EDO STATE COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

SCHOOL OF AGRICULTURAL TECHNOLOGY AND ENGINEERING (IGUORIAKHI)

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DEPARTMENT OF AGRICULTURAL ENGINEERING AND BIO-RESOURCES ENGINEERING

COURSE SYNOPSIS FOR DEPARTMENT OF AGRICULTURAL AND BIO-RESOURCES ENGINEERING

ACADEMIC PROGRAMME

The department will run the following programme of two years duration each.

1. National Diploma (ND) in Agricultural Engineering.
2. Higher National Diploma (HND) in Agricultural Engineering (Farm Power and Machinery, Soil and Water Engineering, Post-harvest Technology Option).

NATIONAL DIPLOMA PROGRAMME

Goal of the programme

The programme is designed to produce Agricultural and Bio-Resources Engineering Technicians capable of utilizing and carrying out repairs and routine maintenance of farm machinery, irrigation and drainage facilities, as well as storage and processing equipment and who can assist in design of farm structures and other farming facilities.

Objectives of the Programme

On completion of the programme, the diplomat of ND in Agricultural Engineering should be able to:

i. Operate, maintain and repair farm tractors, and other farm implements, tools, equipment and machineries.

ii. Supervise and manage mechanized farms.

iii. Prepare technical reports on small farm enterprise

Entry Requirements

National Diploma Programme (2years):

1. Four (4) Credits in SSCE,WASC, GCE,NECO, NABTEB, at one sitting **OR**
2. Five (5) Credits in not more than two sittings. In (1) and (2) above, the Credits must include English language, Mathematics and three (3) Science subjects. The Science subjects must include Physics, Biology, Agricultural Science and Chemistry.

HIGHER NATIONAL DIPLOMA PROGRAMME FARM POWER AND MACHINERY OPTION

Goal of the Programme

The option is designed to produce Agricultural and Bio-Resources Engineering Technologists capable of applying engineering knowledge and skills in the operation, repair and maintenance of all equipment used for production, processing and storage of Agricultural products, and designing and fabricating locally adopted ones.

Objectives of the Option

The products of the HND programme in Agricultural and Bio-Resources Engineering Technology (Farm Power and Machinery Option) should be able to:

i. Operate, maintain and repair farm tractors, machines, equipment, tools, storage and processing equipment.
ii. Design and fabricate locally adopted equipment and tools for agricultural production, processing and storage.
iii. Design, erect and maintain farm structures, including livestock housing and storage structures.
iv. Supervise and manage large-scale mechanized farms.
v. Determine the cost of farm machinery usage and farm operation as basis for economic farm mechanization.
vi. Assist in the design and implementation of field experiments, analysis and interpretation of farm data.

Entry Requirements

National Diploma Certificate with minimum of Lower Credit in Agricultural Engineering and Bio-Resources Engineering Technology and at least one (1) year Post-National Diploma Industrial Training Experience **OR**

National Diploma Certificate with Pass Grade in Agricultural and Bio-Resources Engineering Technology and at least two (2) years Post-National Diploma Industrial Training Experience (with evidence). In addition, the basic requirements for National Diploma Programme must be met.

ORDINARY NATIONAL DIPLOMA CURRICULUM

OND AGRICULTURAL AND BIO-RESOURCES ENGINEERING TECHNOLOGY

OND 1 - 1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE-REQUISITE
1.	ABE 111	Introduction to Agricultural and Bio-Environmental Engineering	2	2	3	60	WASC/GCE /NABTEB
2.	ABE 112	Tractor Operation and Maintenance	1	3	2	60	,,
3.	ABE 113	Rural Sociology and Agricultural Extension	1	3	2	60	,,
4.	ABE 114	Basic Workshop Technology and Practice	1	3	2	60	,,
5.	ABE 115	Engineering Drawing	1	3	2	60	,,
6.	ABE 116	Farm Practice I	0	4	2	60	,,
7.	ABE 117	Engineering Mathematics I	3	0	3	45	,,
8.	ABE 118	Computer Applications I	1	3	2	60	,,
9.	AGT 111	Principles of Crop Production	1	2	2	45	,,
10	GNS 111	Citizenship Education I	2	0	2	30	,,
11	GNS 112	Communication in English I	2	0	2	30	,,
12	EED 116	Introduction to Entrepreneurship	1	2	2	45	,,
		TOTAL	**17**	**22**	**26**	**615**	

OND 1 - 2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 121	Construction and Maintenance of Crop Processing and Storage Facilities	2	3	3	75	
2.	ABE 122	Introduction to Soil Science and Mechanics	2	2	3	60	
3.	ABE 123	Repair and Maintenance of Farm Implement	1	4	3	75	
4.	ABE 124	Introduction to Livestock Farm Mechanization	1	3	2	60	
5.	ABE 125	Applied Electricity	1	2	2	45	
6.	ABE 126	Farm Practice II	0	4	2	60	
7.	ABE 127	Engineering Mathematics II	3	0	3	45	
8.	ABE 128	Computer Applications II	1	3	2	60	
9.	ABE 129	Strength and Properties of Materials	2	2	3	60	
10.	GNS 121	Citizenship Education II	2	0	2	30	GNS 111
11.	GNS 122	Communication in English II	2	0	2	30	GNS 112
12.	GNS 123	Use of Library	0	2	1	30	
13.	EED 126	Skill Acquisition I	1	2	2	45	
		TOTAL	**18**	**27**	**30**	**675**	

OND I COURSE SYNOPSIS

ABE 111: Introduction to Agricultural and Bio-Environmental Engineering (3Credits)

Scope of Agricultural and Bio-Environmental Engineering. Roles of Agricultural and Bio-Environmental Engineering in National economic development. Application of farm power and machinery in Agricultural production, application of soil and water engineering in agricultural production, application of farm structures in agricultural production, use of electric power in agricultural production, application of post-harvest technology in agricultural production, recognize the role of professional organization and professional activities relevant to agricultural engineering.

ABE 112: Tractor Operation and Maintenance (2Credits)

Road traffic laws and regulations. Identify major tractor parts. Carry out routine checks on the tractor. Drive a tractor. Use the tractor P.T.O

ABE 113: Rural Sociology and Agricultural Extension (2Credits)

Basic sociological concepts. Organization and functioning of Nigerian rural institutions. Elements of social systems and barriers to social change. Agents of social change in Nigeria. Scope and principles of Agricultural extension in agriculture. Role of communication in extension. Concept of innovation and adoption in

extension. Principles of extension administration and importance of audio-visual aids. Methods of creating teaching situations for adult learners. Roles of local leaders in agricultural extension. Role of agricultural Research Institutes in extension work.

ABE 114: Basic Workshop Technology and Practice (2Credits) Safety precautions. Maintenance of bench tools. Simple measuring and testing requirements. Drilling and reaming operation. Metal joining operation. Cutting and joining of metal by gas welding. Metal and welding operations. Wood working tools and their operation. Simple operations on plastics.

ABE 115: Engineering Drawing (2Credits) Drawing instruments. Equipment and materials used in technical drawing. Graphical communication. Construction of simple geometrical figures and shapes. Isometric and Oblique Projections. Method of free hand sketching of simple machine parts. Pre use of photographs and exploded illustrations in engineering communication and prepare simple exploded illustrations. Senting drawing for manufacture. Symbol for representing engineering components. The need for standards in Engineering Drawing. Produce component and assembly drawings in accordance with BS308 1972 for use in production and installation. Use of Mechanical accessories and fasteners in Assembly Design. Need for Lubrication, electrical and other devices to be represented in drawings. Interpret finished

Assembly. Drawings of Machines which have sub-assemblies. Process of Engineering Design. Preliminary Design.

ABE 116: Farm Practice (2Credits)

ABE117: Engineering Mathematics I (3Credits)

Laws of indices and their application in simplifying algebraic expressions. Theory of logarithms and surds and their applications in manipulation expressions. Principles underlying the construction of charts and graphs. Quadratic equations. Permutation and combination. Concept of set theory. Properties of arithmetic and geometric progressions. Binomial theorem and its application in the expansion of expressions and in approximations.

ABE 118: Introduction to Computer (2Credits)

Computer basics and use of operating system. Word processing package. Spreadsheet package (Excel).

AGT 111: Principles of Crop Production (2Credits)

Scope of crop production in Nigeria. Different cropping systems. Principle and practices of tillage. Different methods of propagating plants, and practice successful weed control in crop production. Principles and practices of manuring and fertilizing. Principles and practices of crop protection. Principles and practices of harvesting, storage and product handling.

GNS 111: Citizenship Education (2Credits)

Constitution of Nigeria federal system of government in Nigeria Constitutional rights and obligations of Nigerian citizens. Citizenships. Fundamental objectives and directive principles of state policy in Nigeria.

GNS 112: Communication in English I (2Credits)

Language skills. Basic rules of grammar. Nature of the language, Literary words in English. Essential qualities of paragraph. Literary works in English.

EED 116: Introduction to Entrepreneurship (2Credits)

Basic concept of Entrepreneurship. Roles of entrepreneurship in personal and national growth and development. How to set business goals. How to identify business opportunities. How to draw simple business plans.

ABE 121: Construction and Maintenance of Crop Processing and Storage Facilities (3Credits)

General and unique construction features of processing machines and crop storage facilities, understand the operation and maintenance of grain cleaners, sorters, graders and separators, operation and maintenance of shellers, threshers, dehullers and decorticators, operation and maintenance of burr mills, hammer mills and roller mills, operation and maintenance of conveyors,

construction and maintenance of solar crop dryers, operation and maintenance of crop storage structures.

ABE 122: Introduction to Soil Science and Mechanics (3Credits)

Rocks and minerals as parent materials of soils, physical characteristics of soils, chemical properties of soils, soil characteristics, soil moisture and its importance, soil organic matter and its importance, soil organisms and their impact on nature of soils.

ABE 123: Repair and Maintenance of Farm Implement (3Credits)

Different farm implements and the maintenance requirements for each of the farm implements, repairs of the various farm implements, proper storage requirements for different farm implements, importance of maintaining, effective records and inventories of farm implements

ABE 124: Introduction to Livestock Mechanization (2Credits)

Appreciate the range of livestock housing systems within Nigerian, requirements for effective building design and layout for various livestock enterprises, operation and maintenance of various mechanized livestock systems environmental control in farm animal building(s), methods of handling waste in commercial livestock production

ABE 125: Applied Electrical Engineering Science (2Credits)

Concept of the electric current flow. Simple D.C circuits, various types of energy and their inter-relationships. Concept of electrostatics, electric charge and capacitance of capacitor.

ABE 126: Farm Practice II (2Credits)

ABE 127: Engineering Mathematics II (3Credits)

Basic concepts and manipulation of vectors and their applications to the solution of engineering problems. Concept of equations and methods of solving different types of equations and apply same to engineering problems. Definition, manipulation and application of trigonometric functions.

ABE 128: Computer Application Package II (2Credits)

Develop and present a power point presentation. Use efficiently the World Wide Web and use efficiently a search engines. Setup and use correctly an Email application.

ABE 129: Strength and Properties of Materials (3Credits)

Types of stress and strain. Shears force and bending moment. Shear stress and force in circular Shafts. Use of Mohr's circle tensile and compressive test. Izod and charpy tests and Brinell hardness Test.

GNS 121: Citizenship Education II (2Credits)

See syllabus for GNS III.

GNS 122: Communication in English II. (2Credits)

Concept of communication. How to make oral presentations. Essential elements of correspondence. Rules of comprehension and interpretation.

GNS 123: Use of Library (1Credit)

EED 126: Skill Acquisition I (2Credits)

Workshop safety procedures and equipment, uses of simple measuring and testing instruments; skills in the use of hand tools, skills in drilling and reaming, skills in tapping and metal joining operations, cutting and joining of metal by gas welding, skills in arc welding operations, skills in the use of various wood working tools, skills in simple operations on plastics.

OND II - 1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 210	Practical Project 1	1	3	2	60	ND
2.	ABE 211	Agricultural Materials Handling Technology	1	3	2	60	
3.	ABE 212	Farm Machinery and Mechanization I	2	3	3	75	
4.	ABE 213	Irrigation and Drainage	2	2	3	60	
5.	ABE 214	Fluid Mechanics	1	2	2	45	
6.	ABE 215	Farm Machinery Management	1	2	2	45	
7.	ABE 216	Farm Practice III	0	2	2	30	ND
8.	ABE 217	Farm Electrification	1	3	2	60	
9.	ABE 218	Computer Aided Design and Drawing	1	3	2	60	
10	ABE 219	Technical Report Writing	1	0	1	15	
11.	EED 216	Practice of Entrepreneurship	1	2	2	45	
		TOTAL	**14**	**25**	**23**	**555**	

OND II - 2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 220	Practical Project 2	1	3	2	60	ABE 210
2.	ABE 221	Construction and Maintenance of Farm Structure	2	3	3	75	
3.	ABE 222	Farm Machinery and Mechanization II	2	3	3	75	ABE 212
4.	ABE 223	Farm Power	2	3	3	75	
5.	ABE 224	Soil and Water Conservation	2	2	3	60	
6.	ABE 225	Post-Harvest Technology and Storage	2	3	3	75	
7.	ABE 226	Farm Practice IV	0	2	2	30	
8.	ABE 227	Biometrics I	2	0	2	30	
9.	EED 226	Skill Acquisition II	1	2	2	45	
		TOTAL	**14**	**21**	**23**	**525**	

OND II COURSE SYNOPSIS

ABE 210: Practical Project 1 (2Credits)

Research a chosen topic from a list of suitable source provided for the programme. Design an appropriate solution to the problem(s) identified.

ABE 211: Agricultural Materials Handling Technology (2Credits)

Physical and mechanical properties of perishable and non-perishable agricultural materials, agricultural materials handling equipment, constructional features and operation of agricultural materials, handling equipment, knowledge of physical and mechanical

properties in selecting appropriate handling methods and dynamics of handling equipment in work, damage and contamination in agriculture.

ABE 212: Farm Machinery and Mechanization I (3Credits)

Aims and problems associated with farm mechanization. Various operations involved in land clearing and development. Safety and effectively operate and maintain a range of soil tillage equipment. Correctly set and operate crop drilling and planting equipment for a range of crops.

ABE 213: Irrigation and Drainage (3Credits)

Concept of irrigation and drainage water requirement of Crops. Surface and ground water as the major sources of irrigation water. Irrigation structures and pumps. Crop watering systems and requirements. Methods and structures for drainage. Flood and tide control.

ABE 214: Fluid Mechanics (2Credits)

Basic fluid flow and fluid flow classification. Fluid state principles and relationships that describe fluid flow problems. Working principles of pneumatic systems and components. Characteristic of fluid flow in pipes and channels. Working principles and application of different classes of fluid-power machinery.

ABE 215: Farm Machinery Management (2 Credits)

Select appropriate farm machinery for specific activities, match implements and tractors for efficient utilization of tractor power, determination of field performance and outputs of individual machines, manage machinery systems for maximum performance; determine the cost of machinery operations.

ABE 216: Farm Practice III (2 Credits)

ABE 217: Farm Electrification (2 Credits)

Uses of electricity on the farm. How to select and operate electric motors for farm use. Electrical installation in farm buildings. Installation of protective electrical devices in farm buildings. Electrical safety on the farm**.**

ABE 218: Computer Aided Design and Drawing (2 Credits)

Construction of simple geometric shapes, different edit boxes and how to use them. Creation of layers, linear and aligned dimensions**.**

ABE 219: Technical Report Writing (1 Credit)

Filling of log book for all technique works carried out. Presentation of project proposal in the standard format. Purpose and method of presenting different sections of a project report. Writing non-technical report.

EED 216: Practice of Entrepreneurship (2 Credits)

Basic concept of entrepreneurship. Historical perspective of entrepreneurship development. Plan a business enterprise/project

operate simple stock keeping records. Prepare and operate cash flow on spreadsheets. Employment issues. Nigerian Legal system. Comprehend the nature of contract and tort. Agency and partnership.

ABE 220: Practical Project II (2 Credits)

Fabricate the chosen final product from ABE 210 (Practical Project I). Produce a final product. Produce a final report on the project.

ABE 221: Construction and Maintenance of Farm Structures (3Credits)

Preparations and organization of building sites. Principles and practice of making foundations for buildings. Construction and maintenance of walls. Columns and beams. Constructions of floors. Construction of roofs. Features and functions of special farm structures. Preparation and uses of concrete and plumbing materials in farm structures. Repair and maintenance of farm building and structure. maintenance of farm structures.

ABE 222: Farm Machinery and Mechanisation II (3Credits)

Crop husbandry equipment and their operations, uses of crop protection equipment, use of manure and fertilizer application equipment, uses of crop harvesting equipment and horticultural machinery

ABE 223: Farm Power (3Credits)

Various sources of power for fanning, workings of the internal combustion engine, operation and maintenance of the tractor engine and its component parts, operation and maintenance of the tractor transmission system and PTO, operation and maintenance of the tractor hydraulic system.

ABE 224: Soil and Water Conservation (3Credits)

Importance of soil conservation in increasing crop production. Importance of hydrology and meteorology to soil water conservation. Different types of erosion, process of soil erosion by rainfall and surface water flow. Soil loses by wind erosion, various methods of soil and water conservation and their limitations.

ABE 225: Postharvest Technology and Storage (3Credits)

Unique characteristics of biological materials that influence processing handling and storage of agricultural products, cleaning, sorting and separation of biological materials, principles and methods of milling, shelling and decortications, methods of drying of biological materials, methods of storage and preservation of agricultural produce.

ABE 226: Farm Practice IV (2Credits)

ABE 227: Biometrics I (2Credits)

EED 226: Skill Acquisition II (2Credits)

HIGHER NATIONAL DIPLOMA CURRICULUM COURSES
HND AGRICULTURAL AND BIO-RESOURCES ENGINEERING TECHNOLOGY (FARM POWER AND MACHINERY OPTION)

HND 1 (FARM POWER OPTION) - 1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 311	Land Clearing and Development	2	1	3	45	
2.	ABE 312	Soil Mechanics	2	3	3	75	
3.	ABE 313	Agro-Climatology	1	1	2	30	
4.	ABE 314	Safety	2	2	2	60	
5.	ABE 315	Computer Applications I	1	3	2	60	
6.	ABE 316	Theory of Structures	2	2	3	60	
7.	ABE 317	Advanced Algebra	3	0	3	45	
8.	ABP 311	Agricultural Machine Drawing	1	3	2	60	
9.	ABP 312	Thermodynamics and Heat Engines	2	2	3	60	
10	ABP 313	Theory of Machines	2	0	2	30	
11.	EED 316	Entrepreneurship Development I	1	2	2	45	
12.	GNS 301	Communication in English III	2	0	2	30	
		TOTAL	**21**	**19**	**29**	**600**	

HND1 (FARM POWER OPTION) - 2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 321	Engineering Properties of Biological Materials	1	2	2	45	
2.	ABE 322	Farm Waste Management	2	2	3	60	
3.	ABE 323	Land Law	2	0	2	30	
4.	ABE 324	Instrumentation and Control	2	2	3	60	
5.	ABE 325	Rural Electrification	2	2	3	60	
6.	ABE 326	Principles of Surveying and Farm Buildings	2	3	3	75	
7.	ABE 327	Numerical Method	3	0	3	45	
8.	ABE 328	Seminar	1	0	1	15	
9.	ABP 321	Farm Tractor Systems, Operations and Maintenance	1	4	3	75	
10.	ABP 322	Tillage and Planting Machinery	2	3	3	75	
11.	GNS 302	Communication in English IV	2	0	2	30	
12.	EED 326	Skill Acquisition III	1	3	2	60	
		TOTAL	**21**	**21**	**30**	**630**	

HND I COURSE SYNOPSIS

ABE311: Land Clearing and Development (3Credits)

Agricultural land resources in Nigeria, land tenure practices, Nigeria land policy, sequencing of agricultural land development, factors to consider in land clearing, land reclamation and development techniques, economics and management of land clearing operations.

ABE 312: Soil Mechanics I (3Credits)

Clay mineralogy and its engineering properties, principles of the compressibility of clays, flow characteristics and their application in design of water retaining structures, stress distribution below loaded areas and the effect of earth pressure on sheet piles. Principles of compaction. CBR. Darcy's law. Soil stabilization. Shear strength. Soil settlements.

ABE 313: Agro Climatology (2Credits)

The components of a meteorological station, climate and climatic elements, the relevance of climatic elements in agricultural productivity , understanding micro-climate, solar energy, the use of radiant energy in agriculture, radiation and heat budget.

ABE 316: Theory of Structures (3Credits)

Structural Arrangement of atoms and their influence on the properties of materials. Elementary crystal structure of materials. Phase transformation. Process of metal solidification. Structural arrangements of atoms of non-metals. Process of obtaining metals from ores. Various types of ferrous metals considering the properties and Limitations. Common types of non-ferrous metals. Hot working and cold working process. Non-metallic materials in engineering applications. Basic principles of heat treatment as applied to steels, phase transformation. Nucleation, crushing/grid machines and separation techniques.

ABE 317: Advanced Algebra (3Credits)

See syllabus for MTH 311

ABP 311: Agricultural Machine Drawing (2Credits)

Limits, fits and their uses. Application of the concept of intersection of solids and development of surface to drawings. Assembly drawings. Drawings that require electrical and hydraulic symbols. Drawings of selected agricultural machines and parts.

ABP 312: Thermodynamics and Heat Engines (3Credits)

Heat transfer processes, the use and application of thermodynamics tables and charts, work transfer processes, the analysis of the performance of internal combustion engines, the analysis of engine cycles, the principles of refrigeration.

GNS 301: Use of English III (2Credits)

How to construct good sentences. How to reason and apply the basic principle of logic. How to write different types of essays. Appreciate literature in English.

ABE 321: Engineering Properties of Biological Materials (2Credits)

Uniqueness of biological materials as different from engineering (metallic) materials, thermal and electrical properties of biological material on mechanical operations, effect of mechanical damage to biological material and their economic importance.

ABE 323: Land Law (2Credits)

Meaning and types of law, legal concept of land and its ownership, nature of contract and its application to land use, law of torts and application to land use, doctrine of tenure in land holding system, sale and mortgages of land, Nigerian Land Use Decree of 1978.

ABE 324: Instrumentation (3Credits)

Basic units of measurements, performance characteristics of measuring systems, principles involved in the measurement of various quantities, workshop instruments and their uses, instrument used in measurement of fluid, instruments used in measuring soil characteristic. Instruments used for measuring the characteristics of biological material.

ABE 325: Rural Electrification (3Credits)

Drawing of electric circuit, principles of electricity generation, principles of electricity transmission. Principles of electricity distribution. Operations of electric motors and generators, installation of electricity and its appliances on the farm.

ABE327 Numerical Method (3Credits)

See syllabus for MTH 321

ABE328: Seminar (1Credits)

The pre-data oral presentation and examination of the final year practical project assigned to individual students.

ABP 321: Farm Tractor Systems, Operation and Maintenance (3Credits)

Working principles of an internal combustion engine. Engine design principles affecting combustion. Tractor cooling system, Tractor lubrication system. Tractor electrical system, principles and procedure of tractor true up and maintenance. Principles of operation and servicing of small engines.

ABP 322: Tillage and Planning Machinery (3Credits)

Classification of machinery for various operations involved in tillage and seedbed preparations, operation of primary cultivation implements, operation of secondary tillage implements, proper care of tillage equipment, various methods of seed planning, various types of equipment for applying fertilizers and manures.

GNS 302: Communications in English IV (2Credits)

The theory and practice of communication, concept of organizational communication.

HND II COURSES

(FARM POWER AND MACHINERY OPTION)

HND II (FARM POWER OPTION) - 1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 410	Project Seminar	0	6	3	60	
2.	ABE 411	Crop Protection and Harvesting Machinery	2	3	3	75	
3.	ABE 412	Farm Workshop Organisation and Management	2	2	3	60	
4.	ABE 413	Crop Processing and Handling Machinery	2	3	3	75	
5.	ABE 414	Farm Machinery Design and Fabrication	2	2	3	60	
6.	ABE 415	Field Experimentation and Data Analysis	2	2	3	60	
7.	ABP 412	Livestock Farm Mechanisation	2	2	3	60	
8.	EED 416	Entrepreneurship Development II	1	2	2	45	
		TOTAL	**13**	**18**	**23**	**495**	

HND II (FARM POWER OPTION) - 2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	L/T	P	CU	CH	PRE
1.	ABE 420	Project	0	6	3	60	ABE 410
2.	ABE 421	Agricultural Personnel Management	2	0	2	30	
3.	ABE 422	Statistical Methods in Engineering	3	0	3	45	
4.	ABE 426	Agricultural Engineering in Development	2	0	2	30	
5.	ABP 421	Tractors and their Power Units	2	3	3	75	
6.	ABP 422	Farm Power and Machinery Management	2	2	3	60	
7.	ABH 421	Crop Drying and Storage	2	3	3	75	
8.	COM 311	Computer Programming in C++	1	3	2	60	
		TOTAL	**14**	**15**	**21**	**435**	

HND II COURSE SYNOPSIS

(FARM POWER AND MACHINERY OPTION)

ABE 410: Project Seminar (3Credits)

ABE 411: Crop Protection and Harvesting (3Credits)

Construction, operation and maintenance of crop spraying equipment, constructional features and operation of mowing machines, constructional features and operation of forage harvester, constructional features and operation of hay baler, constructional

features and operation of a combine harvester, constructional features and operation of root crop harvester, mechanical harvesting of fruits and vegetable.

ABE 412: Farm Workshop Organization and Management (3Credits)

Planning of agricultural workshops, installation of workshop equipment, workshop organization and management of workshop store.

ABE 413: Crop Processing and Handling Machinery (3Credits)

Principles of operation of shelling and decorticating equipment, principles of operation of size reduction equipment, principles of operation of mixing equipment, principles of operation of equipment for sorting, cleaning and grading of agricultural produce, extraction of oils from seeds, operation of equipment for processing of palm fruit and coconut, operation of agricultural handling equipment.

ABE 414: Farm Machinery Design and Construction (3Credits)

Principles of design and the impact of operational factors on machine components, stresses in mechanical elements, materials of construction and their characteristics, design of individual mechanical elements, farm machinery design considerations, design and construction of selected farm machinery.

ABE 415: Field Experimentation and Data Analysis (3Credits)

The nature of statistics and field experiments, different types of experimental designs, different types of experiments, control of variability in field experiments, meaning of experimental error, management of experiments, data collection organization and analysis and the use of green house for experiments.

ABP 412: Livestock Farm Mechanization (3Credits)

Equipment for handling, management and processing used in livestock production, construction features and operation of equipment for animal feeding systems, environmental control in farm animal building, methods of handling, simple equipment for pastoral farming.

EED 416: Entrepreneurship Developments (2Credits)

History of Entrepreneurship development in Nigeria. Need, scope and characteristics of entrepreneurship, and various sources of information for entrepreneurship development. Appreciate the roles of commercial and development banks in small scale industrial development, functions of various support agencies in small and medium scale industrial development, methods of product selection, activities of different industrial association in relation to entrepreneurship, self through analysis of strengths, weakness, goal-setting and risk-taking behaviour, motivational pattern of

entrepreneurs, functional areas of business, need for business planning.

ABE 420: Project (3Credits)

Review current literature pertaining to a specific issue or problem, Assess the extent of the issue or problem in agricultural practice. Gather and analysis information to identify potential solutions and reach a conclusion, produce a final report on the project.

ABE421: Agricultural Personnel Management (2 Units)

Definition of management, industrial organization, types of organizational system. Element of organization, communication fidelity and work group. Management levels; contract of employment.

ABE 422: Statistical Methods in Engineering (3Credits)

See syllabus for MTH313

ABE 426: Engineer in Society (Agricultural Engineering in Development) (2Credits)

Historical development of engineering and technology. Nature of the engineering family. Organization of the engineering profession in Nigeria. Roles of the various cadres of engineering personnel in the Nigerian Society. Engineering professional associations. Regulatory body, COREN and the process and requirements for professional registration. Provisions of the Acts setting. Progression of engineering personnel along or across cadres. Codes of Conduct and

Fundamental Ethics of the profession as well as the Canons. Unwritten laws of engineering.

ABP 421: Tractor and their power Units (3Credits)

Power transmission devices in farm machinery, tractor drive transmissions, fundamental principles of the hydraulic transmission in tractor, components of the hydraulic system, diagnosis and testing of the hydraulic system, application of hydraulic transmission to tractor systems, factors that demine the stability of the tractor.

ABP 422: Farm Power and Machinery Management (3Credits)

Tractor power available for farm operations, power and tractor requirements for agricultural implements, Evaluate the field capacities of various farm machinery, economics of farm machinery usage, selection of farm machinery, multi farm use of farm machinery, machinery management in relation to selected case studies, tractor testing.

ABH 421: Crop Drying and Storage (3Credits)

Principles of grain/crop drying, systems for grain/crop drying, know the physiological changes which take place in stored agricultural products, technical of sampling stored products, planning and operation of storage structures, environmental control in storage structure, operation of storage systems, method of pest control in storage structures.

COM 311: Computer Programming in C++ (2Credits)

Use of AutoCAD for producing drawings and layouts, use of spreadsheet software (EXCEL) for farm mechanization application, use of psychometric software for the assessment of environmental conditions

DEPARTMENT OF AGRICULTURAL EXTENSION AND MANAGEMENT

CURRICULUM

Department of Agricultural Extension and Management

HIGHER NATIONAL DIPLOMA IN AGRICULTURAL EXTENSION AND MANAGEMENT (HND)

The goal of the Department is to produce graduates with the requisite knowledge, skills and attitudes in the agricultural development process, and those who possess the competence to become self-employed and effectively transmit such skills to farmers and other members of the public.

The thrust of a programme in Agricultural Extension & Management is to produce graduates with an in-depth knowledge of both practical and theoretical aspects of the course and is robust enough to permit self-employment after graduation. Students spend most of their time receiving instructions in the basic sciences, humanities, workshop practice, engineering drawing and general agriculture. Students are expected to acquire a thorough knowledge of extension theory, its application to contemporary agricultural problems as well as the ability to use quantitative/qualitative techniques in conducting agricultural and rural development research.

Objective

The objective of the department is to train technocrats and professional workers with competence in the analysis of socio-economic and cultural problems in agriculture. This is in response to increasing opportunities for our graduates in teaching, research, management, public administration, community and rural development.

Expectations

The graduates of Agricultural Extension & Management are expected to be able to accomplish the following:

* Profitably becoming self employed by establishing and operating their own farming enterprises.
* Take up employment within and outside the country in any aspect of agriculture and related areas.
* Engage in research that would provide relevant and appropriate solutions to most development problems and improve agricultural productivity in general.
* Serve as a channel for the dissemination of agricultural information to farmers.
* Train farmers organizations, community based organizations etc. and interested individuals in skills needed for economic empowerment.

FIRST SEMESTER OF YEAR 1

COURSE CODE	COURSE TITLE	L	T	P	CU	TOTAL CH
GNS 301	Use of English III	2		-	2	30
GNS 311	Agricultural Mathematics	2			2	30
AEM 312	Micro-Economics	2		-	2	30
AEM 313	Resource Economics	2		-	2	30
AEM 314	Extension Methods	2		2	3	60
AGR 315	Tree Crops	2		-	2	30
AGR 316	General Farm Practice I	2		2	3	60
APT 317	Non-Ruminant Animals	2		2	3	60
AGR 315	Agricultural Entomology	2		2	3	60
CPT 313	Agro-Climatology	2		2	3	60
	TOTAL				**25**	**450**

SECOND SEMESTER OF YEAR 1

COURSE CODE	COURSE TITLE	L	T	P	CU	TOTAL CH
AGR 321	General Farm Practice II	2		2	3	60
AEM 322	Field Trips and Seminars				3	-
AGR 302	Field Experimentation and Data Analysis	2		3	3	75
AGR 303	Farm Management	2		-	2	30
AGR 304	Annual Crops	2			2	30
APT 321	Ruminant Animals	2		2	3	60
AGR 401	Research Methods	2		-	2	30
COM 311	Computer Programming	2		2	3	60
GNS 302	English Language and Communication	2			2	30
GNS 321	Physical and Health Education	2		2	3	60
	TOTAL				**26**	**435**

FIRST SEMESTER OF YEAR 2

COURSE CODE	COURSE TITLE	L	T	P	CU	CH
AEM 431	Macro-Economics	2		-	2	30
AEM 432	Agricultural Business Law	2		-	2	30
AEM 433	Farm Records and Accounting	2			2	30
AEM 434	Farm Business Organization	2		2	3	60
AEM 435	Agriculture Marketing	2		-	2	30
AEM 436	Extension Programme Planning and Evaluation	2		-	2	30
AGR 402	Agricultural Personnel Management	2		-	2	30
CPT 441	Post-Harvest Management	2		3	3	75
EED 416	Entrepreneurship Development	2		2	2	60
	TOTAL				**20**	**360**

SECOND SEMESTER OF YEAR 2

COURSE CODE	COURSE TITLE	L	T	P	CU	CH
AEM 441	Agricultural Cooperative	2		-	2	30
AEM 442	Agricultural Development and Policy	2		-	2	30
AEM 443	Farm Planning	2		-	2	30
AEM 444	Extension Administration and Operation	2		-	2	30
AEM 445	General Farm Mechanization	2		3	3	75
AEM 446	Rural Sociology	2		-	2	30
AEM 447	Seminar				2	30
AEM 448	Final Year Project				6	-
	TOTAL				**21**	**315**
	GRAND TOTAL				**92**	

COURSE SYNOPSIS

Course Code	SYNOPSIS	Units
GNS 301	**USE OF ENGLISH** Grammatical rank scale, comprehension and summary writing, essay-descriptive, narrative, and argumentative, expository, literature in English, registers for science technology, theory of group dynamics, mental demonstration, concept of leadership system.	**2**
GNS 302	**ENGLISH LANGUAGE AND COMMUNICATION** Principles of writing formal and informal letters, Basic principles of logic, Principles of continuous writing in expository logical and coherent issues, Technical project report writing, General and specific uses of words, Theory and process of communication, Concept of organizational communication	**2**
GNS 321	**PHYSICAL AND HEALTH EDUCATION** Refer to GNS CURRICULUM	**3**
AGR 302	**FIELD EXPERIMENTATION AND DATA ANALYSIS** Duncan Multiple Range Test, Nature of Statistics and field experimentation, experiment and research, experimental designs, types of experiments, control of variability, in field experiment, experimental error and how to manage experiments, data organization, correlation	**3**

	and regression, LSD.	
AGR 303	**FARM MANAGEMENT** Meaning and scope of farm management, principles of farm management, nature of production resources in agriculture, theory of production, meaning of risk and uncertainty, meaning of farm records, sensitive analysis, farm budgeting, valuation and depreciation of farm inventory, farm business analysis and appraisal.	**2**
AGR 304	**ANNUAL CROPS** Classification of annual crops, Origin and geographical distribution, Major areas of production, Crop botany, Crop varieties, Crop ecological requirements, Crop adaptation, Crop management, Pest diseases and weeds, Harvesting procedures, Crop processing and storage, Uses of products	**2**
COM 311	**COMPUTER PROGRAMMING** Functional units of computer system and their operations, Use of flow charts in computer programming, Programming techniques for writing basic languages, Fortran language, Low level languages, Programme on a microprocessor, BCD arithmetic, Logic operators, Jump and subroutine instructions.	**3**
AEM 312	**MICRO-ECONOMICS** Scope of Economics, Micro-economics Tools and Terms, Role of Economic Theory, Demand and Supply, Market	**2**

	Equilibrium, Laws of Demand and Supply, Effects of Changes in Demand and Supply, Concept of Elasticity, Coefficients of various Types of Elasticity, Utility and Indifference Curves, Assumptions for Utility and Indifference Curves, Factors Influencing Consumer's Behaviour, Changes in Price and Income, Substitution and Income Effect on Price Changes, Equilibrium and Derivation of Demand Curves, Production and Cost Functions, Relationship between Production and Cost Functions, Law of Diminishing Return and Production Process, Theory of Cost in the Short-and Long Run, Determination of Optimum Level of Input, Elements of Market Structure, Pricing and Output Policies in Perfectly Competitive Market, Pricing and Output Policies of a Monopoly, Imperfect market	
AEM 313	**RESOURCE ECONOMICS** Scope of Resource Economics, Location Map of Nigeria, Nigeria Climatic Environment, Vegetation, Drainage and Population, Concept of Land and Land Economics, Nigerian Land Tenure System, Problem of Land Tenure, Development Schemes and Institutions, Land Law, Water Right and Policy Framework, Forestry and Wild-Life resource Law, National Issues of Nigeria's Law.	**2**
CPT 313	**AGRO-CLIMATOLOGY** Components of Metrological station, climate and climate elements, importance	**2**

	of climatic elements, microclimate, solar, Use of radiant energy, radiation and heat energy, radiation balance, energy budget control, Characteristics of tropical climate.	
AEM 314	**EXTENSION METHODS** Communication Process and Change, Adult Education/Learning, Theory of Group Dynamics, Extension Methods, Role of Extension Worker and Learner, Result and Method Demonstration, Importance of Audio-visuals and Information, Communication and Technology in Extension, Power Structure in Village Organization, Identifying Effective Leadership**.**	**3**
CPT 315	**AGRICULTURAL ENTOMOLOGY** Economic importance of pests, Biology of pests, biological cycle of pests of economic importance, general principles of controlling pests of field crops, principles and application of various methods adopted in the control of pests in the form -cultural, biological, chemical etc, principles of chemical pest control, methods used in controlling pests of stored products, legislative, physical and mechanical control, principles and applications of integrated control and pest management**.**	**3**
AGR 315	**TREE CROPS** Permanent crops/tree crops and distribution, crop botany, Grouping of permanent crops, ecological requirement, crop husbandry, harvesting methods, post-harvesting handling, uses of products.	**2**
CPT 316	**GENERAL FARM PRACTICE I** Farm establishment and maintenance,	**3**

	reconnaissance survey, cropping history, preparation of farmland by plowing, , harrowing, rotating and ridging, weeding operation, fertilizer application, fertilizer rate and mix in preparation for application, seed drilling, broadcasting, transplanting, application of chemical, herbicides, pesticides, fungicides and on farm. ***Add Farm Practice I for Livestock Curriculum***	
APT 317	**NON-RUMINANT ANIMALS** ***Check Animal Production curriculum***	**3**
CPT 321	**GENERAL FARM PRACTICE II** Nursery establishment and maintenance techniques, Soil sterilization in the nursery, Raising of seedlings of plantation crops, Vegetative propagation of plantation crops-oil palm seedlings, cocoa seedlings, cashew seedlings, pawpaw seedlings**.** ***Add Farm practice II for Livestock Curriculum***	**3**
AGR 321	**RUMINANT ANIMALS** ***Check Animal Production curriculum***	**3**
AGR 401	**RESEARCH METHODS** Research theory and hypothesis, Formulating hypothesis and variable identification, Design and administration of questionnaire, Methodology of research, Method of data collection, Parametric and non parametric test statistics, Reporting	**2**

	research findings and way of presentation, Concept of hypothesis testing, Correlation and regression analysis	
AGR 402	**AGRICULTURAL PERSONNEL MANAGEMENT** Concept of personnel management, Nature of industrial organization, Organizational structure, Motivation and factors it, Types of employment, Concept of industrial relations, Wages and salary administration in relation to condition of employment	**2**
EED 416	**ENTREPRENEURSHIP DEVELOPMENT** Meaning and importance of entrepreneurship, identification of agribusiness enterprises, types of agribusiness ownership, legal forms of agribusiness organization, elements of an agribusiness plan, , creating an agribusiness plan:, identifying and meeting market needs, creating financial plan, identifying sources of finance and insurance, choice of agribusiness location and acquisition of equipment and supplies, marketing the agribusiness (identifying product mix, distribution channels, pricing and promotion methods), hiring and managing staff, managing business finances, understanding the legal and ethical environment of agribusiness.	**2**
AEM 431	**MACRO-ECONOMICS** Definition and Scope of Macro-Economics, Importance of Macro-Economic Models, National Income Accounting,	**2**

	Consumption and Savings, Investments, Full Employment and Unemployment, Money and Nigerian Financial Institutions, Money Supply and Price Level, Demand and Supply of Money, Monetary and Fiscal Policies, International Trade Theory and Balance of Payment, Goals and Importance of Socio-Economic International Organizations, Economic Growth and Development.	
AEM 432	**AGRICULTURAL BUSINESS LAW** Sources, Nature and Meaning of law, Nigerian Land Law, Right of Alienation Procedure, Water Right Laws, Forestry and Wild-life Resource Law, Property Law, Law of Succession and Executorship, Law of Tort, Law of Contract, Legal Principle of Agency, Legal Aspect of Sales and Hire Purchase, Types of Partnerships, Company Law.	**2**
AEM 433	**FARM RECORDS AND ACCOUNTING** Scope of Farm Records and Accounting, Basic Concepts of Accounting, Principles of Book Keeping, Trial Balance and Final Accounts, Adjustments of Financial Entries, Farm Inventory and Valuation, Principles of Financial Statements, Preparation and Analysis of Financial Statement, Income tax, Data Processing in Farm Business Accounting**.**	**2**
AEM 434	**FARM BUSINESS ORGANIZATION** Nature and scope of Farm Business Organization, Functional Divisions of	**3**

	Farm-Firm, Organizational Typologies, Application of Management Principles, Labour Productivity, Resource Utilization, Land as a Factor of Production, Capital Acquisition/Credit Facilities, Impact of Economy on Business Operation	
AEM 435	**AGRICULTURAL MARKETING** Concept of Agricultural Marketing, Marketing Functions, Marketing Agencies, Demand and Supply Process in Agricultural Market, Elasticity and Agricultural Marketing, Role of Market Price, Theory of Consumer Behaviour, Different Market Structures/Margins, Qualitative Techniques in Agricultural Marketing, Theories and Institutions of International Trade	**2**
AEM 436	**EXTENSION PROGRAMME PLANNING AND EVALUATION** Characteristics of Extension Programme Planning, Operational Model for Agricultural Development, Programme Planning Process, Use of Objectives in Extension Programme Planning Process, Calendar of Work/Programming Activities, Concepts of monitoring and evaluation, Programme Evaluation and Accountability, Emerging issues in participatory Evaluation	**3**
AEM 441	**AGRICULTURAL COOPERATIVES** Definition, Meaning and Genesis of Cooperatives, Cooperative as a business, Pre-condition for Cooperation, Pre-	**2**

	condition for Agricultural Cooperation, Types and models of Cooperatives, Organizational Structure of Cooperatives, Objectives and Process of Management/Administration of Cooperatives, Economic Principles in Cooperative Management, Roles of Cooperatives as Financing Agents, Agricultural Cooperatives as Agents of Rural Development, Solving Production Problems by Agricultural Cooperatives, Problems of Agricultural Cooperatives.	
AEM 442	**AGRICULTURAL DEVELOPMENT AND POLICY** Roles of Agriculture in National Economy, Components of Agricultural Development, Theoretical Framework of Different Agricultural Development Strategies in Nigeria, Formulation and Implementation of Agricultural Policies by Governments, Typology of Agricultural Policies, History of Agricultural Development Policies in Nigeria, Tools Used for Agricultural Policy Decision-Making, Characteristics of Nigeria's Agricultural Plans	**2**
AEM 443	**FARM PLANNING** Scope of Farm Planning, Farm size and Growth, Costs as Functions of Farm size, Process of Farm Business Growth, Evaluation and Management of Risks, Budgeting and Types of Farm Budgets, Types of Budgets as Methods of Evaluating Decisions, Linear Programming in Farm Planning, Investment Analysis Techniques, Business Forecasting Techniques, Farm Stead Planning/Scope,	**2**

	Economic of Farm Buildings.	
AEM 444	**EXTENSION ADMINISTRATION AND OPERATION** Organization Chart of Extension Administration, Differences between Supervision and Administration in Extension, Management in Extension Administration, Tasks of Extension Administrator, Personnel Requirements/Training Needs in Extension Execution, Procedures for Accurate Reporting	**2**
AEM 446	**RURAL SOCIOLOGY** History of Sociology, Social System, Cultural Patterns, Institutional Arrangement of Rural Communities, Types of Change, Role of Modern Technology, Religion and Education, Importance of Religion and Education, Influence of Religion and Education on Agriculture, Headship Structure in Rural Life, Personality, Power Structure, Authority and Descent in Rural Communities, Factors Inhibiting Development Capabilities of Rural People	**2**
CPT 441	**POST-HARVEST MANAGEMENT** ***Refer to Engineering Curriculum***	**3**

DEPARTMENT OF AGRICULTURAL TECHNOLOGY

CURRICULUM

DEPARTMENT OF AGRICULTURAL TECHNOLOGY

NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

1ST SEMESTER ND 1

COURSE CODE	COURSE TITLE	THEORY HOURS/WK	PRACTICAL HOURS/WK	TOTAL HOURS/ WK	UNITS
AGT 101	Principles of Crop Production	1	3	4	2
AGT 113	Farm Practice I	0	4	4	2
AGT 115	Elements of Agricultural Economics	2	0	0	2
STB 111	Cell Biology	2	3	5	3
BPH 111	Mechanics & Properties of matter & Heat Energy	1	3	4	3
GNS 101	Use of English	2	0	2	2
STB 112	Morphology and Physiology of Living Things	2	3	5	3
BCH 111	General and Physical Chemistry	1	3	4	3
STA 111	Introductory Statistics	2	0	2	2
MTH 111	Logic and Linear Algebra	2	0	2	2
COM 101	Introduction to Computer Science	2	1	3	2
	TOTAL				**26**

2ND SEMESTER ND I

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
AGT 102	Annual Crops	1	1	3	2
AGT 104	Crop Protection	1	1	3	2
AGT 106	Basic Principles in Land Surveying	1	1	3	2
AGT 110	Introduction to Forestry	2	0	2	2
STB 121	Plant and Animal Taxonomy	2	2	3	3
GNS 102	Use of English II	1	0	1	1
BCH 121	Organic and Inorganic Chemistry	1	3	4	3
BPH 121	Optics, Waves, Electricity and Magnetism	1	3	4	3
AGT 124	Rural Sociology	2	0	2	2
GNS 128	Citizenship Education	3	0	3	2
EED 126	Introduction to Entrepreneurship	3	0	3	2
	TOTAL				**24**

NATIONAL DIPLOMA IN AGRICULTURAL TECHNOLOGY

1ST SEMESTER ND II

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
AGT 201	Tree Crops	1	3	4	2
GNS 201	Use of English	2	0	2	2
AGT 205	Soil Fertility and Crop Nutrition	2	3	5	3
AGT 207	Basic Workshop Practice	1	3	4	2
AGT 209	Pedology and Soil Survey	1	3	4	2
AGT 211	Farm Practice II	0	6	6	2
AGT 212	Agro-climatology	2	0	2	1
TSL 201/ SUG	Basic Principles of Land Surveying II	2	3	5	3
AGT 215	Soil and Water Management	1	3	4	2
PTD 111	Technical Drawing	1	3	4	2
FIT 111	Basic Fisheries Technology I	1	3	4	2
EED 201	Practice of Entrepreneurship	1	3	4	2
	TOTAL				**25**

2ND SEMESTER ND II

AGT 202	Crop Processing and Storage	1	3	4	2
AGT 204	Introduction to Animal Health	1	3	4	2
AGT 208	Poultry Production	1	3	4	2
AGT 210	Farm Power and Mechanization	2	3	5	3
AGT 212	Genetics and Breeding	1	3	4	2
AGT 214	Beef and Dairy Cattle Production	1	3	4	2
AGT 216	Horticultural Crop Production	1	3	4	2
FIT 227	Basic Fisheries Technology II	2	2	4	2
AGT 220	Agric. Extension & Rural Development	3	0	3	2
AGT 221	Animal Nutrition	2	1	3	2
AGT 230	Farm Management	2	0	2	1
AGT 232	Field Experimentation and Data Analysis	2	0	2	2
AGT 226	Final Year Project				
	TOTAL				**28**

COURSE SYNOPSIS: ND AGRICULTURAL TECHNOLOGY

GNS 101: Use of English (2 Units)

Definition of Language, Functions and Characteristics of Language, Grammar and Parts of Speech, Sentences and Clauses, Idioms and Punctuations, Essays Writing, Summary, Literature in English, Drama and Prose.

TSL 101: **Basic Principles in Land Surveying I (2 Units)**

Basic Principles and Scope of Surveying, Linear Measurements, Angular Measurement, Chain Survey, Plane Tabling, Interpretation of Maps, Layout and Engineering Surveys.

TSL 102: **Basic Principles in Land Surveying II** (**3 Units)**

Optical Distance Measurement, Compass Survey, Theodolite Traversing, Minor Triangulation, Tertiary Leveling, Contoured Plans.

FOW 101: Introduction to Forestry (2 Units)

Benefits of Forestry and National Economy, Forestry Organization in Nigeria, Forestry and Land Use, Forestry Equipment, Wildlife as a Natural Resource.

AGT 101: **Principles of Crop Production (3 Units)**

Concepts of Crop Production, Cropping Systems, Tillage Practices, Propagation Methods, Weed Control, Principles and practices of manuring, Crop Protection, Harvesting Practices, Labeling, Farm Records, Product Handling, Harvesting, Processing and Storage of Produce.

AGT 111: **Principles of Animal Production** (**3 Units)**

Classification of livestock animals, Management of animal production, Classification of feedstuffs, Ruminant animals: Cattle, Breeding and Reproduction in cattle, Management of beef and dairy cattle, Sheep and goat. Non-ruminant/monogastric animals:

Breeding and reproduction in Swine, Poultry breeds and types of poultry, Management of layers and broilers, Rabbit and cane rat (grasscutter) care and management, Livestock diseases and parasites.

AGT 113: **Elements of Agricultural Economics** (**2 Units)**

Agricultural Economics Concepts, Demand and Supply, Determination of Market Price, Principles and Application of Elasticity, Concept of Production Function, Types of Costs and Revenues, Market and Buyers Responses, Macroeconomic Policy and Goals, Principles of Farm Management, Problems of Agricultural Marketing and Agricultural Development.

STA 111: **Introductory Statistics** (**2 Units)**

Definition of Experiment, Replication, Randomization, Population, Treatment etc, Techniques for Data Collection, Observation, Interview, Questionnaire, Report, Charts, Graph, Measures of control tendency, Mean, Median, Mode, Variance, Measure of central tendency and variability probability.

STB 111: **Cell Biology (3 Units)**

The Living Cell, Introduction to Cell Division, Composition of the Cytoplasm of Nucleus, Cell Differentiation, Animal and Plant Tissue, Photosynthesis, Respiration, Transpiration, Translocation in Plants, Absorption in Plants, Water Absorption, Growth, Movement of plants.

BCH 111: **General and Physical Chemistry** (**3 Units)**

Atoms, Molecules, Chemical Bonding, States of Matter, Chemical Equilibrium, Acids, Bases and Salts, Fundamental Concepts of Oxidation Reduction Reactions, Kinetic Molecular Theory of Gases, Chemical Thermodynamics, Physical Chemistry of Solutions, Colligatives Properties of Solutions, Surface Phenomena and Colloidal Systems, Electrochemistry.

MTH 111: Logic and Linear Algebra (**3 Units)**

Definition of Logic and Analysis involving Truth Table, Reasoning and Argumentation, Premises and Conclusion, Symbols for Disjunction, Negation, Conditional and Implicational Statements, Permutation and Combination, Stirring Formula, Probability, Binomial Distribution, Matrices and Determinants.

AGT 112: Elements of Agricultural Economics (2 Units)

Definition of economics, Farm Record, Production Problems of Economics, Demand and Supply, Determination of Market Price, Market: Types and Functions, Inflation and Deflation.

STB 112: Morphology and Physiology of Living Things (3 Units)

Morphology and Lifecycles of Plants, Morphology and Lifecycles of Invertebrates, Morphology, Evolutionary Relationship and Economic Importance of Vertebrates, Morphology and Physiology of various Organs and Systems in Animals.

AGT 113: Farm Practice 2 Units

Cultivation and Maintenance of Vegetables, Weed and Pest Management, Fertilizers, Herbicides and Insecticides, Farm Records, Lettering Design and Teaching Aids, Cropping Calendar, Poultry Brooding and Rearing, Management of Laying Stock.

AGT 121: Annual Crops (2 Units)

Classification, Identification and Botany of some Annual Crops, Nomenclature and Classification of Crop Plants, Origin and Geographical Distribution of Crops, Annual Crop Cultivars/Varieties, Factors Affecting Crop Production, Ecological Requirements of Annual Crops, Crop Production Practices, Crop Management, Weeds and Insect Pests, Harvesting Procedures, Handling, Processing and Storage Pasture, Forage Agronomy.

BCH 121: Organic and Inorganic Chemistry (2 Units)

Periodic Table, Chemistry of the main group elements, Chemistry of Aromatic Compounds, Properties of Carbohydrates, Animal Acids and Proteins. Properties of Lipids.

BPH 121: Optics, Waves, Electricity and Magnetism (2 Units)

Reflection and Refraction at Plane Surfaces, Reflection and Refraction at Curved Surfaces, Optical Instruments and Human Eye, Photometry, Waves, Optics, and Sound Waves, Electrostatics, Capacitors, Direct Current, Chemical Effects of Electric Current, Magnetism.

AGT 122: Crop Protection (2 Units)

Basic Principles of Plant Diseases, Insect Pests, Weeds, Nematode Infections and Control, Vertebrate Pests, Comparisons of Diseases and Pest Control Method, Principles of Crop Pest Management.

CME 122: Basic Workshop Practice (2 Units)

Safety in Workshop, Hand Tools, Measuring and Marketing Instruments, Drilling Machine, Lathe Machine, Shaping Machine, Milling Machine, Grinding Machine, Cutting Machine, Cutting Tools, Soldering, Brazing, Welding.

AGT 123: Sheep, Goats and Swine Production (3 Units)

History and Development of Sheep, Goat and Swine Industry, Taxonomy, Breeds and Terminologies used in production. Sheep, Goat and Swine Distribution, System of Production, Breeding System and Improvement, Sheep, Goat and Swine Nutrition, Health Problems of Sheep, Goat and Swine, their Prevention and Control, Management Practices in Livestock Farm, Livestock Processing, Livestock Farm Records, Housing for Sheep, Goat and Swine.

AGT 124: Rural Sociology (3 Units)

Definition of Rural Sociology, Sociological Concepts, Elements of Social Systems, Rural and Urban Differences, Rural and Social values and Norms, Nigeria Rural Institutions, Agents of Social Changes in Nigeria, Barriers to Changes.

AGT 211: Pedology and Soil Survey (2 Units)

Basic principles of soil survey and classification, Factors and processes of soil formation, Parent materials of Soils, Physical characteristics of soils, Chemical Properties of Soil, Profile Description.

AGT 212: Agro climatology (2 Units)

Definition and Concepts in Weather and Climate, Weather Climatic Instruments, Factors Influencing Climate, Role of Temperature in Weather Conditions, Pressure Pattern and Winds, Locations of Ocean Currents, Causes of Rainfall and Aridity, Agro climatic Regions of Nigeria and West Africa.

AGT 213: Farm Practice II (2 Units)

Farm Tools Identification, Source of Planting Materials, Selecting Land/Soil for Cropping, Nursery Practices, Planting and Cultural Operations, Plant Diseases and their Control, Farm Mensuration and Surveying, Slaughter Practices, Fish Farming, Fishing Gears and Traps.

AGT 214: Tree Crops (3 Units)

Types of Economic Tree Crops, Origin and History of Tree Crops, Tree Crops Production Areas, Botany of Tree Crops in Nigeria, Nursery Operations, Regeneration Methods - Natural and Artificial.

AGT 215: **Soil Fertility and Crop Nutrition** (**3 Units)**

Basic Nature of Soils, Concept of Plant/Crop Nutrition, Soil Characteristics Affecting Plant Growth, Soil Depth, Texture and Structure, Influence of Soil Acidity on Soil Nutrient Availability, Importance of Soil Acidity on Soil Nutrient Availability, Importance of Soil Moisture, Soil Organic Matter, Soil Organisms Impact on Soils, Fertilizers.

AGT 216: **Soil Water Management** (**2 Units)**

Soil Conservation, Wind Erosion, Erosion by Water, Principles of Erosion Control, Principles of Water Conservation, Principles of Farm Water Supply, Principles of Irrigation Systems, Irrigation Equipment, Hydrological Cycle, Field Drainage System, Operation of Field Drainage Machinery.

AGT 221: Animal Nutrition (2 Units)

Livestock Population and Factors of Production, Differences between Ruminants and Non-ruminants, Livestock feed and their properties, Chemical Composition and Biological Functions of Feed, Nutrient Requirements of farm Animals, Feed Formulation, Feed Quality and Nutritive Value of Feeds, Pasture and Range Management, Feed Additives.

AGT 222: Poultry Production (**2 Units)**

Breeds of Poultry, Poultry Keeping in the Economy, Types of Poultry Enterprise, Principles of Commercial Poultry Production,

Poultry Housing and Construction, Health Management Procedure in Poultry, Disease Situation in Poultry, Prophylactic Measures and Vaccination in Poultry. Medication of Birds, Egg Grading, Dressing Chicken, Poultry Product Marketing, Record Keeping.

AGT 223: Farm Power Mechanization (3 Units)

Farm Energy Sources, Farm Engines, Tractors and System, Construction and Operation of Planting and Transplanting Machinery, Construction and Operation of Machines for Fertilizer and Manure Application, Construction and Operation of Harvesting Equipment, Processing and Storage, Electricity Generation and Distribution, Role of Electricity on the farm.

AGT 224: Genetics and Breeding (2 Units)

Introduction to Genetics and Breeding, Mendelian Theory, Epistatis, Principles of Reproduction, Hormones in Reproduction. Principle of Selection, Methods of Breeding.

AGT 225: Beef and Dairy Cattle Production (2 Units)

History and Development of Beef and Dairy Industry in Nigeria, Taxonomy of Beef and Dairy Cattle, Breeds of Beef and Dairy, Factors Considered in Cattle Production, Selection Methods, Cattle Breeding, Housing and Equipment in Beef and Dairy Farm, Feeds and Feeding of Cattle, Management of Beef and Dairy Animals, Milking and Milk Handling, Diseases and Parasites of Beef and Dairy Animals, Record Keeping, Marketing and Dairy Products.

AET 225: Crop Processing and Storage (2 Units)

Properties of Biological Materials, Platform Scale, Porosity, Cleaning, Sorting and Grading, Washing and Screening Methods, Cribs, Silo, Rhombus etc.

AGT 226: Horticulture (2 Units)

Importance of Horticulture, Horticultural Plants, Methods of Propagating Horticultural Plants, Soil Sterilization, Orchard Practices, Fruit Cultivation, Ornamental Horticulture, Cultivation of Local Vegetables, Establishing a Vegetable Garden.

AGT 227: **Basic Fisheries Technology** (**2 Units)**

History and Development of Fisheries in Nigeria, Fish Production in Inland Waters, Roles of various sectors in Fisheries Exploration, Relationship Between Hydrography and Fisheries, Establishment of Fish Farm, Construction Procedures of Pond, Culture of Brackish and Freshwater Fish, Fish Harvesting in Ponds, Types of Fishing Craft, Fish Preservation, Processing and Distribution Methods.

AGT 228: Introduction to Animal Health (2 Units)

Classification of Animal Diseases, Identification of Sick and Healthy Animals, Postmortem Examination, Disease caused by Bacteria, Viruses, Protozoa and Nutritional Factors, Lifecycle of Helminths and Ectoparasites, Prevention and Control of Diseases, Role of Veterinary.

AGT 229: Farm Management (2 Units)

Nature and Scope of Farm Management, Farm Management Terminologies and Concept, Farm Management Problems, Production and Cost Functions, Diminishing Returns and Opportunity Cost, Stage of Production, Deciding Levels of Outputs and Inputs, Farm Records, Whole Farm Records, Farm Transactions, Financial Report Preparation, Farm Planning, Evaluation Measures of Efficiency and Size, Evaluation Measures of Efficiency and Size, Measures of Financial Success, Agricultural Resource Use/Management.

AGT 230: **Agricultural Extension and Rural Development** (**2 Units)**

History of Agricultural Extension, Role of Communication in Extension**,** Audiovisual Aids and ICT in Extension, Teaching Situation for Adult Leaders, Roles of Local Leaders, Extension Administration, Roles of Research Institute as Sources of Proven Technologies

AGT 232: Statistics and Field Experiment (**2 Units)**

Statistics and Field Experimentation, Design and Analysis of Experiments, Principles of Field Experimentation, Layout of Research Experiments, Visual Presentation of Data, Frequency Distribution, Characteristics of Distribution

AGT 227: Project (6 Units)

Final year practical project assigned to each student under the supervision of member(s) of staff. Project report must be submitted and oral examination must be conducted.

DEPARTMENT OF ANIMAL HEALTH AND PRODUCTION TECHNOLOGY

NATIONAL DIPLOMA (ND), ANIMAL HEALTH & PRODUCTION TECHNOLOGY

1ST SEMESTER YEAR 1

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
PTD 111	Technical Drawing	1	3	4	2
STB 111	Cell Biology	2	3	5	3
BCH 111	General and Physical Chemistry	2	3	5	3
MTH 111	Logic and Linear Algebra	2	0	2	2
AHP 111	Anatomy and Physiology of Farm Animals I	1	3	4	2
AGT 112	Elements of Agricultural Economics	1	0	1	1
CME 122	Basic Workshop Practice	1	3	4	2
AGT 212	Agro-Climatology	1	0	1	1
GNS 101	Use of English	2	0	2	2
EEP 127	Skill Acquisition I	0	3	3	1
EED 101	Introduction to Entrepreneurship	2	0	2	2
BHP 111	Mechanics& Properties of Matter & Heat Energy	2	3	5	3
	TOTAL				**24**

2ND SEMESTER YEAR 1

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOUR/WK	TOTAL HOURS /WK	UNITS
AGT 121	Animal Nutrition	1	3	4	2
AGT 124	Genetics and Breeding	2	0	2	2
AHP 121	Principles of Pasture & Range Management	1	3	4	2
AHP 122	Animal Parasitology	1	3	4	2
AHP 123	Anatomy and Physiology of Farm Animals II	1	3	4	2
AHP 124	Introductory Veterinary Microbiology	2	3	5	3
AHP 125	Introduction to Animal Husbandry	1	3	4	2
BCH 121	Organic & Inorganic Chemistry	2	3	5	3
AGT 124	Rural Sociology	2	0	2	2
COM 121	Introduction to Computing	2	3	5	3
EED 126	Introduction to Entrepreneurship	2	0	2	1
EEP 128	Skill Acquisition II	0	3	3	1
	TOTAL				**25**

Supervised Industrial Work Experience (3-4 Months)

NATIONAL DIPLOMA, ANIMAL HEALTH AND PRODUCTION TECHNOLOGY

1ST SEMESTER YEAR II

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
AHP 211	Sheep and Goat Production	1	3	4	2
AHP 212	Swine Production	1	3	4	2
AHP 213	Pathology	1	3	4	2
AHP 214	Pharmacology and Therapeutics	2	0	2	2
AHP 215	Animal Diseases I	1	3	4	2
AHP 216	Clinical Techniques I	2	3	5	3
AHP 217	Principles of Pasture & Range Management II	1	3	4	2
AHP 218	Rabbit and Equine Production	1	3	4	2
AGT 231	Statistics & Field Experimentation	2	0	2	2
AGT 225	Beef and Dairy Production	2	3	5	3
EED 216	Practice of Entrepreneurship	2	0	2	1
EEP 217	Skill Acquisition III	0	3	3	1
	TOTAL				**24**

2ND SEMESTER YEAR II

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOUR/WK	TOTAL HOURS /WK	UNITS
AGT 222	Poultry Production	1	3	4	2
AGT 229	Farm Management	1	0	1	1
AHP 121	Agricultural Extension	2	0	2	2
AHP 221	Introduction to Mini-Livestock Production	1	3	4	2
AHP 222	Animal Products Hygiene & Inspection	2	3	5	3
AHP 223	Animal Diseases II	2	3	5	3
AHP 224	Clinical Techniques II	2	3	5	2
GNS 201	Use of English II	2	0	2	2
EEP 218	Skill Acquisition IV	0	3	3	1
AHP 299	Final Year Project	0	0	0	6
	TOTAL				**24**

HIGHER NATIONAL DIPLOMA, ANIMAL PRODUCTION TECHNOLOGY

1ST SEMESTER YEAR I

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
STC 222	Introductory Biochemistry	2	3	5	3
APT 301	Introductory Veterinary Microbiology	2	3	5	3
AGR 312	Annual Crops	1	3	4	2
APT 311	Animal Farm Mechanization	1	3	4	2
APT 312	Genetics and Animal Breeding	2	-	2	2
APT 313	Animal Anatomy	1	3	4	2
APT 314	Animal Physiology	2	3	5	3
APT 315	Livestock Farm Practice I	-	6	6	3
GNS 301	Use of English III	2	-	2	2
AEM 314	Extension Methods	6	-	6	3
EED 301	Entrepreneurship Development I	0	3	3	1
	TOTAL				**26**

2ND SEMESTER YEAR I

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
APT 320	Agricultural Biochemistry	2	-	2	2
AGR 302	Field Experimentation and Data Analysis	5	0	5	3
APT 321	Livestock Farm Practice II	-	4	4	2
APT 322	Animal Nutrition	2	3	5	3
APT 323	Sheep and Goat Production	1	3	4	2
APT 324	Mini-Livestock Production	1	3	4	2
GNS 302	Communication in English III	2	-	2	2
AEM 446	Rural Sociology	2	-	2	2
EED 302	Entrepreneurship Development II	2	1	3	1
	TOTAL				**19**

1ST SEMESTER YEAR II

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS/ WK	TOTAL HOURS / WK	UNITS
APT 431	Farm Animal Parasitology	2	3	5	3
APT 432	Pasture and Range Management	1	3	4	2
APT 433	Poultry Production	2	3	5	3
APT 434	Swine Production	2	3	5	3
APT 435	Hide and Skin Improvement	1	3	4	2
FIT 435	Fish Farm Engineering and Management II	2	3	5	3
GNS 401	Advance Communication in English	2	0	2	2
AEM 431	Agricultural Business Law	2	0	2	2
AGR 402	Agricultural Personnel Management	2	0	2	2
EED 411	Entrepreneurship Development III	2	1	3	1
AGR 303	Farm Management	2	0	2	1
COM 311	Computer Appreciation and Application	1	2	3	1
	TOTAL				**25**

2ND SEMESTER YEAR II

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS/ WK	TOTAL HOURS / WK	UNITS
APT 441	Applied Animal Nutrition	2	3	5	3
APT442	Beef Cattle Production	2	3	5	3
APT 443	Farm Animal Diseases	1	3	4	2
APT 444	Animal Product Processing and Hygiene	2	3	5	3
APT 445	Dairy Cattle Production	2	3	5	3
APT 450	Seminar	0	0	0	2
ANH 405	Livestock Bio-security	2	0	2	3
EED 416	Entrepreneurship Development	1	3	4	2
APT 446	Final Year Project	0	0	0	6
	TOTAL				**27**

HIGHER NATIONAL DIPLOMA, ANIMAL HEALTH TECHNOLOGY

1ST SEMESTER YEAR I

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS / WK	TOTAL HOURS / WK	UNITS
STC 222	Introductory Biochemistry	2	3	5	3
APT 312	Genetics and Animal Breeding	2	0	2	2
ANH 311	Gross Anatomy	1	3	4	2
ANH 312	Veterinary Microbiology	2	3	5	3
ANH 313	Veterinary Physiology	1	3	4	2
APT 443	Farm Animal Diseases	2	3	5	3
GNS 301	Use of English	2	0	2	3
AEM 314	Extension Methods	2	3	5	3
EED 301	Entrepreneurship Development I	0	3	3	1
COM 301	Computer Appreciation and Application	2	1	3	2
	TOTAL				**24**

2ND SEMESTER YEAR I

COURSE CODE	COURSE TITLE	LECTURE HOURS/ WK	PRACTICAL HOURS/ WK	TOTAL HOURS / WK	UNITS
ANH 321	Histology and Embryology	1	3	4	2
ANH 322	General Pathology	2	3	5	3
APT 431	Farm Animal Parasitology	2	3	5	3
APT 322	Agricultural Biochemistry	2	0	2	2
APT 441	Applied Animal Nutrition (Feed and Feeding	2	3	5	3
AEM 446	Rural Sociology	2	0	2	2
GNS 302	Communication in English	2	0	2	2
AGR 302	Field Experimentation and Data Analysis	2	3	5	3
EED 302	Entrepreneurship Development II	2	1	3	1
	TOTAL				**21**

1ST SEMESTER YEAR II

COURSE CODE	COURSE TITLE	LECTURE HOURS	PRACTICAL HOURS	TOTAL HOURS /WK	UNITS
ANH 431	Poultry Diseases	1	3	4	2
ANH 432	Clinical Techniques I	2	4	6	4
ANH 433	Veterinary Parasitology	1	3	4	2
ANH 434	Pharmacology and Therapeutics I	2	0	2	2
APT 435	Systemic Pathology	2	3	5	3
ANH 436	General Livestock Production	2	4	6	4
AGR 303	Farm Management	2	0	2	2
APT 433	Pasture and Range Management	1	3	4	2
GNS 401	Advanced Communication in English	2	0	2	2
AEM 432	Agricultural Business Law	2	0	2	2
EED 401	Entrepreneurship Development III	2	1	3	1
AGR 402	Agricultural Personnel Management	2	0	2	2
	TOTAL				**28**

2ND SEMESTER YEAR II

COURSE CODE	COURSE TITLE	LECTURE HOURS	PRACTICAL HOURS	TOTAL HOURS /WK	UNITS
ANH 431	Toxicology	1	3	4	2
ANH 432	Clinical Techniques II	2	3	5	3
ANH 433	Pharmacology and Therapeutics II	2	1	3	2
ANH 434	Veterinary Jurisprudence	1	0	1	1
APT 435	Animal Products Processing and Hygiene	2	3	5	3
ANH 436	Relevant Computer Packages	2	3	5	3
ANH 433	Seminar	0	0	0	2
GNS 401	Livestock Bio-security	2	3	5	3
EED 402	Entrepreneurship Development IV	2	1	3	1
ANH 446	Final Year Project	0	0	0	6
	TOTAL				**26**

COURSE SYNOPSIS: ND

ANIMAL HEALTH AND PRODUCTION TECHNOLOGY

APH 111: Anatomy and Physiology of Farm Animals (2 Units)

Regions of the animal body; structure and functions of the animal cell; structure and functions of the various types of tissues; importance of haemopoiesis and blood clotting; general osteology of the bovine and comparative osteology of other domestic animals and

the avian; major muscles that aid locomotion and give shape to the body; structure and functions of mammary gland; anatomy of the hoof and foot; spleen, liver and their functions.

APH 121: **Principles of Pasture and Range Management** (**3 Units)**

Terms in pasture and range management; ecological zones of Nigeria; botany and role of pasture plants; establishment of pasture, range and grazing reserves.

APH 122: **Animal Parasitology** (**2 Units)**

General classification of the animal kingdom; scope of parasitology; diagnostic features of phyla of invertebrates: protozoa, platyhelminthes, coelenterate, nematode, arthropoda, mollusca, annelid; common nematodes in Nigeria; common cestodes in Nigeria; common trematodes in Nigeria; coccidia found in poultry and other animals; various species of babesia, anaplasma and pathogenic trypanosomes; drugs and chemicals for the control of nematodes, trematodes and cestodes; types of insects which are of veterinary importance; distinguishing characteristics and major classes of vertebrates.

APH 123: Anatomy and Physiology of Farm Animals II (2 Units)

Different parts and functions of the digestive system; different parts of the respiratory system; components of the lymphatic system of

mammals and avian; components and functions of the circulatory system of mammals and avians; components and functions of the urinary system; structure and functions of the sensory system; role of the central nervous system; location of the endocrine glands and their functions; structure and functions of the male and female reproductive organs of mammals and avians.

APH 124: **Introductory Veterinary Microbiology** (**3 Units)**

History and scope of microbiology; microscopic examination of microorganisms; systematic microbiology; effects of environmental factors on the growth of microorganisms; isolation, cultivation and preservation of different microorganisms; methods of controlling microorganisms; concept of immunity; vaccines and biological; microorganisms of veterinary importance.

APH 125: Introduction to Animal Husbandry (2 Units)

Handling and restraining animals; care and management of sick animals; basic health management of animals; methods of drug administration; basic veterinary/surgical procedures; different species of animals; routine management operations on a farm; brooding and rearing of chicks; farm management systems and keeping farm records.

APH 211: Sheep and Goats Production (**2 Units)**

History and development of sheep and goat industry in Nigeria; Taxonomy of sheep and goats; distribution of sheep and goat in Nigeria; methods of sheep and goats production in Nigeria; selection

and selection methods; nutrition of sheep and goats; common diseases and parasites of sheep and goats, their prevention and control; management practices in sheep and goat farming; housing for sheep and goats; production records kept in sheep and goat farms.

APH 212: Swine Production (2 Units)

History and development of swine industry in Nigeria; taxonomy of swine; distribution of swine in Nigeria; methods of swine production; selection and selection methods involved in swine production; nutrition of swine; common nutritional disorders in swine, their prevention and control; management practices in swine farming; types of housing for swine production; production records kept in swine farms.

APH 213: Pathology (2 Units)

The concept of pathology and diseases; disturbances in metabolism due to disease; disturbances in blood circulation due to disease; inflammation, wound healing and healing of fracture; disturbances in alimentary system due to disease in animals; disturbances of respiratory system due to disease in animals; disturbances of cardiovascular, urinary, musculoskeletal and reproductive systems in animals due to diseases; blood count and structure in disease condition in animals.

APH 214: Pharmacology and Therapeutics (2 Units)

Terms used in pharmacology and common sources and classification of drugs; different dosage forms and their routes of administrations; absorption, distribution, metabolism and elimination in drugs; peculiarities of drug action and interaction; chemotherapeutic drugs and their uses; use of antihelminthes; place and role of fluid therapy in veterinary practice; common antiprotozoan drugs.

APH 215: Animal Diseases I (2 Units)

Animal diseases and their economic effects on the livestock industry; characteristic features of sick animals; systematic examination of animals for sickness ; common poison conditions and injuries in livestock; important ailments peculiar to the young in animals.

APH 216: Clinical Techniques (3 Units)

Client reception at veterinary clinics; setup of a veterinary clinic; techniques of handling animals for treatment; preliminary examination of sick animals in a veterinary clinic; collection of laboratory specimens/samples from sick animals; sterilization of instruments and other materials.

APH 217: Principles of Pasture and Range Management II (2 units)

Systems of grazing; management of pasture, range and grazing reserves; improvement of pasture, range and grazing reserves; pasture conservation and storage; fodder bank.

APH 218: Rabbit and Equine Production (2Units)

Development of rabbit and equine industry; classification of rabbits into breeds and types; system of breeding rabbits; rabbit housing and equipment; rabbit management and nutrition; common diseases of rabbits and their control; different breeds of equine; breeding and selection in the equine; housing and equipment for equine; management and feeding of equine; equine diseases and their control measures.

APH 221: Introduction to Mini-Livestock Production (2 Units)

History and development of mini-livestock industry in Nigeria; Biology of mini-livestocks; distribution of mini-livestock in Nigeria; methods of mini-livestock farming; nutrition of mini-livestock; health problems of mini-livestock and control; types of housing for mini-livestock; record keeping in mini-livestock farms.

APH Animal Products Hygiene and Inspection(3 Units)

Terminologies used in animal products inspection; handling of animals before slaughter; Methods of slaughtering animals; Abattoir inspection and hygienic judgment of meat; Meat-borne diseases;

meat transportation and preservation; Fish inspection; Egg inspection; Milk inspection.

AHP 223: Animal Diseases II (3 Units)

Viral diseases of domestic animals; bacteria diseases of domestic animals; diseases of Mycoplama infections; fungal diseases of animals; Poultry diseases; Protozoan and rickettia diseases; helminth diseases of economic importance; reproductive problems of animals; shock in domestic animals; diseases control procedures.

AHP224: Clinical Techniques II (3 Units)

Dosage calculation and preparation; Preparation for surgery; wounds, burns and fractures; surgical conditions.

DEPARTMENT OF CROP PRODUCTION TECHNOLOGY

HIGHER NATIONAL DIPLOMA IN CROP PRODUCTION TECHNOLOGY

1ST SEMESTER HND I

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
CPT 301	Crop Production I: Roots, Tubers and Fibres	1	3	4	2
CPT 303	Crop Physiology	2	3	5	3
CPT 305	Agro-Climatology	1	3	4	2
CPT 307	Cropping Systems	1	3	4	2
CPT 309	Agricultural Entomology	1	3	4	2
CPT 311	Pedology and Soil Survey	2	3	5	3
CPT 315	Crop Farm Practice I	0	4	4	2
CPT 317	Agricultural Biochemistry	2	0	2	2
GNS 301	Use of English	2	0	2	2
EED 301	Entrepreneurship I	2	0	2	2
	TOTAL				**22**

2ND SEMESTER HND I

CPT 302	Crop Production II: Cereals, Legumes, Oil crops	2	3	5	3
CPT 304	Plant Pathology	1	3	4	2
CPT 306	Field Experimentation and Data Analysis I	4	0	4	2
CPT 308	Farm Management	2	0	2	2
CPT 310	Principles of Genetics	2	0	2	2
CPT 312	Crop Farm Practice II	0	4	4	2
AEM 316	Extension Methods	2	0	2	2
CPT 318	Weed Management I	1	3	4	2
EED 302	Entrepreneurship II	2	0	2	2
GNS 302	Communication in English	2	0	2	2
COM 302	Computer Programming	1	3	4	2
	TOTAL				**23**

HIGHER NATIONAL DIPLOMA IN CROP PRODUCTION TECHNOLOGY

1ST SEMESTER HND II

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
CPT 401	Irrigation Technology	1	3	4	2
CPT 403	Crop Production III: Permanent Crops	2	3	5	3
CPT 405	Weed Management II	1	3	4	2
CPT 407	Plant Breeding	4	0	4	2
CPT 409	Horticulture	2	3	5	3
CPT 411	Crop Farm Practice III	0	6	6	3
CPT 413	Crop Farm Mechanization	1	3	4	2
AEM 415	Agricultural Personnel Management	2	3	5	3
EED 401	Entrepreneurship III	2	0	2	2
CPT 417	Field Experimentation and Data Analysis II	4	0	4	2
	TOTAL				**24**

2ND SEMESTER HND II

COURSE CODE	COURSE TITLE	THEORY HOURS/ WK	PRACTICAL HOURS/WK	TOTAL HOURS /WK	UNITS
CPT 420	Rural Sociology	2	0	2	2
CPT 402	Produce/Post Harvest Management	2	3	5	3
CPT 404	Ornamental Horticulture and Landscape Design	2	3	5	3
CPT 406	Pasture Agronomy	1	3	4	2
CPT 408	Seed Production and Pathology	2	3	5	3
CPT 410	Soil Fertility and Crop Nutrition	1	3	4	2
CPT 412	Drainage Technology	1	3	4	2
CPT 418	Seminar	0	0	0	2
EED 402	Entrepreneurship IV	1	3	4	2
CPT 446	Final Year Project	2	2	2	6
	TOTAL				**27**

COURSE SYNOPSIS: HND

CROP PRODUCTION TECHNOLOGY

CPT 311: **Crop Productions 1: Roots, Tubers and Fibres (2 Units)**

Classification of roots, tubers, fibres and others, origin and geographical distribution roots, tubers, fibres, and others, crop botany, botanical names structures and forms of crop, ecological requirements of roots, tubers and fibres, crops agro techniques, field crop management, pests and diseases of root, tuber, fibre crops. harvesting, handling, processing and storage of root, tuber, fibre crops.

CPT 312: Crop Physiology (3 Units)

Plant anatomy and structural organization, photosynthesis and the synthesis of carbohydrate, proteins, vitamins and oils. C_4 photosynthesis, C_3 photosynthesis, Calvin cycle, glycolate pathway, importance of plant water relationship, process of respiration (aerobic and anaerobic respiration), important of respiration in plant growth and food storage, plant growth and development, growth and differentiation, yield potentials of crops.

CPT 313: Agro climatology (2 Units)

Components of a meteorological station, climate and climatic elements, importance of climatic elements, microclimate, solar, Use of radiant energy, radiation and heat energy, radiation balance, energy budget concept, characteristics of tropical climate.

CPT 314 Cropping Systems (2 Units)

Concept of cropping system in humid and sub-humid tropics, cropping system components, characteristics of cropping system, types of cropping systems, advantages and disadvantages of various cropping patterns, relay cropping , double cropping, phased cropping, row cropping, Taungya system, alley cropping, principles guiding inter cropping, tillage practices in cropping systems.

CTB 315: Agricultural Entomology (3 Units)

Economic importance of insect pests, biology of pest, biological cycle of pests of economic importance, general principle of cropping pests of field crops, principles and application of various methods adopted in the control pests in the form; cultural, biological, chemical, etc. Principles of chemical pest control, method used in controlling pests of stored products, legislative, physical/mechanical control, principles and applications integrated control and pest management.

CPT 316: Pedology and Soil Survey (3 Units)

Process of soil formation, concept of soil formation, texture and importance physical property, soil structure and soil management, important of soil surveying in agriculture, soil classification, concept of land evaluation.

CPT 317: Crop Farm Practice 1 (3 Units)

Farm Establishment and Maintenance, reconnaissance survey, cropping history, preparation of farm by ploughing, harrowing rotating and ridging, weeding operation, fertilizer application, fertilizer rate and mix in preparation for application, seed drilling, broadcasting, and trans planting, application of chemical, herbicides, pesticides, fungicides, etc on farm.

CPT 318: Agricultural Biochemistry (2 Units)

Relevance of biochemistry in agriculture, principles of energy conservation in a biological system, plant respiratory processes, photosynthesis and the major biochemical processes involved, nitrogen metabolism, nitrogen absorption in plant and transformation, polymer and macromolecules synthesis, monosaccharides, lipids, chlorophyl, isopyrenoids, phenol and aromatic compounds.

GNS 301: Use of English (2 Units)

Grammatical rank scale, comprehensive and summary writing, essay- Descriptive, narrative and argumentative, expository, literature in English, register for science technology, theory of group dynamics, mental demonstration, concept of leadership system.

AGR 302: Field Experimentation and Data Analysis (2 Units)

Duncan Multiple Range Test, Nature of statistics and field experimentation, experiment and research, experimental design,

types of experiments, control of variability in field experiment, experimental error and how to manage experiments, data organization, correlation and regression, LSD.

AGR 303: Farm Management (2 Units)

Meaning and scope of farm management, principles of farm management, nature of production resources in agriculture, theory of production, meaning of risk and uncertainty, meaning of farm records, sensitive analysis, farm budgeting, valuation and depreciation of farm inventory, farm business analysis and appraisal.

CPT 321: Principles of Genetics (2 Units)

Scope of genetics, history of the study of genetics including the continuity of life, cell structure, mitosis and meiosis, transmission of genetics materials, Mendel's experiments, changes in structure of genetics material heterozygote, homozygote, gene expression, gene mutation.

CPT 322: Plant Pathology (2 Units)

Characteristics features of plat diseases, Causes of plant diseases , Diseases and its symptoms, Mechanism of disease dissemination, Factor influence disease incidence, Disease control principles, Disease control methods, importance of pathogen, Epidemiology, Epiphytotism, Endemism Control of a biotic causal agents.

CPT 323: Crop Production 11: Cereal, Legumes, and Oil Crop (3 Units)

Classification of animal crops, Origin and geographical distribution, Major areas of Production, Crop Ecological requirements, Crop adaptation, Crop management, Pest disease and weeds, Harvesting procedures, Crop processing and storage, Uses of products.

CPT 324: Crop Farm Practice (2 Units)

Nursery establishment and maintenance techniques, soil sterilization in the nursery, raising of seedling plantation crops, Vegetative propagation of plantation crops; oil palm seedlings, cocoa seedlings, cashew seedlings, pawpaw seedlings.

AEM 314: Extension Method (2 Units)

Scope of agricultural extension, stem involve in communication, Different methods of extension teaching and the role of extension workers, Role of personal influence of extension, Natural tendencies related to learning.

GNS 302: Communication in English (3 Units)

Principles of writing formal and informal letters, Basics Principles of logic, principles of continuous writing in expository logical and coherent issues, Technical project report writing, General and specific uses of words, Theory and process of communication, Concept of Organizational communication.

GNS 305: Micro Livestock Production (3 Units)

Types of snails, edible land snails, meaning of snailery and uses of snail, housing system of snailery, feeding requirement of snails, management practices, reproduction in snail, marketing and processing techniques in snail production

AES 413: Irrigation Technology (3 Units)

Land leveling and construction features, Various irrigation systems, Data collection process, soil characteristics, intake function, Land surface configuration, slope and shape, Crop characterizes, water supply characteristics, etc, Installation and construction and maintenance.

CPT 431: Crop Production III (Permanent Crop) (3 Units)

Permanent crops and distribution, Crop botany, Grouping of permanent crops, Ecological requirement, Crop husbandry, Harvesting methods, post-harvesting handling, Uses of products.

CPT 432: Weed Management I (2 Units)

Weed definition and significance, weed and crops losses, weed control methods, weed preservation, weed eradication, advantages and disadvantages of weed control methods, Chemical weed control method, influence of environmental factors, safety measure in herbicide use, Protective wear use in herbicidal application.

CPT 433: Plant Breeding (2 Units)

Plant reproduction, Crop improvement and methods, Crop hybridization, crop breeding practices in the field, pollination control mechanism¸ Mutations, polyploidy as method of crop improvement, conservation of plants crops, crops breeding achievement, Gene mutation, Germplasm.

CPT 434: Horticulture (3 Units)

Definition of Horticulture, Types of vegetables and uses, Techniques of vegetables cultivation, Fruit tree crops, Types of fruits and uses, propagation methods.

CPT 435: Crop Farm Practice III (3 Units)

Crop harvesting and processing, various method of processing, of important crops, Drying and storage facilities, Construction of yam ban, maize cribs, rhombic, etc.

CPT 435: Crop Farm Mechanism (2 Units)

Common tractors and their operation, Features and uses of farm equipment, economics of farm machinery, Crop processing, Preservation/ storage equipment, Analysis of live stock feeds, Farm animals nutrients requirement, Principles and techniques of field formulation, Construction features and operation of feed mill.

AGR 401: Research Methods (2 Units)

Research theory and hypothesis, Formulating hypothesis and variable identification, Design and administration of questionnaire, Methodology of research, method of data collection, parametric and non-parametric test statistics, Reporting research findings and way of presentation, Concept of hypothesis testing, Correlation and regression analysis.

CPT 442: Ornamental Horticulture and Landscape design (3 Units)

History and types of landscape garden, Landscape design principles, Classes of ornamental plants, Production techniques of ornamental plants, Flower arrangement for aesthetic value, Care and maintenance, importance of hedges and shelter-belts, Lawn construction.

CPT 443: Pasture Agronomy (2 Units)

Origin and geographical distribution, Terminologies: forage, storage, silage, carrying capacity, range, hay, fodder, invaders, etc, Types of forage crops, Ecological requirements, Types of pastures, Establishment methods, Propagation methods, Grazing Methods, preservation methods, silos, economics importance of forage and pasture.

CPT 444: Seed Production and Pathology (3 Units)

Importance of seed in crop production, Seed formation and development, Techniques of seed production Harvesting techniques, Seed storage, seed germination, seed infection, mechanism/ disease dissemination, Losses through seed borne disease, Seed health testing method, Controlling seed borne diseases, Commercial seed production/ distribution.

CPT 445: Soil Fertility and Crop Nutrition (2 Units)

Significance of soil reaction, soil acidity and alkalinity, Problems and solutions, Soil amendment: Liming and materials, Nature and properties of colloids, soil organic matter and humus, Essential plant nutrients, Supply and availability, Fertilizer element and materials, fertilizer recommendations, importance of fertilizer and uses, Problem soils, Procedures for soil analysis.

AEM 432: Drainage Technology (2 Units)

Drainage problems, Drainage principles, Soil physical characteristics, Surface drainage, Sub-surface drainage, Installation and construction.

AGR 402: Agricultural Personnel Management (3 Units)

Concept of personnel management, Nature of industrial organization, Organizational structure, Motivation and factors affecting it, Types of employment, Concept of industrial relations,

wages and salary administration in reaction to condition of employment.

AGR 446: Rural Sociology (2 Units)

Definition of sociology, Simple terms used in sociology, Rural and Urban community indices, Community settlement, Social systems, Sociology and extension, Agricultural and extension, Social and cultural change.

DEPARTMENT OF GENERAL STUDIES

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FIRST SEMESTER

Course Code	Course Title	Units
GNS 111/ EED 128	Citizenship Education	2
GNS 101	Use of English I	2
EED126/GNS 126	Introduction to Entrepreneurship	2
GNS 104	Physical and Health Education	2
GNS 201	Use of English II	2
GNS 301	Use of English III	2
GNS 401	Advanced Communication in English IV	2
EDD 102	Entrepreneurship Development I	2
COM 101	Introduction and Practice of Computer I	2
MTH 011	General mathematics	3
MTH 101	Logic and Linear Algebra	2
SAP 101	Skill Acquisition Programme I	2
STB 111	Cell Biology	3
COM 321	Operating System III	2
GNS 311	International Relations	2

SECOND SEMESTER

Course Code	Course Title	Units
GNS 121	Citizenship Education II	2
GNS 125	Use of Library	2
GNS 224	Physical Geography	2
GNS 102	Communication in English I	2
GNS 202	Communication in English II	2
GNS 302	Communication in English III	2
GNS 216 /EED 216	Practice of Entrepreneurship	1
GNS 322	Operating system III	2
EED 211	Introduction to Sociology	2
GNS 322	Data Base Design	2
GNS 316	Business Communication	2
SAP 102	Skill Acquisition Programme II	2
COM 102	Introduction and Practice of Computer II	2
STB 112	Morphology and Physiology of Living Things	3
COM 126	Computer Packages	2

PRE-ND PROGRAMME

PRE-NATIONAL DIPLOMA

1ST SEMESTER

COURSE CODE	COURSE TITLE	UNITS
BIO 001	Basic Principles of Biology	3
CHM 001	Basic Physical Chemistry	2
BIO 003	Diversity of Plants	2
AGR 001	General Agriculture I	3
MTS 001	General Mathematics	2
PHY 001	Mechanics and Properties of Matter	2
GEO 001	Geography	2
ENG 001	Use of English	2
	TOTAL	**18**

2ND SEMESTER

COURSE CODE	COURSE TITLE	UNITS
BIO 002	Introductory Ecology	3
AGR 002	General Agriculture II	3
CHM 002	Organic and Inorganic Chemistry	2
MTS 002	Introductory Statistics	2
BIO 004	Diversity of Animals	2
PHY 002	Optics, Waves, Electricity and Modern Physics	2
ENG 002	Communication in English	2
ENT 002	Introduction to Entrepreneurship	2
	TOTAL	**18**

COURSE SYNOPSIS: PRE-ND

BIO 001: Basic Principles of Biology (3 Units)

Basic characteristics of living things; Use of Microscopes; Cell Structures and Functions of Organelles. Cell division (Mitosis and Meiosis); gametogenesis; Macromolecules: Carbohydrates, Lipids, Proteins and Nucleic acids.

BIO 103: Diversity of Plants (2 Units)

Introduction to the diversity of plants kingdom; the major plant groups viz: Viruses, Bacteria, Fungi, Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. Major characteristics and classification features of each group;

BIO 002: Introductory Ecology (3 Units)

Definitions of terms: ecology, environment, habitats, community, ecosystem, population, biosphere etc. Ecological factors; habitat concepts: types and profiles of terrestrial and aquatic habitats. Ecosystem concepts: definition of types, characteristics and components. Food chains and Food webs.

BIO 004: Diversity of Animals (2 Units)

General classification of animals; characteristics and life history of representatives of each phylum. Animals of economic importance: Medical, Veterinary and Agricultural. The concept of evolution.

CHM 001: Basic Physical Chemistry (2 Units)

Atomic and molecular structure of matter; chemical reactions and equations; chemical bonding; simple treatment of acids and bases; IUPAC nomenclature; Properties of solutions.

CHM 002: Organic and Inorganic Chemistry (2 Units)

Empirical, molecular and structural formulae of organic compounds. Introduction to Isolation, purification and identification of organic compounds; general chemistry of functional groups.

MTS 001: General Mathematics (2 Units)

Quadratic equations; graphs of simple functions (polynomials, logarithm and trigonometry). Sum of angles; small angles; solution of triangles. Differentiation and integrations. Complex numbers. Linear regression and correlation.

MTS 002: Introductory Statistics (2 Units)

Descriptive statistics: mean, median, mode and standard deviation; frequency, distribution and related graphs. Introduction to probability. Binomial Poisson and normal distribution. Introduction to large samples.

PHY 001: Mechanics and Properties of Matter (2 Units)

Dimensions, vectors, Newton's Law of Motion. 2D Motion, motion on a plane surface, circular motions, orbital motions. Gravitation, moment of inertia, rotation of rigid bodies; friction, viscosity, elasticity. Elements of fluid mechanics.

PHY 002: Optics, Waves, Electricity and Modern Physics (2 Units)

Geometrical optics; reflection of light at plane and curved surfaces; refraction and dispersion of prisms through thin lens and its application in optical instruments; wave nature of light, diffraction, interference and polarization of light. Electric potentials, capacitance and dielectric. Types of waves. Modern Physics.

ENG 001: Use of English (2 Units)

The word, the clause and the sentence. Word classes: verbs, nouns, adjectives, determiners, preposition and conjunctions. Reading and comprehension. Summary writing.

AGR 001: General Agriculture I (3 Units)

Tillage practices: conventional, minimum, no-tillage. General production practices of field crops. Characteristics of the common varieties of crops: cereals, grains, legumes and pulses, roots and tuber species, plantains and bananas. Crop propagation through seed and vegetative means. Farm tools and machineries. Soil nutrients and mineral nutrition of plants.

AGR 002: General Agriculture II (3 Units)

Livestock breeds and distribution in Nigeria. Livestock management systems including feeding, housing, health etc. Physiology of digestion, reproduction, endocrine, nervous, circulatory and excretory systems. Common animal husbandry terminologies.

ENG 002: Communication in English (2 Units)

Concepts of communication, oral presentations. Elements of correspondence; rules of comprehension and interpretation. How to write a report.

ENT 002: Introduction to Entrepreneurship (2 Units)

Basic concepts of entrepreneurship. Roles of entrepreneurship in personal and national growth and development. Setting of business goals; identifying business goals. Drawing simple business plans.