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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	<p>3.1 Describe the features of a sensitive drilling machine i.e. table, column spindle etc.</p> <p>3.2 Explain the need for clamping before drilling.</p> <p>3.3 Describe the problems associated with producing holes in sheet metal copper, brass and plastics using sensitive drilling machines.</p> <p>3.4 Describe basic sheet metal operations and the use of lathe machines</p>			<p>Identify the features of twist drills, trepanning tools, reamers, cutting angle and holding methods.</p> <p>Produce through and blind holes using sensitive drilling machines.</p> <p>Produce holes in sheet metal, copper brass and plastics using sensitive drilling machine</p> <p>Determine the required bending and folding allowances</p> <p>Identify the component parts and drive systems of a typical center lathe.</p> <p>Produce simple cylindrical shapes to a given specification using a center lathe.</p> <p>Produce holes to a given specification using</p>	<p>Demonstrate use of drilling machines.</p>	<p>Drilling machines</p> <p>Sheet metal, copper, brass, plastics, wood</p>
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				drills, boring tools and reamers on a center lathe. Produce a thread using machine.		
General Objective: 4.0 Know basic sheet metal shaping operations and the use of lathe and shaping machines.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	4.1 Produce basic rectangular shapes using manually operated guillotine, bending machine and hand tool 4.2 List the functions of a shaping machine			Cut sheet metals into various shapes using machines and hand tools. Identify the component parts and drive systems of a typical shaping machine Produce simple forms to a given specification using a shaping machine.	Guide the students in the use of machines and hand tools. Guide students in using shaping machines	Lathe, Boring tools, Reamers. Shaping machines iron sheets and rods.
General Objective: 5.0 Understand the functions and uses of the milling machine						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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6-7	5.1 List the functions of the milling machine.	Demonstrate the use of milling machine	Milling machine	Identify the component parts and drive systems of a typical shaping machine Produce simple forms to a given specification using a milling machine.	Demonstrate the use of milling machine	Milling machines. Metal sheets.
General Objective: 6.0 Understand the functions and uses of the surface grinding machine						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8-9	6.1 List the functions of the surface grinding machine. 6.2 Compare the surface finish obtained by grinding, milling, Shaping and turning machines	Discuss uses of grinding Machines	Chalkboard Lesson notes	Identify the component parts and drive systems of a surface grinding machine Grind surfaces using surface grinding machine Identify relevant angles of common cutting tools Select and use appropriate tools for various machining Operations.	Demonstrate the use of grinding machines Demonstrate the use of cutting machine. List cutting machine Describe the functions of cutting tools. List the advantages of using cutting fluids.	Grinding machines metal sheet and rods. Cutting tools.

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General Objective: 7.0 Understand the principles involved in soldering, brazing, welding, adhesive bonding, fastening and joining						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11-12	7.1 Describe the following operations: (i) Soldering (ii) Brazing (iii) Welding (iv) Adhesive bonding (v) Fastening and joining			20) Produce a test piece using the principles involved in welding 21) Produce a test piece using various adhesives. 22) Produce stress tests on the test pieces to compare the relative strengths of the above methods	Demonstrate soldering, brazing and welding	Welding machine soldering machine Riveting tool Brazing equipment.

Programme: NATIOAL INNOVATION DIPLOMA IN AGRICULTURE
Course: IAE 213 FISH FARMING
Duration: 60 Hours (1 Hours Lecturee3r, 3 Hours Practical)
Units: 2.0

Goal: This course is designed to equipment students with the knowledge and skills to set up and manage small/ medium scale land based freshwater fish farm.

General Objectives

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

- 1 Know the scope of fish culture.
- 2.0 Understand site selection, design and construction of fish pond.
- 3.0 Know different culturable fish species.
- 4.0 Understand fish pond management.
- 5.0 Understand the role of natural feed and supplemental feeding in fish culture.
- 6.0 Understand the principles and methods of fish seed production.
- 7.0 Know enemies of fish under culture condition.
- 8.0 Know the method of fish harvesting, transportation and marketing

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: FISH FARMING		COURSE CODE: IAE 213		CONTACT HOURS: 60 Hours (1 hr lecture, 3hrs practical)		
GOAL: This course is designed to equip the student with the knowledge and skills to set up and manage small/ medium scale land based freshwater fish farm.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the scope of fish culture.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Define fish culture 1.2 List the advantages of fish farming 1.3 Describe culture systems- extensive, semi-extensive, intensive. 1.4 Identify fish culture facilities - reservoirs, pond, tanks, cages, aquaria.	Explain the terms aquaculture fish culture integrated fish farming. Highlight the importance of fisheries sector in the Nigeria Explain culture system as it relates to productivity. Explain fish culture facilities.	Chalkboard Lesson notes.	Visit a commercial fish farm. Report on the visit.	Lead student on an excursion to a commercial fish farm	Commercial fish farm.
General Objective: 2.0 Understand site selection, design and construction of fish pond.						

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WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>2.1 Explain site selection - For fish pond.</p> <ul style="list-style-type: none"> - Topography -Water source -Water quality -Soil type <p>2.2 Plan and design pond layout.</p> <p>2.3 Describe pond construction:</p> <ul style="list-style-type: none"> - site preparation - pegging pond layout - Pre-excavation. - Pond excavation and dyke construction. 	<p>Describe the importance of site selection in fish pond construction.</p> <p>Describe sources of water and their disadvantage.</p> <p>Describe how a fish pond to planned and designed.</p> <p>Describe dyke, inlet and outlet designing.</p>	<p>Chalkboard</p> <p>Lesson Notes</p>	<p>Select site for fish farm.</p> <p>Survey site for fish farm.</p> <p>Identify soil types that can retain water - carry out permeability test.</p> <p>Design pond and dyke.</p>	<p>Guide students to identify suitable pond sites.</p> <p>Guide students to identify clay and loamy soil.</p> <p>Guide the students in pond construction</p>	<p>Soil test kits.</p> <p>Soil samples. E.g. clay, soil loamy soil.</p>
<p>General Objective: 3.0 Know different culturable fish species.</p>						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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	<p>3.1 Identify culturable fish species in Nigeria –clarias, Oreochromis (Tilapia) Heterotis Heterobronchus Carp, etc.</p> <p>3.2 Explain biological and economic factors in selecting fish to culture:</p> <ul style="list-style-type: none"> - market price - growth rate. - Hardiness. - Seed availability <p>3.3 Describe monoculture and polyculture system.</p>	<p>Explain factor important in selecting fish for culture.</p> <p>Describe different species that can be raised together and their advantages.</p>	<p>Chalkboard.</p>	<p>Collect and differentiate culturable species.</p>	<p>Demonstrate the main features of culturable species.</p>	<p>Culturable Species Specimen.</p>
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General Objective 4.0 Understand fish pond management						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3-4	<p>4.1 Explain the need for preparing pond bottoms in old and new ponds before stocking</p> <p>4.2 Describe the use of liming materials to condition pond bottoms.</p> <p>4.3 Explain the processes involved in impounding water in ponds</p>	<p>Describe advantages and disadvantages of inorganic and</p>	<p>Chalkboard</p> <p>Lesson notes</p>	<p>Prepare pond bottoms Before stocking.</p> <p>Condition pond bottoms Using liming materials.</p> <p>Fertilize ponds</p> <p>Stock ponds with desired fish species in different culture Systems.</p>	<p>Demonstrate Pond Preparation fertilization and stocking</p>	<p>- lime</p> <p>Fertilizer (organic manure)</p> <p>Fish fingerling.</p>

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	<p>4.4 Explain the need for pond fertilization</p> <p>4.5 Describe inorganic and organic fertilization.</p> <p>4.6 Explain the principles of stocking ponds with desired fish species in different culture systems (monoculture, polyculture etc)</p>	<p>organic fertilizer.</p> <p>Describe stocking density, ratio in polyculture.</p>		<p>Count fish.</p>		
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WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5-6	<p>5.1 Describe methods available for the production of natural fish foods.</p> <p>5.2 Describe the procedure for compounding simple rations</p> <p>5.1 Estimate quantity of supplemental feed to be applied in ponds:</p> <ul style="list-style-type: none"> - feeding rate. - Feeding frequency. 	<p>Explain the required ingredients for fish feed</p> <p>Explain the procedure for fish feed formulation</p>		<p>Identify common, locally available feed stuffs such as cotton seed meal, rice bran groundnut cake, palm kernel meal, maize etc</p> <p>Carry out practical feeding of fish</p>	<p>Guide the students in identifying feed stuff.</p> <p>Demonstrate the procedure for fish feed formulation.</p>	<p>Fish feed ingredients</p> <p>Feed mill</p> <p>Pelleting machine</p>

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				Compound simple ration and feed to fish		
				Produce and package fish feed in pellets etc using feed mill		
General Objective 6.0 Understand the principles and methods of production of fish seed.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
7-8	6.1 Describe natural propagation of fish in ponds. 6.2 Explain the need for the care and maintenance of brood-fish. 6.3 Describe the artificial propagation of fish by hypophysat	Highlight the importance of aeration in fry survival. Explain the need for specialized feeding of fry/fingerlings. Explain consideration in fingerling transportation. - Ambient temperature		Induce spawning in catfish. Carry out hatchery processes	Propagate fish artificially by hypophysation, Stripping, incubation, etc.	Hormones Spring Saline solution Breeder fish Kakabans Aquaria Small concrete tanks.

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	<p>ion, stripping etc</p> <p>6.4Describe proper nursery practices such as care of eggs, fry and fingerlings.</p> <p>6.5Explain the reasons for hybridization programs</p> <p>6.6 Describe methods of transporting fingerlings, brood fish etc.</p>	<ul style="list-style-type: none"> - Duration - Acclimatization. - Stress. 		<p>Package fingerling for transportation.</p>	<p>Guide the student in packaging some fingerling for transport.</p>	<p>Oxygen Cylinder Poltene bag Plastic jerry cans.</p>
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	General Objective 7.0 Know enemies of fish under culture.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9-10	7.1 Define pollution . 7.2 Identify ways of dealing with problems in culture systems.	Enumerate major pollutants.			Take students to see commercial fish farm.	

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	<p>7.3 Describe and apply simple methods for improving water quality in ponds.</p> <p>7.4 Explain the need for the control of fish predators.</p> <p>7.5 Describe the role of aquatic weeds in culture systems and methods available for their control</p> <p>7.6 Describe common diseases/parasites of fish and their control.</p>	<p>List aerating equipment and methods of operation.</p> <p>List some enemies of fish and control method.</p> <p>Classify fish pathogen into viral, bacterial mematode, crustacean</p>		<p>Identify various aerating equipment</p> <p>Carry out weeding on college pond.</p> <p>Identify some common fish diseases a parasite</p>	<p>Demonstrate how various aerating equipment work.</p> <p>Supervise pond weeding.</p> <p>Guide students to identify fish diseases and parasite.</p>	<p>Various aerating equipment.</p> <p>Cutlasses.</p> <p>Fish specimens</p>
General Objective 8.0 Understand harvesting, transportation and marketing of fish						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11-12	<p>8.1 Describe common methods of harvesting fish including total and partial cropping.</p> <p>8.2 Identify the mode and equipment used for the transportation of harvested fish</p>	<p>Discuss fish harvesting, transportation and marketing</p> <p>Describe fish box, jute bong cold van.</p>		<p>Identify simple fish harvesting equipment.</p> <p>Harvest fish in ponds applying various methods.</p> <p>Demonstrate the use of</p>	<p>Demonstrate fish cropping with the students.</p> <p>Guide the students in packaging and transportation of fresh fish.</p>	<p>Seine net</p> <p>Pond net.</p> <p>Fish box</p> <p>Jute bong</p>

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	8.3 State the outlets for the marketing of fish seed, table fish, shell fish, ornamental fish etc.	Describe market outlets.		transportation equipment.		
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Programme: NATIOAL INNOVATIVE DIPLOMA IN AGRICULTURSE
Course: IAE 214 SWINE PRODUCTION.
Duration: 60 Hours (2 Hours Lecture, 3 Hours Practical)
Units: 2.0

Goal: This course is designed to equip students with skills in rearing pigs.

General Objectives

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

1. Understand pig development in Nigeria.
2. Know the Breeds of pig.
3. Know about swine housing.
4. Know the methods of swine production.
5. Understand the nutrition of swine.
6. Understand the management practices in swine farming.
7. Understand production records kept in swine farms.
8. Know how to slaughter pig, process and package carcass cuts.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: SWINE PRODUCTION			COURSE CODE: IAE 214		CONTACT HOURS: 60 Hours (1 hr lecture, 3hrs practical)	
GOAL: This course is intended to acquaint the trainees with skills in rearing non-ruminant animals (Pigs).						
COURSE SPECIFICATION: Theoretical Contents:					Practical Contents:	
	General Objective: 1.0 Understand pig development in Nigeria.			General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-2	<p>1.1 Describe the past, present and future development of the pig industry in Nigeria.</p> <p>1.2 List factors that hinder the production of pig in Nigeria.</p> <p>1.3 Identify major pig producing areas in Nigeria.</p>	<p>List factors affecting Swine production in Nigeria</p> <p>With the aid of a map showing distribution of swine population in Nigeria.</p> <p>Enumerate the importance of Pig over other farm animals in providing animal protein.</p>	<p>Lesson notes</p> <p>Chalkboard.</p> <p>Relevant maps.</p>	<p>Study the map of the agro-ecological zones of Nigeria showing pig distribution.</p>	<p>Ensure that students have access to the map.</p>	<p>Agro-ecological map of Nigeria.</p>

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General Objective 2.0 . Know the Breeds of pig.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Describe the common breeds of pig . 2.2 Describe the relative performance of exotic and indigenous breeds. 2.3 Describe the factors affecting the performance of pigs. 2.4 Describe the characteristics of common breeds of pig.	Discuss the different commonly available breeds of Pig in Nigeria. Explain the differential performance between exotic and indigenous breeds.	Lesson notes Chalkboard. Visual charts.	Identify different breeds of pigs.	Take the students to farms to show them the available breeds.	Visual charts.
General Objective 3.0 Know about swine housing						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4	3.1 Describe the different kinds of housing for the rearing of pigs. 3.2 State the stocking densities for the different age groups of Pigs.	Explain types of houses for pigs Explain the need for housing	Lesson notes Chalkboard	Identify difference types of housing for rearing pigs. Calculate the stocking density in farms visited.	Take students on visits to model swine farms to appreciate differences in housing for pigs. Demonstrate how to calculate stocking density.	Different age groups of pig. Pig houses.

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	(ix) Breeding efficiency (ii) Weaning period					
General Objective 5.0 Understand the nutrition of swine.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8-9	<p>5.1 Describe the digestive system of swine</p> <p>5.2 List the various ingredients used in formulating swine ration</p> <p>5.3 State the nutritional composition of these ingredients.</p> <p>5.4 Describe the diseases and parasites of swine and their casual agents.</p> <p>5.5 Describe the prevention and control measures for the various swine diseases and parasites.</p>	<p>Explain functions of the digestive system.</p> <p>Discuss the diseases and parasites of swine and causal agents.</p> <p>Discuss preventive and control measures for swine diseases or parasites.</p> <p>Classify feed ingredients in swine nutrition according to their function</p> <p>Discuss feed formulation</p>	<p>Lesson notes</p> <p>Chalkboard.</p>	<p>Dissect a weaned pig and display the digestive system for identification of various parts.</p> <p>Formulate swine rations depending on the Production purposes e.g. piglet, weaning, fattening</p>	<p>Demonstrate how to formulate feed using available ingredients.</p> <p>Show students how to dissect pig.</p> <p>Guide students to identify diseases and parasites in swine.</p> <p>Demonstrate medication application to Pig</p>	<p>Pig</p> <p>Dissecting instruments</p> <p>Knife</p> <p>Feed ingredients.</p> <p>Drugs/medication.</p>

		using different techniques to meet different production objective.		and breeding Make an album of feed ingredients. Identify diseases and parasites of pig. Administer medication to pigs.		
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General Objective 6.0 Understand the management practices in swine farming.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	6.1 Describe the following management operations: (i) castration (ii) deworming (iii) teeth cutting (iv) identification (v) weighing	List the daily chores and discuss the specific management practices.	Lesson notes chalkboard	Carry out the following management operations on pigs: deworm, Castrate, teeth cutting, identification and weighing.	Demonstrate to students how to safely carry out these practices.	Instruments for identification castration, teeth cutting. Wheal barrow, spade Weighting scale.
General Objective 7.0 Understand the various production records kept in swine farms						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	7.1 Describe the various records kept on the farm (i) Production records (ii) Accounting records (iii) Medication (iv) Breeding (v) Feed (vi) Health	Explain the different types of records that can be kept.	Lesson notes. Chalkboard.	Design various types of records used in a swine Farm e.g. production records, Accounting records, Medication, Breeding, Feed, Health.	Guide the students to list possible records to keep and develop tables for them.	A swine farm as a case study.

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General Objective 8.0 Know the processes involved in swine processing						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12 - 13	<p>8.1 Determine the killing out percentage of swine.</p> <p>8.2 Describe methods of slaughtering pigs.</p> <p>8.3 Identify the various whole sale and retail carcass cuts of swine.</p>	<p>Outline swine processing procedures.</p> <p>Describe the different carcass cuts.</p> <p>Explain packaging of carcass cuts.</p>	<p>Lesson notes</p> <p>Chalkboard</p> <p>Charts.</p>	<p>Slaughter, dress, cut and package swine</p> <p>Process swine meat into bacon.</p>	<p>Demonstrate how to slaughter pig.</p> <p>Demonstrate how to produce the carcass cuts and package them for marketing.</p>	<p>A weaned pig.</p> <p>Knife</p> <p>Sledge hammer</p> <p>Polyethene bags.</p>

NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture

Course: AGT 214 TREE CROPS

Duration: 45 hours

Unit: 2 Credit Unit

Goal: This course is designed to acquaint the student 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 Know different types of economic trees.
- 2.0 Know the production techniques of tee crops in Nigeria.
- 3.0 Understand the production cycle of major economic tree crops in Nigeria.

PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)		
COURSE: TREE CROPS	COURSE CODE: AGT 214	CONTACT HOURS: 45 HOURS (1 hr lecture: 2 hrs practical)

NID in Agriculture (Draft)

GOAL: This course is designed to acquaint the student with the agronomy and agro-techniques of different types of tree crops.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know different types of economic tree crops.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-3	<p>1.1 Explain the origin and history of the following tree crops: Cocoa, Rubber, Coffee, Oil palm, Kola Raffia palm, Cashew, Coconut etc.</p> <p>1.2 Explain the tree crop adaptation to Nigeria climatic conditions.</p> <p>1.3 Explain the production trends of the main tree crops producing areas in Nigeria</p>	<p>- Discuss each of the tree crops.</p> <p>Discuss the meaning of adaptation and various climatic condition of Nigeria.</p> <p>Explain production trends of tree crops in different geographical area in Nigeria.</p>	<p>Chalkboard</p> <p>Lesson notes.</p>	<p>Differentiate the following tree crops; Cocoa, Rubber, Coffee, Oil palm, Kola Raffia Palm, Cashew, Coconut etc.</p> <p>Identify areas of production of the various economic tree crops.</p> <p>Identify the main producing areas of the economic tree crops in Nigeria.</p>	<p>Conduct a tour guide</p> <p>Help student to classify various economic tree crops in different agro-ecological zones in Nigeria</p> <p>A team guide.</p>	Tree crop plantation
General Objective: 2.0 Know the production techniques of tree crops in Nigeria						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4-8	<p>2.1 Describe the following operations for economic tree crop production:</p> <p>(i) Site selection</p> <p>(ii) Site clearing and</p>		Lesson notes	<p>Carry out lining, holing, transplanting, mulching, pruning of diseased branches of economic tree crops.</p>	Demonstrate all production techniques and procedures.	Different types of pesticides.

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	(x) characteristics. Manure and fertilizer Application	grading				
	2.2 Describe harvesting, processing techniques, grading and marketing of processed produce.					
General Objective: 3.0 Understand the production cycle of major economic tree crops in Nigeria						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9-12	3.1 Describe the life cycle of major economic tree crops e.g. cocoa, kola, coffee, citrus, oil palm, Rubber, locust bean etc. 3.2 Describe the yield capacity of major Economic tree crop	Explain life cycle of major economic tree crops. Discuss the yield per hectare of each of the economic trees.	Chalkboard Lesson notes			

NID in Agriculture (Draft)

Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
Course: IAE 216 INDUSTRIAL CROPS PRODUCTION.
Duration: 45 Hours
Unit: 2 Credit Units.

Goals: This course is designed to equip students with the knowledge and skills of producing industrial crops.

General Objectives:

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

- 1.0 Know the uses and economic importance of industrial crops.
- 2.0 Know the botany and ecological requirements of the industrial crops.
- 3.0 Know the cultural practices of industrial crop production.
- 4.0 Know the pests and diseases of industrial crops production.
- 5.0 Know how to harvest, handle and process industrial crops.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: INDUSTRIAL CROSPRODUCTION.		COURSE CODE: IAE 216		CONTACT HOURS: 45 HOURS		
GOAL: This course is designed to equip students with the knowledge and skills of producing industrial crops.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
1 .0 General Objective: Know the uses and economic importance of industrial crops.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Identify industrial crops 1.2 Describe the uses and economic importance of industrial crops.	List industrial crops such as sugar cane, sweet sorghum, castor, sesame, coffee, neem, etc. Discuss the uses of the crops and specific industries where they can be utilized.	Chalkboard.			
2.0	General Objective: Know the botany and ecological requirements of the industrial crops					
	2.1 Describe the botany of each industrial crop. 2.2 State origin and	Classify industrial crops unto different looking classes.	Chalkboard Lesson notes.	Identify industrial crops	Show student samples of industrial crops.	Crop samples Seed samples.

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	distribution of industrial crops. 2.3 Describe the ecological requirements of each industrial crops.	Explain the origin and the distribution of the crops in Nigeria. Discuss the specific climatic and soil requirements of each of the crops in 2.1 above.				
General Objective: 3.0 Know the cultural practices of industrial crop production						
	3.1 Describe the varieties of each industrial crop. 3.2 Describe land preparations for each industrial crop. 3.3 Describe planting and planting methods. 3.4 Describe weed control in industrial crops. 3.5 Describe fertilizer rate and application methods for each of the industrial crops.	Characterize the varieties of each of the industrial crops listed in 3.1 above. Discuss the different tillage practices for preparing land. Describe how to dress seeds and planting materials. Describe planting spacing, plant population and seed rate.	Chalkboard Lesson Notes.	Identify the varieties of each crop. Carry out land preparation techniques. Carry out planting procedure. Identify weeds of industrial crops.	Guide student to identify fertilizers. Demonstrate to students methods of fertilizer application.. Guide students to identify the varieties of each crop. Guides student to	Seeds, P Planting materials, Tapes, Ropes. Different fertilizers samples.

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		<p>Describe planting methods.</p> <p>Discuss different methods of weed control of each industrial crop.</p> <p>Discuss the rate of fertilizer and the various application methods for each nutrients.</p>		<p>Identify different fertilizer samples.</p> <p>Carry out different methods of fertilizer application.</p>	<p>prepare land for planting.</p> <p>Demonstrate planting methods, and procedures.</p> <p>Ask students to make weed album.</p> <p>Visit field to collect weeds.</p>	
<p>General Objective: 4.0 Know the pests and diseases of industrial crops.</p>						
<p>4.1 Describe the pests of industrial crops.</p> <p>4.2 Explain the various diseases of industrial crops.</p> <p>4.3 Explain the control measures of the pests and diseases described above.</p>	<p>Discuss the pests affecting each industrial crop.</p> <p>Discuss the diseases of industrial crops and their control.</p> <p>Highlight disease casual organisms.</p>	<p>Chalkboard</p> <p>Lesson Notes.</p>	<p>Identify pest of industrial crops.</p> <p>Identify diseases of industrial crops.</p>	<p>Guide student to collect pests of industrial crops.</p> <p>Guide student to identify diseases of industrial crops.</p>	<p>Insect collection methods.</p> <p>Diseased plant</p> <p>Samples.</p>	

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		Discuss the economic implications of the diseases and pests to each of the crop.				
General Objectives: 5.0 Know how to harvest, handle and process industrial crops						
5.1 Explain the harvesting procedures for each of the industrial crops.	Describe the different methods of harvesting each of the industrial crops.	Chalkboard. Lesson Notes.	Carry out the harvesting of industrial crops.	Guide students on how to harvest each industrial crops.	Harvesting Implements and equipments	
5.2 Explain the processing of each of the industrial crops.	Discuss the processing of each of the industrial crops.	Chalkboard.	Carry out the processing of industrial crops e.g. sugar cane, castor, sesame, neem etc.	Guide students to process industrial crops.	Processing equipment.	
5.3 Describe the handling and transportation of each of the industrial crop.	Discuss the various ways of handling industrial crops.	Lesson Notes.				

Programme: NATIOAL INNOVATIVE DIPLOMA IN AGRICULTURSE
Course: AGT 223 FARM POWER AND MECHNIZATION.
Duration: 60 Hours (2 Hours Lecturee3r, 3 Hours Practical)
Units: 2.0

Goal: This course is designed to enable students understand various farm energy sources, their methods of generation and utilization for increased agricultural output.

General Objectives

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

1. Know sources of energy on the farm.
2. Know types of farm engines.
3. Understated tractor and its system.
4. Understand the general construction and operation of common types of tillage equipments.
5. Understand the general construction and operation of common types of planting and transplanting machines.
6. Understand the general construction and operation of common types of machine for applying organic manure and artificial fertilizers.
7. Understand the general construction and operation of common types of hand sprayer, boom sprayer and crop dusters.

8. Know the general construction and operation of common types of mower, forage harvester, pick-up bailers and combine harvesters.

PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: FARM POWER AND MECHANISATION		COURSE CODE: AGT 223		CONTACT HOURS: 60 Hours (1 hr lecture, 3hrs practical)		
GOAL: This course is designed to enable students understand various farm energy sources, their methods of generation and utilization for increased agricultural output.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective : 1.0 Know sources of energy on the farm.				General Objective:		
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 - Fuel - Electrical - Solar - Biomass	Explain the need for energy on the farm.	- Chalkboard Lesson Note.			

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WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.2 Explain the methods of generation and utilization of energy from the various power sources listed in 1.1 above</p> <p>1.3 Compare the various farm energy sources based on: (i) efficiency of generation (ii) cost of generation</p>	Describe various methods of energy generation from the sources listed in 1.1 and their utilization.	<p>Chalkboard</p> <p>Lesson Notes.</p>	Generate energy from available sources on the farm.	Demonstrate how to generate energy for use in the farm.	- Work animals, Water Fuel solar energy, etc.
General Objective 2.0 Know types of farm engines						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2-3	<p>2.1 Distinguish between the mode of operation of internal and external combustion engines.</p> <p>2.2 List the various types of farm engines e.g.</p> <ul style="list-style-type: none"> - steam engines - steam turbines - gas turbines - gas engines <p>2.3 Classify the various types of farm engines listed in 2.2 above as</p>	<p>Display various farm engines.</p> <p>Explain the mode of operation of internal and external combustion engines.</p>	<p>Chalkboard</p> <p>Lesson note</p>	Operate different farm engines.	Demonstrate the working of farm engines.	External and internal combination engines.

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	<p>either internal or external combustion engines.</p> <p>2.4 Differentiate between the principle of operation of diesel (compression ignition) and petrol (spark ignition) engines.</p> <p>2.5 Distinguish between the working principle of two and four stroke engines.</p> <p>2.6 Describe the constructional features of both two and four.</p>					
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General Objective 3.0 Understand tractor and its systems						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4-5	<p>3.1 List various types of and makes of farm tractors such as:</p> <ul style="list-style-type: none"> - Massey Ferguson (MF256, 278 etc) - Styr 178 etc 	<p>Illustrate the simple differences in the types of tractors</p>	<p>Chalkboard</p> <p>Lesson Note</p>	<p>Identify tractor engine component parts.</p> <p>Select farm tractors based on their power ratings for specific jobs such as tillage, planting</p>	<p>Draw some main component parts of the tractor</p>	<p>Assorted tractors</p>

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	<ul style="list-style-type: none"> - John Deere - Fiat <p>3.2 Distinguish between tracklayer tractors and pneumatic tractors</p> <p>3.3 Describe the constructional features of a farm tractor such as steering, engine, engine transmission, final drive, implement control system.</p> <p>3.4 State the functions of various tractor parts.</p> <p>3.5 Describe the constructional features and mode of operation of the various tractor systems:</p> <ul style="list-style-type: none"> - Fuel and air system - Lubrication system - Ignition system - Transmission system - Steering Mechanism - Hydraulic life system 	Highlight the main features of tractors		<p>etc.</p> <p>Operate a farm tractor</p> <p>Carry out routine maintenance of the tractor systems in 3.5</p>	Demonstrate the procedure in routine maintenance of tractors e.g. oiling,cleaning	Oils Grease Gauge
General Objective 4.0 Understand the general construction and operation of common types of tillage Equipment.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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<p>6-7</p>	<p>4.1 Describe the general construction with simple line diagrams of the following: . (i) Mould boards (iii) Disc (iv) Chisel (v) Sub-soiler and Ridging plough</p> <p>4.2 Describe the general construction with simple line diagrams of ground driven and power driven harrows and cultivators</p> <p>4.3 Describe the working principles of mould board, Disc, Chisel, Sub-soiler and Ridging ploughs</p> <p>4.4 Describe the working principles of ground driven and power driven harrows and cultivators.</p> <p>4.5 Describe the maintenance requirements of ploughs, harrows and cultivators.</p>	<p>Display tillage equipment</p> <p>Explain the use of simple line diagrams in the construction of the tillage components of tillage equipment.</p> <p>Explain how to maintain the tillage equipment.</p>	<p>Classroom notes.</p> <p>Chalkboard.</p>	<p>Operate common types of ploughs, harrows and cultivators,</p> <p>Service and repair ploughs, harrows and cultivators.</p>	<p>Carry out tillage operations.</p> <p>Demonstrate how to service common tillage equipment.</p>	<p>Tillage equipment</p> <p>Tractor.</p>
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General Objective 5.0 Understand the general construction and operation of common types of planting and transplanting machinery.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8	5.1 Describe the general construction with simple line diagrams of common types of planters, seed drills and transplanters. 5.2 Explain the importance of calibrating seed drills.	List transplanting machinery. Describe practical significance of seed drills calibration.	Chalkboard. Lesson note.	Calibrate seed drills .	Demonstrate calibration of seed drills.	Planter, seed drills, transplanters.
General Objective 6.0 Understand the general construction and operation of common types of machines for applying organic manures and artificial fertilizers						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9	6.1 Describe the general construction with simple line diagrams of common types of machines for applying organic manures and artificial fertilizers. 6.2 Describe the working principles of common types of machines for applying organic manures and artificial fertilizers	List machines for manure and fertilizer application. Explain the use of simple line diagrams in the construction of machines for organic and inorganic fertilizer	Chalkboard Lesson Notes.	Operate common types of manures and fertilizer distributors	Demonstrate manure and fertilizer applications with machinery	Manure Artificial fertilizer Machines for manure and fertilizer application.

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	6.3 State the maintenance requirements of common types of manure and fertilizer spreaders.	application. Explain the various principles of common machines for applying manures and fertilizers, and their maintenance.				
General Objective 7.0 Understand the general construction and operation of common types of hand sprayers, boom sprayers and crop dusters						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	7.1 Describe the general construction with simple line diagrams of common types of hand sprayers, boom sprayers and crop dusters. 7.2 Describe the working principles of common types of hand sprayers, boom sprayers and crop dusters. 7.3 Explain the importance of calibrating boom sprayers. 7.4 State the maintenance	Describe special features of different types of sprayers		Operate hand sprayers, boom sprayers and crop dusters. Service and repair common types of hand sprayers, boom sprayers and crop dusters.	Demonstrate the use of sprayer and their maintenance	- assorted sprayers.

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	requirements of common types of hand sprayers, boom sprayers and crop dusters.					
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	General Objective 8.0 Know the general construction and operation of common types of mowers, forage harvesters, pick-up balers and combine harvesters					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	<p>8.1 Describe the general construction with simple line diagrams of common types of mowers, forage harvesters, pick-up balers</p> <p>8.2 Describe the working principles of common types of mowers, forage harvesters Pick-up balers and combine harvesters.</p> <p>8.3 Describe the maintenance requirements of common types of</p>	Describe assorted types of mowers, harvesters, balers.	Chalkboard Lesson Notes.	Identify and operate mowers, balers and forage harvesters, combined harvesters.	Demonstrate the use of mowers, forage harvesters, pick-up balers and combine harvesters .and their maintenance.	<p>- Mowers</p> <p>Forage harvesters.</p> <p>Pick-up balers.</p> <p>Combine harvesters.</p>

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	mowers, forage harvesters, pick-up balers and combine harvesters.					
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Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
Course: IAE 218 FEASIBILITY STUDIES AND FARM ENTERPRISE DEVELOPMENT
Duration: 45 Hours
Units: 2.0

Goal: The course is designed to equip students with skills that will enable them write feasibility reports and source for fund to develop farm enterprises.

General Objectives

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

1. Understand feasibility study and its importance in enterprises development.
1. Know the characteristics of a feasibility study.
2. Know pre-investment evaluation of farm enterprise.
3. Know various sources of financing farm enterprise.
4. Know business organization and registration.

NID in Agriculture (Draft)

	PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)					
	Course: FEASIBILITY STUDIES AND FARM DEVELOPMENT			Course Code: IAE 218	CONTACT HOURS: 45 (1 hr lecture, 2 hrs practical)	
	GOAL: The course is designed to equip students with skills that will enable them write feasibility reports and source for fund to develop farm enterprises.				Theoretical:	
	Year:	Pre-requisite:		Practical:		
	Theoretical Content				Practical Content	
	General Objective: 1.0: Understand feasibility study and its importance in enterprise development.					
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1-2	1.1 Define feasibility study. 1.2 Explain the purpose of feasibility studies. 1.3 Explain the importance of a feasibility study in the process of making an investment decision. 1.4 Explain the industrial use of feasibility studies. 1.5 Determine the factors that make a feasibility study technically, financially and economically sound.	Explain the importance for feasibility study. Explain what is involved in technical appraisals.				
	General Objective : 2.0: Know the characteristics of a feasibility study.					
	2.1 Describe the critical areas normally covered in any feasibility study:-	Outline the critical features of a feasibility study.		Carry out a feasibility study.	Guide the student in conducting	

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3-4	i)Project background, sponsorship and arrangements for technical assistance ii) Market and demand analysis iii) Technical feasibility: manpower, machines, equipment and raw materials requirement iv) Project financing v) Financial evaluation and financial projections vi) Project implementation				a feasibility study.	
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General Objective : 3.0: Know pre-investment evaluation of farm enterprise.						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
	<p>3.1 Describe pre-investment evaluation of farm projects</p> <p>3.2 Explain the various pre-investment activities required to bring a project to fruition</p> <p>3.3 Describe methods measuring profitability of an enterprise.</p> <p>3.4 Explain the following factors in the evaluation of projects:</p> <p style="padding-left: 20px;">(i) the size of funds that can be mobilized for the project</p> <p style="padding-left: 20px;">(ii) size of unsatisfied market demand</p> <p style="padding-left: 20px;">(vii) technical implications of the project</p> <p>3.5 Describe technical appraisals.</p>	<p>Describe pre-investment activities.</p> <p>Explain what is involved in technical appraisals.</p>		Carry out a role play on pre-investment activities.	Guide the student in the role play.	
General Objective : 4.0: Know various sources of financing farm enterprise.						
7-9	<p>4.1 List viable farm projects that can attract financial assistance from donor agencies</p> <p>4.2 List some agencies that offer loans for agricultural development</p> <p>4.3 State the role of Nigerian Agricultural and Rural</p>	Describe role of SME in poverty alleviation.		Write proposals for a viable farm business	Guide students in writing a feasibility report	

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	<p>Development Bank and microfinance houses in the financing of agricultural enterprises</p> <p>4.4 Explain the conditionalities required in procuring a bank loan</p> <p>4.5 Explain the role of agricultural cooperative societies in farm enterprise development</p>			Prepare a report for a bank loan		
General Objective : 5.0: Knows business organization and registration..						
10-12	<p>5.1 Identify types of business organization.</p> <p>5.2 Describe methods of registration of business.</p>	<p>Outline types of business organisation</p> <ul style="list-style-type: none"> - sole trade. - Partnership. - Company with their characteristics. <p>Explain the activities of corporate affairs commission and mode of registration e.g online registration.</p>				

- Programme:** NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
- Course:** AGT 224 PRINCIPLES OF GENETICS AND BREEDING.
- Duration:** 15 hours
- Unit:** 1 Credit Unit
- Goal:** **This course is designed to enable the students understand the principles and importance of inheritance and its application in agricultural production.**

General Objectives:

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

- 1 Know the concept of Genetics and Breeding.
- 2 Understand the principles of Mendelian Laws of Inheritance.
3. Understand the various methods of crops and animal improvement.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: PRINCIPLES OF GENETICS AND BREEDING			COURSE CODE: AGT 224		CONTACT HOURS: 15 HOURS	
GOAL: This course is designed to enable the students understand the principles and importance of inheritance and its application in agricultural production.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the concept of Genetics and Breeding.				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Explain the meaning of Genetics and Breeding. 1.2 Explain mitosis and meiosis.	Define Genes and chromosomes in relation to Inheritance. Define Breeding in relation to agriculture. Explain terms such as Mitosis and Meiosis. Explain how Mitosis and	Genetics charts	(1) Identify each stage in mitosis (2) Identify each stage in meiosis		

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		<p>Meiosis occur and the differences between them.</p> <p>Explain the significance of mitosis and meiosis in agriculture. Discuss in general terms genetics and breeding.</p>				
General Objective: 2.0 Understand the principles of Mendelian Laws of inheritance.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2	<p>2.1 Explain the mendelian Laws of Inheritance.</p> <p>2.2 Explain the important terms in relation to Inheritance.</p>	<p>Explain the mendelian laws of inheritance e.g. the Laws of segregation, Independent Assortment, etc.</p> <p>Explain important terms such as - dominance and Recessive genes.</p> <p>- Incomplete dominance.</p>	<p>Charts</p> <p>Projector</p> <p>Slide</p> <p>Chalkboard</p> <p>Lesson notes</p>	<p>3) Verify by experiments Mendeli an law as a basis for inheritance</p> <p>4) Carry out simple crosses to verify Mendeli an ratio using mice.</p>		

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		<p>Explain how gene inhibition takes place.</p> <ul style="list-style-type: none"> - epitasis <p>Hybrid Heterosis Mutation.</p> <p>Explain the importance of Mendelian laws of inheritance in Agricultural production.</p>				
General Objective: 3.0 Understand the various methods of crops and animal improvement.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3-5	<p>3.1 List the aims of crops and animal improvement</p> <p>3.2 Explain the methods of crops and animal improvement..</p> <p>3.2 Explain incomplete dominance, sex influence on inheritance with examples of gene action.</p>	<p>Explain the Aims of crops and animal improvement in agriculture e.g.</p> <ul style="list-style-type: none"> - increase yield - Develop disease resistant varieties and breeds. - Meet growers and consumer needs 	<p>Charts Crops Instrument used for Artificial Insemination.</p>	<p>Collect the reproductive parts of flowering parts and identify the parts involved in cross-breeding.</p>	<p>Organize excursion to NPRI or other animal research Institute to observe how artificial Insemination is carried out.</p> <p>Demonstrate how cross breeding takes place in plant.</p>	<p>Animals</p> <p>Artificial Vagina</p> <p>Liquid nitrogen</p> <p>Cannisters</p> <p>Insemination pipette</p>

		<ul style="list-style-type: none"> - Adapt to climatic conditions, etc. <p>Explain methods of crops and animal improvement such as:</p> <ul style="list-style-type: none"> - introduction - selection - hybridization through cross breeding, in-breeding, and out-breeding. <p>Outline the advantages and disadvantages of each method.</p> <p>Define Artificial insemination.</p> <p>Explain the processes involved in Artificial</p>				Cooling system.
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		Insemination. State advantages and disadvantages of Artificial Insemination.				
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Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE

Course: .IAE 221 Feed Production (LIVESTOCK AND FISH)

Duration: 75 Hours

Unit 3.0

Goals: This course is designed to provide the students with the basic knowledge and skill in Feed Formulation for Livestock and Fish.

General Objectives:

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

1. Know the various classes of livestock/fish feed and their physical and chemical properties.
2. Know the different ingredients that can be used for livestock and fish feeds.
3. Know the nutrient requirements of farm animals and fish.
4. Know how to formulate and compound balanced rations for different classes of livestock and fish.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
Course: Feed Production (Livestock/Fish)		COURSE CODE: IAE 221		CONTACT HOURS: 75 Hrs. (1 hr lecture, 3hrs Practical)		
GOAL: This course is designed to provide the student with the basic knowledge and skill in feed formulation for livestock and fish.						
Year:		Pre-requisite:				
Theoretical Content				Practical Content		
General Objective: 1.0 Know the various classes livestock/fish feed and their physical and chemical properties.						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1-3	<p>1.1 List the nutrients of livestock/fish feeds;</p> <p>i) Water ii) Carbohydrates iii) Protein iv) Fats and oils v) Minerals vi) Vitamins</p> <p>1.2 Describe the physical and chemical characteristics of these nutrients.</p> <p>1.3 State the psychological functions of the nutrients.</p> <p>1.4 Describe the chemical composition of the various classes of livestock/fish feeds.</p> <p>1.5 List the nutritive composition of</p>	<p>Explain the basic composition of feeds.</p> <p style="text-align: center;">- Discuss the functions of nutrients in the animal body.</p> <p style="text-align: center;">- Discuss the nutritional implication of deficiency of the nutrients.</p> <p style="text-align: center;">- Discuss the effect of physiological status and age on</p>	<p>Chalkboard</p> <p>Lesson Notes.</p> <p>Charts.</p>	<p>Identify deteriorated feeds.</p> <p>Process some of the feedstuffs.</p>	<p>Demonstrate how to identify deteriorated foodstuffs and feed.</p> <p>Demonstrate how to process some feedstuffs.</p>	<p>Foodstuffs Equipment and materials for processing.</p> <p>Grinder</p> <p>Mixer.</p> <p>Grinder, Mixer</p>

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<p>4-6</p>	<p>various classes of feed a) Roughages – carbonaceous and proteinous types. b) Concentrates – proteinous and carbohydrate types. c) energy feed d) Protein supplements. 1.6 Identify different factors affecting choice of feeds for different animals and fish. 1.7 Describe the various methods used in processing/preparing livestock/fish feeds and their effects on feed quality.. 1.8 Explain Feed deterioration. 1.9 Describe the various methods of preserving/storing livestock/fish feeds and their effectiveness. 2.0 Know different ingredients that can be used for livestock and fish feeds. 2.1 Identify the various ingredients used in livestock/fish feeds.</p>	<p>nutrient requirements of Livestock/Fish. - Describe feed processing methods and effects on feed quality. - Explain the effect of feed deterioration on animal performance.. Enumerate feed ingredients needed in feed compounding. Discuss the nutritive</p>		<p>Identify foodstuffs locally available. Separate foodstuffs</p>	<p>Indicate foodstuffs locally available. Take</p>	
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<p>7-8</p>	<p>2.2 Classify feed ingredients into:-</p> <ul style="list-style-type: none"> i. roughages ii. concentrates of plant origin iii. concentrates of animal origin iv. Mineral feeds. <p>3.0 Know the nutrient requirements of farm animals and fish.</p> <p>3.1 List sources of information on nutrient requirements of farm animals.</p> <p>3.2 List the nutrient requirements of all classes/ages of livestock/fish for:</p> <ul style="list-style-type: none"> a. maintenance b. growth c. lactation d. reproduction e. egg production f. work g. wool <p>3.3 Explain the factors affecting nutrient requirements of farm animals/fish.</p> <p>3.4 describe how to determine the nutrient composition of feeds and foodstuffs.</p>	<p>functions of the classes of feed stuffs.</p> <p>-Discuss the effect of the environment on nutrient requirement of farm animals and fish.</p> <p>Explain why the nutrient requirements of farm animals and fish vary with age, and their environment.</p> <p>List sources of information on standard nutrient requirements of different classes of farm animals and fish.</p> <p>Describe the standard methods for determining the nutrient composition of feeds and feedstuffs.</p>		<p>into the classes they belong.</p> <p>Identify the nutrient requirement charts.</p> <p>Analyse feeds and feedstuffs for</p> <ul style="list-style-type: none"> - Moisture - Crude protein - Crude fibre - Ash - Ether extract - Gross energy. 	<p>students out on field trips to see these foodstuffs.</p> <p>Take students to the laboratory and teach them how to determine nutrient composition of foods and foodstuffs.</p>	<p>Foodstuffs.</p> <p>Proximate analyses equipment</p> <p>Food Foodstuffs.</p> <p>Bomb calorimeter , Weighing scale.</p>
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General Objective: 4.0 Know how to formulate and compound balanced rations for different classes of livestock and fish.						
9-10	4.1 Explain ration formulation. 4.2 Define balanced ration. 4.3 Describe various methods of ration formulation. 4.4 Describe methods available for the production of natural fish foods.	Describe different methods of feed formation. - Explain terms like (a) ration (b) Formulate © Balanced ration Compounding.	Chalkboard Lesson Notes.	Formulate rations using the following: a. Pearson square method b. Algebraic method c. Trial and error method.	Guide students in feed formulation .	Mixer Buckets. Spade Broom Computer software.
11-12	4.5 Describe the basic equipment/materials needed for compounding feeds.					

Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
Course .IAE 222 ANIMAL PRODUCTS PROCESSING.
Duration: 60 Hours (1 Hour Lecture, 3 Hours Practical)
Units: 3.0

Goal: The course is designed to inculcate skills in animal products processing and production using simple techniques.

General Objectives

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

1. Know milk components, sources and importance
2. Understand Milk processing techniques and hygiene.
3. Understand the process of making starter culture and its importance.
4. Understand the processes involved in the production of milk products.
5. Understand the methods used in the processing of meat.
6. Understand the methods used in the processing of fish.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
Course: ANIMAL PRODUCTS PROCESSING.			Course Code: IAE 222	CONTACT HOURS: 60 (1 hr lecture, 3 hrs practical)		
GOAL: The module is designed to inculcate skills in Animal products processing and production using simple techniques				Theoretical:		
Year:		Pre-requisite:		Practical:		
Theoretical Content				Practical Content		
General Objective: 1.0: Know milk components, sources and importance			General Objective :			
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1-2	1.1 List the sources of Milk. 1.2 List components of milk. 1.3 Explain milk quality and the factors affecting it. 1.4 Explain the process of milk formation in farm animals.	Define milk Explain the various sources of milk (e.g. Dairy cattle, sheep and goats). Discuss the components of milk (e.g. water, protein, lactose, colostrums, etc.). State the importance of the various	Milk Charts Milking equipment Udder Lesson notes	Draw the udder. Identify milking equipment.	Organise an excursion to a dairy farm	Dairy animals, Milk, Charts.

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		<p>constituents of Milk (e.g. protein, etc.).</p> <p>Explain Milk quality and factors that affect it:</p> <ul style="list-style-type: none">- quality of feeds.- Diseases e.g. tuberculosis, mastitis, anthrax, cholera, etc.- Vaccination.- Poison from pasture e.g. arsenic and other toxic substances' <p>- Bacteria Infection</p> <p>- Odour absorbed from the surrounding environment.</p> <p>-</p> <p>Explain the process of milk formation in farm</p>				
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		animals				
		Explain the term milk let down.				

General Objective : 2.0: Understand milk processing techniques and hygiene.						
3-4	<p>2.1 Explain the reasons for processing milk</p> <p>2.2 Describe the various milk processing techniques.</p> <p>2.3 Describe different types of milk.</p> <p>2.4 Explain milk hygiene.</p>	<p>Define milk pasteurization.</p> <p>Explain the reasons, for pasteurization.</p> <p>Explain the methods used in pasteurization.</p> <p>- Low temperature methods.</p> <p>-High temperature method.</p> <p>Define Homogenization of milk.</p> <p>Explain the processes involved in</p>	<p>Charts Milk, equipment for pasteurization on milking equipment</p>	<p>Pasteurize milk.</p> <p>Carry out homogenisation of milk.</p> <p>Separate cream from milk</p>	<p>Demonstrate the pasteurization of milk</p> <p>Demonstrate milk homogenization</p> <p>Demonstrate the separation of milk.</p>	<p>Pasteurization equipment.</p> <p>Milk, thermometer, pots.</p>

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		<p>homogenization.</p> <p>Outline the importance of Homogenization and pasteurization.</p> <p>Explain the processes involved in souring by fermentation or acidification.</p> <p>Explain the processes involved in cream separation.</p> <p>Describe the various types of milk.</p>				
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General Objective: 3.0: Understand the process of making starter culture and its importance.						
5-6	<p>3.1 Describe starter culture.</p> <p>3.2 Describe the preparation of starter culture.</p> <p>3.3 Describe the maintenance of starter culture and uses.</p>	<p>Define Starter culture.</p> <p>Discuss sources of starter culture.</p> <p>Explain the development and preparation of starter culture.</p> <p>Explain the maintenance and uses of starter culture.</p>	<p>Starter culture Chalkboard Lesson notes.</p>	<p>Prepare starter culture.</p>	<p>Demonstrate the preparation of culture starter.</p>	<p>Starter Culture Milk, Thermometer Lactic Acid bacteria. Milk Product</p>
General Objective: 4.0 Understand the processes involved in the production of milk products.						
7-8	<p>4.1 Describe the processes involved in Yoghurt production.</p> <p>Describe the processes. involved in the production</p>	<p>Define the term yoghurt.</p> <p>Explain the processes involved in Yoghurt production.</p> <p>Discuss the</p>	<p>Yoghurt Milk Chalkboard, Lesson notes.</p>	<p>Prepare Yoghurt, cheese, butter, etc.</p>	<p>Demonstrate the preparation of yoghurt cheese, etc.</p>	<p>Yoghurt Milk Thermometer.</p>

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	4.3 Explain the uses of milk products.	composition of cheese, butter, and ice cream. Explain the processes involved in the production of Cheese, butter, and Ice-cream. Explain the uses of the various milk products above.				
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General Objective: 5.0: understand the methods used in the processing of meat.						
9-10	5.1 Describe the processes involved in the handling of animal products.	Discuss the various methods of handling animal products.	Equipment used in slaughtering Chalkboard			Equipment used in Slaughtering.
	5.2 Describe the various methods of preserving meat and poultry products.					
	5.3 Describe the factors that affect the taste of frozen animal products.					
	5.4 Explain the various sanitation practices in the slaughtering and handling of animal products.	Explain the various methods of preserving meat and poultry products e.g. canning, toasting freezing, etc.				
	5.5 Describe the methods of meat preservation.					
	5.6 Describe the processes involved in the preparation of Bacons and other Meat by-products.	Explain the factors that affect the taste of frozen animal products.	Lesson Note.			
	5.7 Explain the hygiene and sanitation practices involved in the processes in 5.6 above.	Explain the various sanitation practices in the slaughtering and handling of animal products.				
		Explain the various methods				

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		<p>of meat preservation: -salting Refrigeration Freezing. Curing Smoking.</p> <p>Explain the processes involved in the preparation of:</p> <ul style="list-style-type: none">- Bacon- Sausage, etc. <p>Explain the methods of processing and preservation of poultry products.</p>				
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General Objective: 6.0: understand methods used in the processing and preservation of fish.						
11-12	<p>6.1 Describe the various methods of preserving fish.</p> <p>6.2 Explain the effects of processing and preservation on: - protein denaturing, lipid changes, etc in fish.</p>	<p>Explain the various methods of preserving fish e.g. salting, smoking, sun drying, freezing canning, etc.</p> <p>Explain the effects of processing, freezing, drying, canning, smoking etc, and storage on: - Protein denaturing - Lipid changes, - Palatability - Flavour - Loss of nutrient.</p> <p>Explain the reasons and functions of</p>	<p>Charts, Dried fish</p>	<p>Carry out the smoking and freezing of fish.</p> <p>Identify the common coolants used in chilling and freezing water.</p>		

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		<p>additives in fish preservation.</p> <p>Describe the process of extracting oil from fish.</p> <p>Explain the importance of preserving fish.</p>				
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NID in Agriculture (Draft)

Programme: National Innovation Diploma In Agriculture
Course: IAE 223 PRINCIPLES OF ANIMAL HEALTH.
Duration: 60 Hours
Unit: 2 Credit Units.

Goals: The course is designed to provide the students with the knowledge of the basic concepts of animal health and diseases.

General Objectives:

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

1. Know the economic effects of animal diseases in livestock industry.
2. Know the characteristics features of sick animals.
3. Know the procedure of animal handling and restraint.
4. Know the inspection and examination of animal sickness.
5. Know the principles of drugs administration and disinfection.
6. Know the principles of disease prevention and control..

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PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: PRINCIPLES OF ANIMAL HEALTH.		COURSE CODE: IAE 223		CONTACT HOURS: 75 HOURS		
GOAL: The course is designed to provide the students with the knowledge of the basic concepts of animal health and diseases						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the economic effects of animal diseases in livestock industry						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Define – disease, infection, health, prognosis, diagnosis epidemic, pandemic, sporadic contagious.</p> <p>1.2 Explain the direct and indirect effects of animal disease on farmers and nation’s economy.</p> <p>1.3 Explain the factors that predispose animals to diseases.</p> <p>1.4 Classify the factors in 1.1 above.</p>	<p>Explain – disease, infection health, prognosis, diagnosis epidemic, pandemic, sporadic contagious.</p> <p>List the direct and indirect economic loss to farmer.</p> <p>Explain the direct indirect economic loss to the nation.</p> <p>Describe all the factors predisposing animals to diseases.</p>	<p>Chalkboard</p> <p>Lesson Notes.</p>			

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		Classify factors e.g. intrinsic and extrinsic factors.				
General Objective: 2.0 Know the characteristic features of sick animals.						
	2.1 Identify all the early signs of ill-health in Livestock and poultry.	Identify the signs of ill health in various animals and birds.	Chalkboard. Lesson Notes.	Observe animals to detect early signs of ill-health.	Demonstrate to students how to observe signs of ill-health.	Animal with visible signs of ill-health
	3. 2 Explain how to measure vital parameters that indicate ill-health in animals.	Describe how to take the vital parameters – temperature pulse, respiration rate.				
	2.3 Explain the importance of close and regular observation of animals to detect early signs of ill-health.	Describe the importance of early detectives of ill-health. Explain how often and when the observe various animal for the signs of ill-health.				
General Objective: 3.0 Know the procedure of animal handling and restraint						
	3.1 Define - animal handling and animal restraint.	Define – animal handling and animal restraint.	Chalkboard Lesson Notes.	Handle animals for examination.	Demonstrate to student how to handle	Various type of animal

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	<p>3.2 Describe the different methods of restraint/handling of various animals for examination.</p> <p>3.3 List all the equipments used in animal handling and restraint.</p>	<p>List and explain all the methods used for animal restraint and handling in, cattle sheep, goat, pig, chicken, etc.</p> <p>Explain the uses of equipment for animal handling and restraint.</p>		<p>Identify equipments used in animal handling.</p>	<p>animal for examination.</p> <p>Guide students to handle and restraint animal for observation or treatment.</p>	<p>Equipment of animal handling.</p>
<p>General Objective: 4.0 Know the inspection and examination of animal sickness.</p>						
	<p>4.1 Describe the systematic examination procedure of sick animals.</p> <p>4.2 Describe the instruments used in examination of sick animals.</p> <p>4.3 Explain the care of sick animals.</p>	<p>Explain the procedure of examination of sick animal</p> <p>List the instrument used in different animals during examination.</p> <p>Describe the care of sick animals in the farm.</p>	<p>Chalkboard</p> <p>Lesson Notes.</p>	<p>Handle examination instruments.</p> <p>Carry out the examination of sick animals.</p>		
<p>General Objective: 5.0 Know the principles of drugs administration and disinfection.</p>						
	<p>5.1 Outline the forms in which drugs are presented.</p>	<p>List various drugs presentation – tablets,</p>		<p>Identify common</p>	<p>Guide the student to</p>	<p>Drugs veterinary.</p>

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	<p>5.2 List the common routes of drugs administration.</p> <p>5.3 Describe various categories of drugs used in treating animals.</p> <p>5.4 Explain the use of disinfectants in animal farm.</p>	<p>capsule, suspension, bolus, etc.</p> <p>Explain the merits and demerits of rate of drug administration – oral, nasal, intramuscular, etc.</p> <p>List with examples the antibiotics, antihelmintics, antiprotozoa, vita mins, etc.</p> <p>Explain the use of disinfectants, antiseptics, etc.</p>		<p>drugs of animal. Demonstrate the drug administration and use of disinfectants .</p>	<p>identify various drugs used on animals.</p> <p>Guide student to administer drugs to animals and to use disinfectant and antiseptics in the farm.</p>	<p>Animals.</p> <p>Disinfectants.</p> <p>Instruments, etc.</p>
<p>General Objectives: 6.0 Know the principles of disease prevention and control..</p>						
	<p>6.1 Describe the general methods of preventing of animal diseases.</p> <p>6.2 Describe the general methods of control of animal diseases.</p>	<p>List and explain the methods of prevention animal diseases – e.g. good nutrition, good housing, selection, prophylaxis, etc.</p> <p>Explain the disease control methods, e.g.</p>	<p>Chalkboard</p> <p>Lesson Notes.</p>	<p>Carry out various methods of disease prevention and control.</p>	<p>Demonstrate the use of drugs vaccines as a mean of preventing animal diseases.</p>	<p>Vaccine</p> <p>Drugs</p> <p>Syringe and needles, etc.</p>

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	<p>6.3 Explain the agents used in prevention and control of animal diseases.</p>	<p>Mass treatment, quarantine, depopulation, Test and slaughter, etc.</p> <p>List the most common drugs, vaccines and antiprotozoa/anthelmintics used in animal disease prevention and control.</p>				
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Programme: NATIONAL DDDINNOVATION DIPLOMA IN AGRICULTURE
Course: AGT 225 Crop Processing and Storage.
Duration: 60 Hours
Units: 3.0

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.-1 Know the physical characteristics of crop produce.
2. Know 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. Know 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 INNOVATION DIPLOMA (AGRICULTURE)		
COURSE: CROP PROCESSING AND STORAGE	COURSE CODE: AGT 224	CONTACT HOURS: 60 HOURS (1HRS LECTURE

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			3HRS PRACTICALS)			
GOAL: This course is designed to provide the students with the basic skills and knowledge on crop processing and storage.						
COURSE SPECIFICATION: Theoretical Contents:			Practical Contents:			
General Objective; 1.0 Know 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 Explain density and moisture content of agricultural crops. 1.3 Explain optical properties of crop materials. 1.4 Explain the importance of optical properties in processing, handling and storage of crop materials.	Outline the features of crop materials. .	Chalkboard. Lesson Notes.	Determine density, porosity and moisture content of crop materials.	Demonstrate the determination of density and moisture content of different crop produce.	- containers, - Samples of crops - Oven.
General Objective: 2.0 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
2-3	2.1 Describe the process of cleaning, sorting and separation of crop materials. 2.2 Describe various	Describe cleaning process and separation of crop produce.	Chalkboard Lesson Notes.	Identify the equipment used for carrying out the process in 2.1 above. Clean, sort, grade and separate grains using	Guide the practical in cleaning sorting, grading and separation of grains.	Unsorted groups sieves Blower.

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	<p>methods of grain cleaning, sorting, grading and separation.</p> <p>2.3 Explain the purpose of each of the processes in 2.1 above</p> <p>2.4 Describe the principles and methods of carrying out each of the processes in 2.1 above.</p>	<p>Explain the processes of sorting and grading crops.</p>		<p>appropriate equipment.</p> <p>Identify the equipment for carrying out the processes in 2.2 above.</p>		
<p>General Objective: 3.0 Understand the principles and methods of milling, shelling and decortications.</p>						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
4	<p>3.1 Explain milling, shelling and decortications.</p> <p>3.2 Describe the various methods of shelling, milling and decortications.</p>	<p>Describe operations of milling, shelling and decortications machines.</p>	<p>Chalkboard</p> <p>Lesson Notes..</p>	<p>Identify equipment for carrying out the processes in 3.1 above</p> <p>Carry out milling, shelling and decortication operations using appropriate equipment.</p> <p>Carry out minor servicing operations of equipment for processing of crop materials.</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 <p>- Destoning machine.</p>

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4.0	General Objectives: Know the various handling equipment for crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
5-6	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. 4.3 Calculate the capacities of conveyors 4.4 Calculate the cost of conveyance of crop materials.	Describe the handling of crop produce. List handling equipment. Describe the various conveying mechanisms. Compute the cost of conveyance.		Identify handling devices of agricultural produce. Select appropriate handling devices for specific jobs in 4.2 above. Operate various conveyor devices.		<ul style="list-style-type: none"> - conveyors - Trucks. - Refrigerators vehicles, etc. -
	General Objectives: 5.0 Understand the methods of drying crop produce.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
7-8	5.1 Define drying. 5.2 Explain the importance and purpose of drying crop produce. 5.3 List the parameters for drying. 5.4 Describe the components of a drying system.	Illustrate the process of drying crop materials Explain parameters for drying. Describe various drying processes and equipment.	Chalkboard Lesson Notes.	Identify drying equipment.	Demonstrate drying equipment and their use.	<ul style="list-style-type: none"> - solar dryer - pneumatic dryer - ovens - blowers, etc.

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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 Resource
9-10	6.1 List the prevention measures against rodents in stored products 6.2 Describe the control of insects and rodents in stores. 6.3 Describe process of detecting insects in store. 6.4 Describe traditional techniques of insect control in store. . 6.5 Explain fumigation.	Describe the importance of pest control in store. Describe the control and prevention of stored products pests. List the various insecticides and use in store.		Control rodents using rodenticides and bait. Examine stored products to detect insects. Set trays for insects Apply chemical and physical methods of insect control in stored products.	Demonstrate methods of rodent control in store and houses.	<ul style="list-style-type: none"> - Insecticides - Rodent traps, - Rodenticides - Baits. - Crop samples.
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 Resource
11-12	7.1 Define storage and preservation. 7.2 Explain the parameters for safe storage 7.3 Explain terms used in storage practice. 7.4 Describe the various methods of storage and preservation.	Discuss preservation and storage of crops. Discuss the various methods of storage and preservation for perishable and non perishable crops.		Carry out the various storage methods. Identify the materials/structures used in storage and preservation	Guide the student on how to store various crops.	<ul style="list-style-type: none"> - Storage equipment - - crop samples.

<u>Programme:</u>	NATIONAL INNOVATION DIPLOMA IN AGRICULTURE
Course:	IAE 225. PASTURE AND FORAGE CROP PRODUCTION.
Duration:	45 Hours
Unit	2.0

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 trainee should be able to:

- 5. Know the general classification, identification and botany of important forage crops.**
- 6. Know how to establish pasture or forage crop.**
- 7. Know the management and improvement of pasture/rangeland**
- 8. Know how to make hay and silage and their marketing.**

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
	Course: Pasture and Forage Crop Production.	Course Code: IAE 225		Credit Hours: 3 hours/week		
	Goal: This course is designed to inculcate basic skills in hay and silage making.				Theoretical: 1 hour/week	
	Year:	Pre-requisite:		Practical: 2 hours /week		
	Theoretical Content			Practical Content		
	General Objective 1.0: Know the general classification, identification and botany of important forage crops.					
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1-2	1.1 List various forage and pasture crops in Nigeria. 1.2 Explain the basis on which pasture and forage crops can be classified e.g. (a) On duration of use basis. (b) On nutrients composition basis. 1.3 Describe the factors affecting the nutritional value and productivity of pasture.	Discuss the importance of pasture and forage crop in animal production. Describe the common pasture and forage crop.	Chalkboard Lesson Notes	Identify various pasture crops common in the immediate locality. Classify the various pasture crops in the locality.	Show the students various pasture crops.	Specimens of pasture and forage crops.
	General Objective 2.0: Know how to establish pasture and forage.					
3-4	2.1 Describe the practice of establishing new pasture. 2.2 Describe methods of planting pasture crops.	- Discuss the advantages and disadvantages pure stand and mixed pasture.	Chalkboard Lesson Notes.	Establish a medium sized pasture and legume fodders under rain fed irrigation. Make an	Guide the students in the establishment of pasture and forage crops.	Pasture and forage seeds.

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	2.3 Distinguish between pure stand and mixed pasture.			album of major pasture and forage crops. Make an album of various forage crops.		
General Objective 3.0: Know the management and improvement of pasture and forage crop.						
5-6	3.1 Enumerate the objectives of renovating/improving pasture. 1.2 Describe the methods of improving/renovating old pasture/range. 1.3 Identify problems of pasture management. 1.4 Explain the principles of pasture/range maintenance and management. 3.5 Explain the methods of forage management and associated factors.	Describe the steps in pasture renovating programmes, improvement of natural grassland	Chalkboard Lesson Notes.	Improve pasture using different methods.	Guide the students in pasture and forage improvement.	
General Objectives: 4.0 Know how to make Hay and Silage.						
7-9	4.1 List the advantages of pasture and forage crops preservation and storage. 4.2 Differentiate between hay, silage, pasture and bush forage.	Discuss the process involved in Hay and Silage making..	Chalkboard. Lesson Notes.	Make different types of hay.	Demonstrate and guide the students in hay and	Pasture and forage crops. Digger

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	<p>4.3 Explain hay making under the following: Benefit 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 preservations used in storing hay.</p> <p>4.5 Explain the factors affecting the supply of hay and silage. 4.6 Explain the problems of marketing hay and silage.</p>			<p>Build a hay barn</p> <p>Construct a silage pit</p> <p>Prepare silage.</p>	<p>silage making.</p>	<p>shovel ask water, etc.</p>
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Programme: NATIOAL INNOVATIVE DIPLOMA IN AGRICULTURSE
Course: .IAE 226 FARM MANAGEMENT
Duration: 15 Hours
Units: 1

Goal: The course is designed to introduce students to the basic principles of Farm Management and accounting.

General Objectives

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

- 1 Understand the nature and scope of farm management.
- 2 Understand the production and cost functions.
- 3 Know the concept of diminishing returns and opportunity cost.
- 4 Know the stages of production and the economic stage of production.
- 5 Know the procedures for deciding upon the level of output and input.
- 6 Know the importance of keeping adequate record of farm activities
- 7 Understand the preparation of financial reports or statement.
- 8 Understand the need and importance of planning in agriculture
- 9 Know the need of evaluating performance in agriculture

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- 10 Know the various measures of efficiency and size.
- 11 Know the importance of effective agricultural resource use.

PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: FARM MANAGEMENT		COURSE CODE: IAE 226		CONTACT HOURS: 15 hours theory		
GOAL: This course is designed to introduce the students to the basic principles of farm management and accounting.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Understand the nature and scope of Farm Management.				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-2	1.1 Describe the characteristics of agriculture that influence farm management.	Define farm management	Chalkboard Lesson note.	Visit a medium scale integrated agricultural farm	Guide students on farm tour	
	1.2 Identify the social and economic environment that makes for an effective and successful farm management performance.	Describe social and economic environment. List and explain the tools of farm management.				
	1.3 List the tools of farm					

	<p>management.</p> <p>1.4 Describe the importance of economics, accounting and mathematics as tools of farm management.</p> <p>1.5 Distinguish between risk and uncertainty</p> <p>1.6 Describe some peculiar problems faced by Farm Managers (e.g. what to produce)</p> <p>1.7 Explain the steps involved in solving management problems.</p> <p>1.8 Identify the different goals of a typical farm firm</p> <p>1.9 Explain the relevance of such goals in 1.8 above to the social and economic environment.</p> <p>1.10 Describe factors</p>	<p>Explain the importance of farm economics, mathematics and accounting in farm management</p> <p>Mention specific problems in the farm</p> <p>Describe the steps of solving farm management problem</p> <p>List the goals of a typical farm firm.</p> <p>List the factors influencing management decisions.</p>				
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	influencing farm management decisions.					
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General Objective: 2.0 Understand production and cost functions.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3	2.1 Define production functions and its derivative functions (average and marginal products) 2.2 Define cost functions and its derivative functions. 2.3 List the determinants of a production function (average and marginal cost function) 2.4 Explain the concepts of short run and long run in production. 2.5 Construct a hypothetical data showing a response to a single variable input	Define production and list all the production functions. Define – cost function, derivative function. List and explain the determinants of a production function. Describe the concepts of short and long run producing.	Chalkboard. Lesson notes.			

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General Objective: 3.0 Know the concept of diminishing returns and opportunity cost.

WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	3.1 Describe with examples the nature of diminishing returns in agricultural production. 3.2 Explain opportunity cost and its implications in farm decision making.	Discuss diminishing returns and opportunity cost Describe the implication of farm decision making.				

General Objective: 4.0 Know 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
4	4.1 Describe the three stages of production, 3 typical production curves 4.2 State reasons to support the choice of stage two as the economic stage of production.	List and explain the three stages of production.				

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General Objective: 5.0 Know the procedures for deciding upon the level of output and inputs.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5	5.1 Enumerate and describe the criteria used in determining the optimum level of output. 5.2 Identify the criteria used in determining the optimum level of input.	Discuss production inputs and outputs	Chalkboard. Lesson notes.			-
General Objective: 6.0 Know the importance of keeping adequate record of farm activities						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6-7	6.1 Define farm record 6.2 Enumerate and explain the advantages of a good farm record system 6.3 Identify types of farm records	Outline importance of records in farm enterprises Discuss all the types of records	Chalkboard Lesson notes.	1) Design farm record charts for various farm operations 2) Record farm activities in farm records book (ledger)	Guide the students to draw various farm record charts.	- Chart paper - Rules.

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<p>6.4 Define whole farm record system</p> <p>6.5 Identify the output and uses of whole farm record system.</p> <p>6.6 Define enterprise record</p> <p>6.7 Enumerate the advantages and disadvantages, of keeping record by enterprise</p> <p>6.8 Explain the meaning of the term: Double entries system</p> <p>6.9 Define farm accounts</p> <p>6.10 Enumerate the basic types of accounts.</p> <p>6.11 Illustrate the use of accounting equation to keep track of revenue and expenses.</p> <p>6.12 Identify and apply the rules of debit and credit</p> <p>6.13 Illustrate the debit and</p>	<p>maintain in the farm.</p> <p>Discuss the advantages and disadvantages of keeping farm records.</p> <p>Explain main features of farm accounts</p>			<p>3) Design an appropriate Enterprise records.</p> <p>4) Record farm activities in farm record books</p>		
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	credit analysis of a given transaction. 6.14 Identify the types of information in farm management. 6.15 Identify the sources of information in farm management. 6.16 Categorize farm transactions 6.17 Determine the appropriate accounts to be debited or credited				
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	General Objective: 7.0 Understand the preparation of financial reports or statements.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8	7.1 Distinguish between income statement and balance sheet. 7.2 Explain the importance of each in 7.1 above. 7.3 Identify the various	Discuss preparation of financial reports	Chalkboard Lesson note	5) Construct a balance sheet and income statement	Guide students to construct balance sheet and income statement.	Book Rules Pencil and other drawing materials

	<p>categories of accounts used to prepare financial report (Income statement and Balance sheet)</p> <p>7.4 Define depreciation</p> <p>7.5 Identify depreciation assets.</p> <p>7.6 Distinguish between the method calculating and asset depreciated.</p> <p>7.7 Calculate an asset annual depreciation.</p> <p>7.8 Define inventory</p> <p>7.9 Define the various inventory valuation methods.</p> <p>7.10 Define budgeting</p> <p>7.11 Distinguish between partial and complete budgeting.</p> <p>7.12 Enumerate the steps involved in partial and complete budgeting.</p> <p>7.13 Explain the concept of</p>	<p>Discuss the inventory – valuation methods.</p> <p>Mention parameters for budgeting</p>				
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	time value of money in budgeting (compound and discounting procedures).					
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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
9	8.1 Explain farm planning 8.2 Identify the need for planning 8.3 Enumerate the tools for planning	Discuss farm planning	Chalkboard Lesson notes			
General Objective: 9.0 Know the need for evaluating performance in agriculture						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
10	9.1 Define performance 9.2 Enumerate the needs, for evaluating and appraising farm projects. 9.3 Identify various methods used in evaluating and appraising farm projects.	Highlight performance indicators in farm enterprise	Chalkboard Lesson notes			

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General Objective: 10.0 Know the various measures of efficiency and size						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11	<p>10.1 Identify criteria for evaluating efficiency and size.</p> <p>10.2 Calculate some efficiency ratios.</p> <p>10.3 Interpret the coefficients of the ratios calculated</p> <p>10.4 Enumerate the characteristics of successful financially well managed agricultural enterprise.</p> <p>10.5 Identify the criteria for evaluating the financial success and capital position of an agricultural enterprise</p> <p>10.6 Identify costs and benefits and their relationship to appraisal of farm projects.</p>	Discuss efficiency in farm business		<p>5) Measure costs and benefits in relation to farm appraisal involving:</p> <p>(i) market prices</p> <p>(ii) valuating non-marginal changes</p> <p>(iii) distribution</p> <p>(iv) use of shadow prices</p>		

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General Objective: 11.0 Know the importance of effective agricultural resources use						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
12	<p>11.1 Explain the theory of equilibrium in factor markets.</p> <p>11.2 Explain the impact of agricultural labor markets on productivity</p> <p>11.3 Describe the effect of the use of capital inputs on farms (small and large scale farms)</p> <p>11.4 Explain the impact of land acquisition on the economic analysis of agricultural projects.</p> <p>11.5 Describe the influence of size of farms on resource management</p>					

Programme: NATIOAL INNOVATIVE DIPLOMA IN AGRICULTURSE
Course: IAE 227 PRINCIPLES OF IRRGIATION AND DRAINAGE.
Duration: 60 Hours (1 Hour Lecture, 3 Hours Practical)
Units: 2.0

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. Understand the concept of irrigation and drainage.
2. Know the water requirements of crops.
3. Understand the sources of irrigation water.
4. Know effects of water stress on crop growth.
5. Know irrigation structures and pumps.
6. Know irrigation application system and scheduling.
7. Understand principles of drainage.

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (AGRICULTURE)						
COURSE: PRINCIPLES OF IRRIGATION AND DRAINAGE.		COURSE CODE: IAE 227		CONTACT HOURS: 60 Hours (1 hr lecture, 3hrs practical)		
GOAL: This course is designed to equip the student 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
1-2	1.1 Define irrigation. 1.2 Differentiate between irrigation and drainage. 1.3 State the problems associated with irrigation and drainage	Highlight importance of irrigation Discuss irrigation problems.	Chalkboard Lesson Note			

General Objective 2.0 Know the water requirements of crops.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
3-4	2.1 Determine the different forms of soil moisture e.g. gravitational water,	Explain water requirements of crops.	Chalkboard Lesson Notes			

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	<p>available water, field capacity, wilting point etc.</p> <p>2.2 Explain available water capacity of a soil.</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 Explain evapotranspiration</p>	<p>Explain concept of soil and water plant relationship.</p> <p>Explain concept of available water.</p> <p>Describe water quality parameters.</p> <p>Define evapotranspiration and its importance.</p>		<p>Demonstrate the determination of water requirements of crops.</p>	<p>Guide the student how to determine water requirement of crop.</p>	<p>-Lysimeters - Pan evaporimeter</p>
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	General Objective 3.0 Understand the sources of irrigation water.					
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5-6	<p>3.1 Explain sources of water for irrigation.</p> <p>3.2 State the forms in which ground water exists.</p>	<p>Outline sources of irrigation water.</p> <ul style="list-style-type: none"> - Rivers - Stream. - Lakes 	<p>Chalkboard.</p> <p>Lesson Notes.</p>			

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	3.3 Estimate ground water yield. 3.4 Compute discharge from wells.	- Ground water - Domestic water				
General Objective 4.0 Know effects of water stress on crop growth.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	4.1 Define water stress. 4.2 Explain the effects of water stress. 4.3 Explain the beneficial effects of water stress.	Explain and define water stress. Explain the various effects of water stress on plant function and processes e.g photosynthesis, respiration, growth, carbohydrate metabolism, protein metabolisms, hormonal balance, etc.	chalkboard	Demonstrate effect of water stress on appearance of crops.	Students should grow crops and stress them by not applying water and observe the effects.	- seeds - plastic pots - watering cans.

General Objective 5.0 Know irrigation structures and pumps.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	5.1 Describe irrigation water conveyance	List and describe major structures	Chalkboard	Maintain irrigation pumps	Demonstrate the servicing of	Different pumps.

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7-8	<p>systems and measuring devices with their component parts.</p> <p>5.2 Describe irrigation structures and water control structures such as off takes, cross drainage works, siphons, lining of canal</p> <p>5.3 Identify types of irrigation pumps</p> <p>5.4 State criteria for pump selection.</p> <p>5.5 Explain working principles of selected pumps</p>	<p>in irrigation scheme.</p> <p>Describe the different pumps used in irrigation</p>	Lesson Notes		<p>irrigation pumps.</p> <p>Show the students different pumps used in irrigation</p>	
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General Objective 6.0 Know irrigation application systems and scheduling.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
9-10	6.1 Describe different water application methods in irrigation e.g. surface irrigation, sub-surface irrigation, sprinkler	Explain crop water application systems.	<p>Chalkboard.</p> <p>Lesson notes.</p>	Carry out routine maintenance of irrigation structures, plants and systems.	<p>Visit an existing irrigation project.</p> <p>Show the students</p>	Crops field, siphon tubes

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	<p>irrigation and drip system..</p> <p>62. Explain the factors that determine when to irrigate and how much water to apply.</p> <p>6.3 Explain procedures for schedule irrigation.</p> <p>6.4 Calculate the depth to which irrigation scheduling can be applied.</p>	<p>Describe the factors influencing the choice of irrigation methods.</p> <p>Describe irrigation scheduling methods.</p>		<p>Demonstrate the irrigation schedule methods.</p>	<p>how to maintain irrigation system.</p> <p>Show students how to schedule irrigation.</p>	<p>Irrigation pumps source of water.</p>
General Objective 7.0 Understand principles of drainage						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
11-12	<p>7.1 Define drainage</p> <p>7.2 Explain the difference between surface drainage and file drainage.</p> <p>7.3 Explain the sources of drainage problems e.g. poor land grading, flood, poor soil structure, surface runoff</p> <p>7.4 Explain methods of carrying out soil drainage e.g. open drains, tile drains, sub-surface methods</p> <p>7.5 Describe types and</p>	<p>Describe drainage problems in agriculture</p> <p>Describe drainage problems.</p>	<p>Chalkboard.</p> <p>Lesson notes.</p>	<p>Plan the layout of drainage structures.</p>	<p>Guide student to layout drainage structure.</p>	<p>- Hoes</p> <p>Tractor</p>

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features of drainage structures.						
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Programme: NATIONAL INNOVATION DIPLOMA IN AGRICULTURE

Course: IAE 228 MICROLIVESTOCK

Duration: 75 Hours (2 Hours Lecture, 3Hours Practical)

Unit: 3 Credit Units.

Goals: The course is designed to provide the students with the operational techniques of micro livestock farming.

General Objectives:

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

- 1.0 Know the economic importance of Microlivestock .
- 2.0 Know how to start snail farming.
- 3.0 Know the management and nutrition of snails.
- 4.0 Know the diseases and parasites of snails and their control.
- 5.0 Know the classification and distribution of cane rat in Nigeria.
- 6.0 Know the cane rat management and Nutrition.
- 7.0 Know the classification and distribution of rabbits in Nigeria.

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8.0 Know the Management and nutrition of rabbits.

9.0 Know the diseases and parasite of rabbits and their control.

PROGRAMME: NATIONAL INNOVATION DIPLOMA						
COURSE: MICROLIVESTOCK		COURSE CODE: IAE 228		CONTACT HOURS: 75 HOURS		
GOAL: The module is designed to provide the students with the operational techniques of micro livestock farming.						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective: 1.0 Know the economic importance of Micro livestock						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	<p>1.1 Explain the contribution of micro livestock in the Livestock sector of Nigeria economy.</p> <p>1.2 Outline the economic importance of keeping micro livestock.</p> <p>1.3 Explain the distribution and adaptation of small mamalls.</p>	<p>Explain the economic benefits of keeping micro livestock to farmer and the nation.</p> <p>List the advantages of domesticating small mammals.</p> <p>Explain the distribution of snail manuals in Nigeria.</p>	<p>Chalkboard.</p> <p>Lesson Notes.</p>			

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General Objective: 2.0 Know how to start snail farming.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	2.1 Explain the Operational techniques of snail farming.	. Discuss the procedure of how to start a snail farm.	Chalkboard Lesson note	Establish a small snail farm.	Start a small snail farm with the students.	Construction wire of cages(Nets), Planks Snails.
	2.2 Explain how to select a site for snail farming. 2.3 Describe how to treat soils for snail farming.	. Identify soils suitable for snail farming. . Explain how to treat soils for snail farming.	Chalkboard Lesson notes	Carry out soil treatment on a proposed snail farm.	Demonstrate soil treatment to students.	Soil Sample Chemicals
	2.4 Describe the materials used in constructing a snailery. 2.5 Know the design and construction of a snailery.	. Identify the materials needed for the construction of a snailery. . Construct a snailery.	Chalkboard Lesson note	Construct a cage for snailery	Guide the students to construct a snailery.	Old tyres,Drums, Baskets,Pots
General Objective: 3.0 Know the management and nutrition of snails.						
	3.1 Describe the processing of snail meat.	. Explain how snail meat is processed.	Chalkboard Lesson note	Process snail meat.	Guide the students to	

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	3.2 Explain the feeding techniques in snailery.	<ul style="list-style-type: none"> . Identify snail nutritional requirement. . Describe the feeding techniques for snails. . Process snail meat. . Feed snails. 		Feed snails.	feed and process snails.	
General Objective: 4.0 Know the diseases and parasites of snails and their control.						
	4.1 Describe the diseases and parasites of snails. 4.2 Describe the control measures in 4.1 above.	<ul style="list-style-type: none"> . Identify the diseases of snails. . Explain the control measures for snail diseases. 	Chalkboard Lesson note	Identify snail diseases and parasites.	Guide student to identify snail diseases and parasite	Handlers Microscopes Sample of sick snails. Sample of parasites..
General Objective: 5.0 Know the classification and distribution of cane rat in Nigeria.						
	5.1 Classify cane rats taxonomically. 1.2 Describe the characteristics of cane rats. 1.3 Outline the distribution	Classify cane rats into the right zoological scheme. Explain how cane rats adapt to their environment.	Chalkboard Lesson Notes.	Identify the differences that exist between the cane rat and other small mammals.	Guide the student to compare the features of the cane rat and other snail manuals.	Cane rat other mammals, rabbit, guinea pig etc.

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	<p>of small mammals in Nigeria.</p> <p>1.4 Identify the factors affecting the distribution of cane rat.</p> <p>5.5 Distinguish between the cane rat and other small mammals.</p>	<p>List the distinguishing features of cane rats.</p> <p>List the distinguishing features of other small mammals.</p>				
<p>General Objective: 6.0 Know the cane rate management and Nutrition</p>						
	<p>6.1 Explain the features of different breeds of cane rats.</p> <p>6.2 Explain the breeding and selection of cane rats.</p> <p>6.3 Explain the feeds and feeding of cane rats..</p> <p>6.4 List the diseases and parasites of cane rat.</p> <p>6.5 Explain the design and construction of cane rat housing.</p>	<p>List the various breeds of cane rats.</p> <p>Define selection and explain reason for selection.</p> <p>List various methods of selection of cane rats.</p> <p>List the feeds of cane rat and methods of feeding.</p> <p>Describe the diseases</p>	<p>Chalkboard</p> <p>Lesson notes.</p>	<p>Identify different feeds and the methods of feeding cane rats.</p> <p>Design and construct cane rat housing.</p>	<p>Guide student to identify various feeds of cane rat and demonstrate how to feed.</p> <p>Guide student to construct cane rat house.</p>	<p>Cane rat feeding</p> <p>Various feed stuff for feeding cane rats.</p> <p>Planks,Nails, Wire nets.</p>

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		and parasites of cane rat according to causative agents. Describe the prevention and control measures for the various diseases.				
General Objectives: 7.0 Know the classification and distribution of rabbits in Nigeria.						
	7.1 Classify rabbits on the basis of breeds, size, production purpose, etc. 7.2 Explain the distribution and adaptation of rabbit in Nigerian climate.	Classify rabbit into meat, fur, fancy bred small, larger breeds. Describe the characteristics features of various rabbit breeds. List factors that favor rabbit production.		Identify various rabbit breeds.	Guide students to identify and categorize various rabbit breeds.	Different breeds of rabbits.
General Objectives: 8.0 Know the Management and nutrition of rabbits.						
	8.1 Explain the selection and breeding of rabbits.	List factors to be considered in selecting breed stock of rabbit.	Chalkboard.	Carry out selection in rabbits.	Guide the student to carry out	

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	<p>8.2 Describe the distinct signs of a pregnant doe. 8.3 Describe the care for the pregnant and young rabbit.</p> <p>8.4 Describe the type of housing suitable for rabbits.</p> <p>8.5 Explain the uses of rabbitry equipments.</p> <p>8.6 List the feeds used for feeding rabbits and methods of compounding the rations.</p>	<p>Describe mating behavior and mating methods of rabbits.</p> <p>List all the signs of pregnancy in does.</p> <p>Describe different type and design of rabbit housing.</p> <p>List all the rabbitry equipment and explain their uses.</p> <p>List all the feeds of rabbit and materials for compounding rat ration.</p>	<p>Lesson note.</p>	<p>Identify signs of pregnancy in does.</p> <p>Construct rabbit housing.</p> <p>Identify the rabbitry equipment an their uses.</p> <p>Identify the feeds of rabbits and the method of feeding.</p>	<p>sexing and selection of rabbits.</p> <p>Guide student how to recognize pregnant rabbit.</p> <p>Guide student to construct rabbitry and hutches.</p> <p>Guide the students to identify the equipments of rabbitry.</p> <p>Guide the student to identify various feeds of rabbits.</p>	
<p>General Objectives: 9.o Know the diseases and parasite of rabbits and their control.</p>						

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	<p>9.1 Recognize signs of disease in rabbits.</p> <p>9.2 List common diseases and parasites of rabbits and their control.</p> <p>11.3 Describe some prevention and control measures against rabbit diseases in 9.2 above.</p>	<p>Explain the behavior of a sick rabbits.</p> <p>List all the diseases and parasites of rabbits.</p> <p>Explain the control measures of the rabbits diseases and parasites.</p>	<p>Chalkboard.</p> <p>Lesson Notes.</p>	<p>Identify the signs of a sick rabbit.</p> <p>Demonstrate the treatment measure of some rabbit disease.</p>	<p>Guide the student to identify sick rabbit and treat it.</p>	<p>Rabbits</p> <p>Drugs.</p>
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LIST OF EQUIMENTS TOOLS REQUIRED

BIOLOGY LABORATORY:

S/NO	EQUIPMENT	QUANTITY
1	Balance Top loading balance analytical balance	8
2	Aquarium transparent plastic glass 60 x 30 x 30 cm	5
3	Crucible, Porcelain , 43mm diameter with lid	2
4	Crucible tongs with bow, 15 cm	30
5	Dissector	30
6	Filter funnels, plastic, 6.5 cm diameter	4
7	Magnifiers hand lens, 7.5 diameter (or folding magnifier x 10)	10
8	Microscopes, light with x 10 wildfield eyepiece and x4 (or x5), x1C, x 20 (or x 50) and x 100 objectives	30
9	Micro slide storage box, for 100 slides	30
10	Microtome, hand type	2
11	Dissecting kits	30
12	Dissecting boards (or trays with wax)	30
13	Nets (various types)	5

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14	Plant press	2
15	Thermometer – 5 to + 50oC x 0.1oC	30
16	Thermometer – 5 to 110oCx10C	30
17	PH meter	2
18	Heating mantle (with at least 5 burners)	1
19	Water distiller	2
20	Magnetic stirrer	2
21	Centrifuge (various types)	2
22	Spatula	30
23	Photosynthesis apparatus	2
24	Plant and animal tissues	5 of each type
35	Histological slides	5 of each type
36	Embryology slides	5 of each type
37	Animals and plants whole mount (for smaller plants and animals)	5 of each type
38	Charts of various organs and tissues	1
39	Blood and lymph circulation	1
40	Mammalian organs	1

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41	Models of human and animal and plant tissues and organs	1
42	Full size skeleton of man, rabbit, birds, snakes toads	1 each
43	Pieces of vertebrate bone	1 set
44	Preserved specimen	
45	Fish	1
46	Snakes	1
47	Mammalian foetus	1
48	Rabbits, rats	1
49	Mammalian organs – liver, kidney, brain, eye, ears	1 each
50	Sex organs etc	1 each
51	Worms	1
52	Birds	1
53	Dried insects	1
54	Molluses – Gastropod, bivalves and Cephalopods	1 each
55	Gas jar covers	30
56	Gas jar (different types)	10
57	Barrettes	30

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58	Petri dishes	30
59	Pipettes graduated (different sizes)	50
60	Reagent bottles	100
61	Test tubes	200
62	Watch glass	50
63	Post Morton kit	2
64	Stethoscope	1

ENGINE MAINTENANCE AND REPAIR TOOLS

Sets of open-end spanners-5mm-32mm

Big open-end spanners

Ring spanners- 6mm- 32mm

Sets of socket spanners – 6mm – 32

Pre-adjustable torque wrenches

Small, medium and big adjust spanners

Pipe wrenches (assorted sizes)

Vice grip wrench

Spark plug socket spanners

Sets of Allen keys (hexagon square)

Feeler gauges

Pressure gauges

Micrometer

Steel rule

Straight edge

Wing dividers

Scribers

Inside and outside calipers

Hydrometer

Set of clutch alignment gauge

Clutch set – screw gauge

Oil cans

Plug gauge

Ring gauge

Engineer's compass

Head pan

Vacuum tester

Timing light

Spark plug tester

Air compressor

Grease guns

Portable hoisi

Hydraulic jack

Gear press

Large drills

Assorted grinders

Large drills and drill bits

Mechanic work bench

Power hacksaw

Engine stands

Creepers
Ramps
Dust bin
First aid box
Battery charging equipment
Set of pullers
Standby generator
Hydraulic press
Valve grinders
Wheel alignment gauge
Injector repair machine
Injector needle service kit
Carburetor service kit
Grease guns
Lathe machine
Ploughing tool
Finishing tool
Rounding tool
Right hand turning tool
Left hand turning tool
Screw thread cutting tool (internal & External)

Brass turning tool

Cutting off tool (parting tool)

Knurling tool

Chasing tool

MEASURING TOOLS

Inside caliper

Outside caliper

Micrometer gauge

Thread pitch gauge

Steel tape

Steel rule

Cutter bit gauge

Milling machine

Grinding wheel

Drilling machines

Storage cabinet

Tap and dies

Machine wrench

Oil stone

Punches

Hammer

Knock-out bar

Drill bits

Countersink bit

Centre head

Soluble oil

Oil can

Cooling tank

Lathe oil

Allen keys

Side table

Broom

SOLDERING EQUIPMENT

Blow torch

Soldering copper

Files

Tin snips

Soldering flux

Granulated soil ammoniac and water

Half and half solder

Acid – core wire solder

Resin – core wire solder

Emery cloth

Sand paper

Sheet metal shear

Cotton waste

Wire brush

Tong

Anvil

Malker hammer

C. Clamp

Hacksaw

Marking gauge

Try square

Water bath

Dust bin

Leather gloves

Soldering table

Tower

GAS WELDING EQUIPMENT

Oxygen and acetylene bottle on a cart

Oxygen and acetylene regulators

Oxyacetylene welding cutting outfit

Oxygen and acetylene hoses

Welding goggles

Welding tips

Cylinder wrenches

Spark lighter

Welding rods

Welding fluxes

ARC. WELDING EQUIPMENT

Arc, welding (AC)

Electrodes (various types and sizes)

Electric grinder

Welding leather gloves

Arc. Welding helmet

Carbon arc touch
Wire brush
Chipping hammer
C. Clamp
Water bath
Clear gaggles for shipping
Welding booths and screens
Power backsaw
Dressing wheels
Tong
Try-square
Vice
Hardie for anvil
Files
Dust bin
Electro-spot welder
Cold chisels

TRACTORS AND IMPLEMENTS

Tractors to be purchased of different sizes and makes. It is recommended that there should be a tractor and its accessory equipments to

10 students

Different sizes and make of tractors and trailers

Disc ploughs

Disc harrows

Spring time cultivators

Rotavators

Seed drills and planters

Inter-row weeders

Straddle row weeders

Knapsack sprayers

Tractor driven sprayers

Fertilizer applicators

Manure spreaders

Cutter bar mowers

Flail mowers

Double chopping forage harvesters

Flail forage harvesters

Hay balers

Combine harvester

Potato digger

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Groundnut lifters

Yam and Cassava diggers

Petrol engine vehicles

S/NO	TITLE	AUTHOR
1	Basic farm machine	J.C. Turner
2	Basic farm machinery	Ship pen and Turner
3	Crop Production	H.T.Lovegrove
4	Gas Engines	Jones
5	Workshop practice	Greer and Howell
6	Principles of farm machinery	R. Kepner
7	Farm machinery management	H. Smith & L. Wilkes
8	Farm power & machinery management	D.Hurt
9	Fundamentals of service a) electrical systems b) Engines c) Hydraulics d) Welding e) Shop tools f) Tires and tracts g) Power training h) Bearings and seals i) Belts and chains j) Mowing and spraying k) Fuels lubricant and coolants	John Deere Publications (available also in slides and films)
10	The Science of Animal Husbandry	J. Blakely & D. Bade
11	Working in Animal Science	D. Acker
12	Fundamentals of Machinery Operations (a) Crop chemicals	

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	<ul style="list-style-type: none">(b) Preventive maintenance(c) Hay and Forage harvesting(d) Machinery managements(e) Combine harvesting(f) Agricultural machinery safety(g) tractors(h) Tillage(i) Planting	John Deere Publications
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RECOMMENDATIONS FOR WORKSHOP FOR AGRICULTURAL EQUIPMENT AND IMPLEMENT MECHANIC COURSE

1. Workshop Space

The workshop space should be large enough to accommodate and permit three workshop spaces per student approximately 3m²/student.

The workshop should include a pit or ramp for easy access to vehicles undercarriage.

The shop should be equipped with at least a workbench per student

ANIMAL TRACTION EQUIPMENT AND TOOLS

(a) Restraining materials

- Steel nose – ring or nylon nose – rope
- Screw driver (for nose ring)
- Steel puncher
- Casting rope (5 meters)

(b) Yokes

- Withers/shoulder yokes
- Horn/head yoke

(c) Animal Drawn Equipment

- Mould board plough
- Harrows
 - Spike tooth harrow
 - Spring tooth harrow
 - Disc harrow
- Ridgers:
 - Mouldboard ridgers
- Seed planter
- Weeder
- Groundnut lifters
- Carts
- Land levelers

Beekeeping Equipment and tools

(a) Equipment

- Lang troth hive
- Top bar (modern hive)
- Frame hives
- Suitable local hives
- Sitting hives
- Smoker

- Tools
 - bee gloves
 - Bee hat
 - Boots
 - Hive tools

FISH FARMING, LIST OF EQUIPMENT AND TOOLS

1.0 SURVEYING EQUIPMENT

S/NO	TEM	QTY
1	Stereoscope	4
2	Prismatic	3
3	Ranging poles	8
4	Chain	2
5	Metric tape	2
6	Drawing	10
7	Protractors	10
8	Planimeters	1
9	Theodolite and staff	1
10	Scale rules	15
11	Set square	1 of 10
12	Set of arrows	30
13	Levels	4
14	T-square	10
15	Pantograh	10

2.0 GEAR AND CRAFT

S/NO	TEM	QTY
1	Working space	For 30
2	Model for Gillnets	1
3	Model for Trammel net	1
4	Model for Cast net	1
5	Model for Seine net	1
6	Model for Traps (various)	1 each
7	Model for Hooks and line	1
8	Model for Mid-water trawl	1
9	Model Purse seine	1
10	Model light fishing net	1
11	Model lift net	1
12	Netting materials	2 bundles each for 2" 3", 3 1/2, 4" and 5"

S/NO	TEM	QTY
13.	Hooks packets	1 pkt of No: 1 to 20
14.	Nylon ropes	2 pkts each of No. 6, 8, 10 and 12 210D/3 to 210D/60
15.	Mounting twine	

3.0 FISH FEED MILL

S/NO	TEM	QTY
1	Laboratory type grinding machine	2
2	Sieves	10
3	Mixer/blender	1
4	Refrigerators with freezer	2
5	Feed storage facility/store/packaging room	1
6	Earthworm breeding room	1
7	Pelleting machine	1

4.0 AQUACULTURE

S/NO	TEM	QTY
1	Hatchery troughs	6
2	Air pumps and accessories	6
3	Secchi disc	5
4	pH meter	2
5	Portable field analysis kit	2
6	Ruttner water sampler	2
7	Eckmann grab	1
8	Portable Oxygen meter	2
9	Aerators	
10	Thermometer	10
11	Seine net	5
12	Sample bottles	10

13	Aquarium (various sizes)	5
14	MacDonald's Jar (for incubating egg)	
15	Chlorophyll (a) grinding motor (general purpose)	2
16	Incubator	1
17	Cell counting chamber	10
18	Ocular micrometer	10
19	Binocular	10

5.0 FISH PROCESSING EQUIPMENT

S/NO	ITEM	QTY
1	Cutting knives	30
2	Measuring boards	30
3	Weighing balance	2
4	Hand gloves	30
5	Freezers	5
6	Ovens	4
7	Kilns (different types)	5
8	Thermometers	10
9	Deep freezers	2
10	Fish drying racks	2
11	Fish boxes	10
12	Salting trays basins	10
13	Sun drying vats	10
14	Cold room	1

6.0 FISH MUSEUM

S/NO	ITEM	QTY	REMARKS
1	Aquaria Fish skeleton	10	Various types of all Nigeria Freshwater and as many as marine fish and animals
2	Preserved specimen		

7.0 FISH PONDS

S/NO	ITEM	QTY	REMARKS
1.	Concrete ponds	10	
2.	Earthen ponds	10	

8.0 WORKSHOPS (BOAT BUILDING AND ENGINE MAINTENANCE ETCO

S/NO	ITEM	QTY
	Wood Workshop	
1	Band saw	1
2	Cross cutting circular saw	1
3	Surface planer	1
4	Thicknessing planer	1
5	Spindle moulding machine	1
6	Mortising machine	1
7	Drilling machine	1
8	Sanding machine	1
9	Simple platen processor	1
10	Grinding machine	1
11	Router	1
12	Wood chipper	1
13	Lathe (wood machine)	
14	Dimension sawing machine	
15	Hand tools: Saws, chisel, T- square, gauges, rule,	

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	screw drivers, a set of drill bit, hammer mallets, pincers, oil stones, planners etc	12
16.	First aid box	1
17.	Model boats	Assorted
18.	Model aquaria	Assorted

PEST CONTROL EQUIPMENT AND TOOLS

S/NO	ITEM	QTY
1	Magnifying glasses	15
2	Insect cages and cabinets	5
3	Specimen bottles	20
4	Insect nets	30
5	Lamps	10
6	Mist nets	10
7	Cool boxes	10
8	Knapsack pressure sprayer	2
9	Moterised mist spryer	1
10	Handy sprayer	5
11	Hand sprayer with container	5
12	Flood jet nozzles (1.5 ok)	4
13	Boom sprayer	2

NURSERY TOOLS AND Equipment

S/NO	ITEM	QTY
1	Watering system (spraying)	5
2	Seed sowers	5
3	Root pruners	5
4	Plant lifters	5
5	Plant weeders and ledgers	5
6	GHP Pump	3
7	Secatours	2
8	Planting hoes	10
9	Spade	10
10	Pick axe	10
11	Pick axe	10
12	Hand trowel	10
13	Wheel barrows	10
14	Watering cans Head pans	10
15	Head pans	10
16.	Machetes	10
17.	Cutting knives	10

CROP STORAGE AND PROCESSING EQUIPMENT

S/NO	ITEM	QTY	REMARKS
1	Rice milling machine	1	Yam barns Rhombus refrigerated ware house
2	Rice thresher	1	
3	Rice parboil machine	1	
4	Groundnut desiccators	1	
5	Maize Sheller	1	
6	Hand oil press	1	
7	Grain drier	1	
8	Cassava grater	1	
9	Cassava peeler	1	
10	Silos	1	
11	Cribs	1	

S/NO	ITEM	QTY
	Crop farm (Teaching and Commercial)	1
	Nursery	
	Horticultural form	3
	Orchard	3

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S/NO	ITEM	QTY
1	Crop farm	
2	Tubers	
3	Cereals	3
4	Grains	20
5	Fertilizer store	1
6	Manure store	1
7	Implement store	1

Animal Farm (Teaching and Commercial)

S/NO	ITEM	QTY
1.	Poultry	
2.	Laying unit	1000
3.	Brooder unit	1000
4.	Deep litter	1000
5.	Hatchery	1
6.	Incubators	3
7.	Goat unit	80
8.	Sheep unit	80
9.	Rabbit	80
10.	Piggery	80
11.	Beef cattle	50
12.	Dairy cattle	50
13.	Milking parlour	1
14.	Slaughter house with slab	1
15.	Dip slab	1
	Hay pit	1

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