COLLEGE OF ANIMAL SCIENCE AND LIVESTOCK PRODUCTION.

(A) HISTORICAL DEVELOPMENT

The College of Animal Science and Livestock Production, which came into being on October 1, 1989, consists of four Departments:

(a) Department of Animal Breeding and Genetics
(b) Department of Animal Nutrition
(c) Department of Animal Production and Health
(d) Department of Pasture and Range Management
(e) Department of Animal Physiology

As an integral part of the college programmes a Teaching and Research Farm is in place. The farm is well stocked with different species of livestock such as cattle, pigs, sheep, goats, poultry and rabbits and plays a complementary role in Teaching and Research. The College is actively involved in collaborative research with National and International Agricultural Research Centres.

(B) POSTGRADUATE PROGRAMME

The College, through its various programmes run by the Departments, contributes to the postgraduate programmes of the University. Postgraduate programmes are designed primarily to lead to the M.Agric and Ph.D degrees. Such programmes are generally academic in concepts and content and prepare the students for career in Animal Science. The research areas are Animal Production and Health, Animal Reproductive Physiology, Animal Nutrition, Livestock Biotechnology, Animal Breeding and Genetics and Pasture and Range Management.

DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

POSTGRADUATE DIPLOMA PROGRAMMES

Small Ruminant Production
Beef and Dairy Cattle Production
Meat Processing and Packaging
Poultry Production
Pig production
Rabbit Production
Livestock Feed Resources
Pasture Production

STRUCTURE

COURSE CODE	**Units**
College Course	2
Core Courses	12
Electives**	4
Project	6
Seminar	2
Minimum requirement for graduation	22
Minimum registration	26

** Select elective courses outside the core courses.

COURSES LISTS

POSTGRADUATE DIPLOMA IN SMALL RUMINANT PRODUCTION

Course code	Course Title	Units
PDA 707	Small Ruminant Fattening	2
PDA 701	Sheep and Goat Production Enterprise	2
PDA 716	Sheep and Goat Nutrition	3
PDA 720	Ruminant Animal Breeding	2
PDA 717	Basic Statistics in Animal Production	2
PDA 722	Pasture Management and Animal Production	2
PDA 721	Controlled Breeding of Sheep and Goat	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**27**

POSTGRADUATE DIPLOMA IN BEEF AND DAIRY CATTLE PRODUCTION

Course code	Course Title	Units
PDA 702	Commercial Beef and Dairy Cattle Production	3
PDA 723	Cattle Nutrition	3
PDA 720	Ruminant Animal Breeding	3
PDA 717	Basic Statistics in Animal Production	2
PDA 722	Pasture Management and Animal Production	3
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**26**

POSTGRADUATE DIPLOMA IN MEAT PROCESSING AND PACKAGING

Course code	Course Title	Units
PDA 709	Abattoir Design and Operation	3
PDA 708	Meat Hygiene	2
PDA 703	Meat Production and Processing	3
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**22**

POSTGRADUATE DIPLOMA IN POULTRY PRODUCTION

Course code	Course Title	Units
PDA 704	Commercial Poultry Production	3
PDA 711	Poultry Nutrition	3
PDA 718	Monogastric Animal Breeding	2
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**22**

POSTGRADUATE DIPLOMA IN SWINE PRODUCTION

Course code	Course Title	Units
PDA 705	Commercial Swine Production	3
PDA 710	Swine Nutrition	3
PDA 718	Monogastric Animal Breeding	2
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**22**

POSTGRADUATE DIPLOMA IN RABBIT PRODUCTION

Course code	Course Title	Units
PDA 706	Commercial Rabbit Production	3
PDA 713	Rabbit Nutrition	3
PDA 718	Monogastric Animal Breeding	2
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**22**

POSTGRADUATE DIPLOMA IN LIVESTOCK FEEDS RESOURCES

Course code	Course Title	Units
PDA 712	Feeds and Feed Resources	3
PDA 715	Feed Quality Control	3
PDA 722	Pasture Management and Animal Production	2
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Electives	4
	TOTAL	**22**

PDA IN PASTURE PRODUCTION

Course code	Course Title	Units
PDA 722	Pasture Management and Animal Production	3
PDA 727	Forage Conservation Tech. And Dry Season	3
PDA 714	Forage Production and Utilisation	3
PDA 717	Basic Statistics in Animal Production	2
PDA 798	Seminar	2
PDA 799	Project	6
	Elective	4
	TOTAL	**22**

SYNOPSES

PDA 701: Sheep And Goat Production Enterprises (2 Units)

Some considerations in raising sheep and goats. Breeds of sheep and goats. Production records. Determining the age of sheep and goats. Housing and equipment, fences, plans etc. Sheep and goat feeding. Functions of vitamins and minerals. Feeding the dry and lactating ewe/doe. Management Practices. Managing the kids/lamb, doe/ewe, tethering, dehorning, hoof trimming, Castration. Identification Practices. Goat/Sheep disease: Internal parasites, brucellosis, mastitis, footrot, mange, bloat, poisonous plants etc.

PDA 702:- Commercial Beef and Dairy Cattle Production (3 units)

Prospects and problems of beef and dairy cattle production. Factors to consider in establishing beef and dairy enterprise. Beef and Dairy cattle breeds and husbandy systems. Housing and equipment. Common diseases and disease control. Marketing of animals and their product

PDA 703:-Meat Production and Processing (3 Units)

Construction and design of meat processing factory. Processing equipment and maintenance. Meat selection and cutting methods. Preparation of meat products such as sausages, bacon, burgers te.c . Use of seasoning binders, fillers, protein supplements and chemical additives in meat products. Types of Packaging materials. Meat and meat products packaging, Principles of costing and pricing in the meat trade. Management of meat shop.

PDA 704: Commercial Poultry Production (3 units)

Management of different classes of birds from day old to maturity. Poulty feed formulation and feed miling business. Routine poultry farm operations. Hatchery operations. By-products utilization. Processing and Packaging of Poultry meat. Egg handling and processing. Poultry diseases management. Visit to relevant farms.

PDA 705: Commercial Swine Production (3 units)

Economic importance of pig. Breeds of pigs, pigs production problems and prospects. System of pig production. Kinds of commercial pig operation in Nigeria. Factors to consider in establishing commercial piggery. Planning Production targets. Records keeping. Diseases and disease control. Visit to established farms.

PDA 706: Commercial Rabbit Production (3 Units)

Breeds of Rabbit. Selection criteria for breeding stock. Fattening for agricultural show. Breeding and fattening. Housing. General Management Procedures.

PDA 707- Small Ruminant Fattening (2 units)
Introduction: Definition, Market Requirement/Prospects. Breeds of small ruminant. Flocks Development. Systems of Production. Housing Facilities and Equipment. Flocks Health Management. Cost and Returns. Marketing.

PDA 708 – Meat Hygiene (2 units)
Ante-Mortem Management and Inspection of Stock Post-mortem Inspection and Changes. The micro-biology of meat. Meat spoilage and preservation. Quality control in the meat industry. Food poisoning and diseases. Meat and meat product regulations. Personal and general hygiene in the meat industry.

PDA 709 – Abattoir Design and Operation (3 Units)
Site selection. Construction of Lairage, slaughtering and holding pens.
Stock flow and retention. Design of passageway,. Walls, floors and drainage in the slaughter house. Abbatoir equipment and maintenance. Stunning and slaughtering techniques. Evisceration and meat inspection regulations. Meat grading and classification. Disposal of carcase by-products.

PDA 710 – Swine Nutrition (3units)
Chemistry, digestion and absorption of CHO, fats, fibre, protein and nuclic acid with special reference to swine. General consideration for nutrient requirements for various classes of swine, piglets, weaners, growers, breeders, lactating and dry sows. Feeds formulation and feed compounding. Feeding systems for swine, alternative feeding e.g. cafeteria feeding, wet feeding etc.

PDA 711 – Poultry Nutrition (3 units)
General feeds and feedstuffs for poultry. Nutrient composition and feeding value of different ingredients for poultry. Nutrient requirement for various poultry species and classes of birds. Alternative feed sources for poultry.

PDA 712 – Feed and Feed Resources (3 units)
Feeds and feedstuffs for livestock, chemical composition and nutritive value of feeds. Component of rations and ration formulation. Concentrate feeds, grasses and legumes and their composition. Feed and feedstuff processing, compounding of rations and formulation. General aspects of practical livestock feed formulation.

PDA-713 Rabbit Nutrition (3unit)
Chemistry, digestion and absorption of CHO, fats, fibre protein and nucleic acid with special reference to rabbits. Functions and metabolism of CHO, fats, fibre, protein and nucleic acid in rabbits. Nutrient requirements for various classes of rabbits, growing rabbits, breeding and lactating does. Feed formulation – feeding systems.

PDA 714 – Forage Production and Utilization (3 units)
Forage resources for livestock production in the tropics. Establishment, management, harvesting and preservation of forage. Forage quality considerations. New trends in forage processing (Grass – legumes mixtures), Range improvement. Grazing reserves for ruminant animals. Transporting and marketing of forage, stocking rate and productivity evaluations. Digestibility assessment.

PDA 715 – Feed Quality Control (3 units).
Feed microscopy, identification, characteristics and properties. Storage quality control of feed stuffs and feeds. Commercial feed production. Proximate analysis and mineral analysis. Fibre characterization. Biochemical evaluation of feed ingredients. Toxic substances in feed ingredients.

PDA 716. Sheep and Goat Nutrition (3units)
Nutritional peculiarities of sheep and goats. Feed resources and feeding of sheep and goats in various production system. Nutrient requirements for maintenqance, growth, milk, hair/wool and reproductive purposes. Feed production technologies. Least cost feed formulation for sheep and goats, rumen manipulation.

PDA 717 – Basic Statistics in Animal Production (2 units)
Student t-Test, Chi-square test, Normal distribution, Analysis of variance/experimental design.

PDA 718-Monogastric Animal Breeding (2units).
Breeding and selection of poultry, rabbits and swine, Breed development strategies.

PDA 719 – Introductory Genetics (2units)
A review of basic Mendelian genetics, identification of breeds, Breeds and Breeding Structure, Genes and Genes Structure/functions.

PDA 720 – Ruminant Animal Breeding (2units)
Breeding and Selection of sheep, Goats, Beef and Dairy Cattle, Breed development strategies.

PDA 721 – Controlled Breeding of Sheep and Goat (2units)
Definition of controlled breeding in farm animals. Impact on animal productivity. Oestrous and pregnancy cycles in sheep and goats. Oestrus detection and Synchronization, artificial insemination, synchronized breeding, flushing, pregnancy detection, steaming up, accelerated lambing and kidding. Collection and utilization of reproductive records in controlled breeding.

PDA 722 – Pasture Management and Animal Production (3Units)
Pasture improvement techniques, proper uses of tropical pastures, methods of enhancing quality and utilization, grazing management, its effects on pasture and animal productivity, stocking rate, carrying capacity, stocking density, grazing season etc. Production of different classes of ruminants on pasture, pasture requirements for different classes of animals.

PDA 723 – Cattle Nutrition (3units)
Nutrition consideration in the establishment of beef and dairy cattle enterprises. Tropical feed resources and cattle production. Milk production from tropical pastures. Nutrient requirements of beef and dairy cattle. Ration compounding for beef and dairy cattle. Feed management of cattle. Nutritional disease of beef and dairy cattle. Nutrition-parasites interaction.

PDA 724 – Range Management and Utilization (3 units)
Range ecology, range conditions, range land productivity, range and resources and their roles in domesticated animal production, influences of man on rage land productivity.

PDA 725 – Principles of Forage Production(3units)
Tropical forage species and their adaptation, types of pastures and their features, establishment of improved pastures, role of legumes in pastures, factors affecting dry matter yield, nutritive values and factors affecting it.

PDA 726 – Forage Seed Production Technology (3units)
Agronomic management for seed production, factors limiting seed production, seed quality and certification seed yields of grasses and legumes, seed harvesting, processing and storage, seed importation, seed marketing.
PDA 727 – Forage Conservation Technology and Dry Season Feeding (3 units)

Forage conservation methods, problems and methods of enhancing feed quality in the dry season – intensive feed garden, fodder bank and their uses.

PDA 728 – Pasture Productivity (3 units)
Pasture productivity indices herbage yield measurement, sampling techniques, relationship between herbage yield and animal productivity, quality indices and evaluation techniques, measuring dry matter yields of shrubs and trees used as forages.

DEPARTMENT OF ANIMAL PRODUCTION AND HEALTH

M.AGRIC. (Ph.D IN ANIMAL PRODUCTION)

COURSE UNITS (M.Agric)
Compulsory College Courses

Course code	Course Title	Units
ABG 707	Bio-Statistics	3
ANS 705	Advanced Techniques in Animal Science Research	3
CSC 701	Computer Application to Livestock production	4
	TOTAL	**10**

RUMINANT PRODUCTION OPTION
Core Courses

Course code	Course Title	Units
APH 702	Sheep and Goats Production	3
APH 703	Beef Cattle Production System	3
APH 704	Dairy cattle production and Dairying	
ANS 798	Seminar	2
ANS 799	Dissertation/Thesis Research	6
		14
	COMPULSORY ELECTIVE COURSES	
APH 713	Animal Products and Processing	2
APH 714	Livestock diseases and control	3
	TOTAL	**5**

NON-RUMINANT PRODUCTION OPTION
CORE COURSES

Course code	Course Title	Units
APH 701	Poultry Production	3
APH 706	Swine Production	3
APH 708	Rabbit Production	2
ANS 798	Seminar	2
ANS 799	Dissertation/Thesis Research	6
	TOTAL	**16**

COMPULSORY ELECTIVE COURSES

Course code	Course Title	Units
APH 713	Animal products and processing	3
APH 714	Livestock Diseases and Control	3
	TOTAL	**6**

LIVESTOCK SYSTEM OPTION

Core Courses

Course code	Course Title	Units
APH 707	Livestock Housing and Management System	3
APH 709	Animal Traction	3
ANS 710	Livestock Farming System	3
ANS 798	Seminar	2
ANS 799	Dissertation/Thesis Research	6
		17
	COMPULSORY ELECTIVE COURSES	
APH 714	Livestock Diseases and Control	3
PHY 718	Animal Behaviour	2
	TOTAL	**5**

COURSE SYNOPSIS

APH 701 – Poultry production

Discussion of various poultry breeds and their performance. Poultry housing. Egg production and marketing. Disease of poultry. Hatchery management and operation. Poultry production as a business.

APH 702 – Sheep and Goats Production

Breeding stock for herd establishment. Breeding problems. Housing and diseases. An overview of small ruminant production. System and their characteristics. Small ruminant production and estimates of their productivity performance. Constraingts and opportunities to increased productivity in these sytems. Milking and processing.

APH 703 – Beef Cattle Production System

Different methods of beef production. Characteristics of beef cattle, advantages and disadvantages of the different production system. Feedlot fattening. Slaughtering and products handling.

APH 704 – Dairy Cattle Production

Discussion on breeds and comparative performance of the different breeds. Calf management. Feeding for milk production. Establishment of a dairy enterprise. Problems and prospects of the diary industry in Nigeria. The milk parlour. Procedures for milking (Hand and Machine milking). Milk handling and processing.

APH 705- Advanced Techniques in Animal Science Research General (3 Units)

Research methodologies Ethical issues in Animal Science Research. Recent developments in Animal Science. Nutritional Research Technique. Newer approaches to Animal Nutrition. Nutrition of emerging livestocks. Biotechnology in Animal Improvement. Reprodutive techniques. Sex differentiation. Stress and diseases resistance. Feed manipulation.

Impact of Biotechnology in Animal Research. Techniques in Animal Reproduction Research. Pasture Research Technique.

Background information on pasture Research. Measurements of pasture production Procedures and design in grassland research.

Advanced Research Techniques in Animal Production. Discussion of the recent findings and experimental techniques in the management, feed, feeding, breeding of farm animals.

Reports, new research techniques and current literature of interest in animal science
Modification of techniques.

APH 706 – Swine Production

Description of Various breeds. Management of Pig (Farrowing, litter management, Growers and furnisher).. Feeding and breeding. Stock selection and improvement. Pig handling, slaughter and processing. Pig products. Pig production as business

APH 707-Housing and Management of farm Animals

Description of different species, breeds and their characteristics. General principles of livestock management. Principles of housing and types with the advantage and disadvantages. Animal handling and techniques. The livestock industry in Nigeria-Problems and prospectus. Maintaining a healthy herd/flock

APH 708 – Rabbit Production

Description of various breeds, features and performance. Rabbit management, feeding and housing. Backyard rabbit production. Low-cost housing protypes production techniques, disease prevention and controlling Commercial rabbit enterprise.

APH 709 – Animal Traction

Introduction – Draft animal selection. Animal husbandry. Training draft animals, Yokes and harnesses. Hitches. Field operations ands implements. Economics and technical assistance. Animal traction extension

APH 710 – Livestock farming systems and Research

Types and characteristics of livestock farming/Production. Systems with special emphasis on Nigeria.. Concept, methodology and applicability of livestock farming systems. Research in Smallholder systems in Africa with emphasis on Nigeria Livestock extension services.

APH 713 – Animal products and processing (3units)

Egg formation in the reproductive systems of domestic fowls. Egg quality characteristics

Physical and chemical composition, marketing and storage of eggs. Types of egg products. Hatchery management. Process of milk production. Milk quality characteristics. Milk spoilage and preservation methods. Types of milk products with emphasis on local cheese production. Slaughtering methods, meat quality characteristics.

Meat spoilage, preservation methods. Types of meat products and processing.

APH 714 – Livestock Diseases and Control (3units)

A general account of the main diseases of various species of livestock, disease causing organisms – virus, bacteria, mycoplasma, fungus, protozoa, internal and ectoparasites, metabolic diseases, prevention and control of diseases in farm animals. Traditional and conventional methods of treatment.

Ph.D in Animal Production

The Ph.D in Animal Production will have areas of specialization in Ruminant Production, Non-ruminant Production, Livestock systems and Reproductive Physiology.

ACADEMIC STAFF LIST

NAME	RANK	QUALIFICATION	SPECIALIZATION
Adu, I. F	Professor	OND (Ife), B.Sc., Ph.D(Ibadan), FNSAP	Small Ruminant Production
Abiola, S. S	Professor	DIP (Leeds), B.Sc(Kansas) M.Sc, Ph.D(Ibadan)	Monogastric Anim. Production
Aina, A. B. J	Professor	B.S.C, M.Sc. Ph.D(Ibadan) PGDE(Ilorin), MASAN, MNSAP	Small Ruminant production
Biobaku, W. O	Professor	B.Sc(Ilorin). M.Sc., Ph.D(Ibadan)	Swine/Rabbit Production
Fanimo, A. O	Professor	B.Sc, M.Sc, Ph.D(Ibadan)	Monogastric Production and Management.
Oduguwa, B.O.		B.Sc, M.Sc(Ibadan) Ph.D(UNAAB)	Ruminant Production
Sowande, S. O	Lecturer I	B.Sc, M.Sc, Ph.D (UNAAB)	Ruminant Production
Iposu, S. O		B. Agric, M.Agric (UNAAB), Ph.D (Lincoln, NZ)	Ruminant Production
Bawala, T. O		B.Agric, M.Agric, (Akure)	Ruminant Production
Sogunle, O. M		B.Agric,M.Agric, Ph.D(UNAAB)	Monogastric Production
Fasae, O. A		B.Agric, Tech, M.Agric (Akure), Ph.D (UNAAB)	Ruminant Production

DEPARTMENT OF ANIMAL PHYSIOLOGY

POSTGRADUATE COURSES IN ANIMAL REPRODUCTIVE PHYSIOLOGY

Introduction

The Department of Animal Physiology offers postgraduate programmes leading to Master of Agriculture (M.Agric) and Doctor of Philosophy degrees in Animal Reproductive Physiology. The Department aims to produce specialists well grounded in the modern theory and practice of various aspects of animal production aimed at improving reproductive efficiency. Courses in applied techniques such as reproductive management, artificial insemination, and embryo transfer are given equal prominence with advanced courses in endocrinology, environmental physiology and reproductive physiology.

Courses offered

The following courses are offered at Masters Level and also as make-up courses at PhD level for students who did not offer them at a lower level.

First semester

Course code	Course Title	Units
ANP701	Advanced endocrinology	3
ANP703	Environmental physiology of farm animals	2
ANP705	Multiple ovulation and embryo transfer in farm animals	2
ANS799	Thesis research	6
	TOTAL	**13**

Second semester

Course code	Course Title	Units
ANP702	Advanced reproductive physiology	3
ANP704	Artificial insemination	3
ANP706	Animal behaviour	2
ANP708	Reproductive management and controlled breeding	2
ANS798	Seminar	
	TOTAL	**10**

Compulsory College Courses

Course code	Course Title	Units
ANS705	Advanced techniques in animal science research	3
ABG707	Biostatistics	3
CSC701	Computer application to livestock production	4
	TOTAL	**10**

Electives

Course code	Course Title	Units
ANN704	Metabolism of proteins and nucleic acids	3
ANN705	Metabolism of carbohydrates and lipids	3
ANN707	Bioenergetics	3
ANN710	Digestion and metabolism in ruminants	3
ABG706	Advanced biotechnology	3
ABG708	Molecular genetics	2
ABG711	Immunogenetics	2
	TOTAL	**19**

Minimum Credit Units for Graduation

For Masters Degree the minimum number of units required for graduation is 30. Candidates for the PhD Degree are normally required to register only for Research Seminar and Thesis Research.

POSTGRADUATE COURSE SYNOPSES FOR ANIMAL PHYSIOLOGY

ANP702: Advanced reproductive physiology (3 Units)

Theories of sex determination; sex differentiation; postnatal sexual development. Oogenesis, ova physiology and ovulation. Spermatogenesis, sperm physiology and sperm output. Pre-determination of sex; embryo sexing.

Ovarian and oestrous cycles; corpus luteum formation; hypophysial regulation of luteal function; corpus luteum in pregnancy; luteal regression.

Fertilization; sperm capacitation; implantation; gestation; maternal recognition of pregnancy. Metabolic changes during pregnancy; role of maternal hormones during pregnancy. Role of the foetal-pituitary-adrenal axis in parturition; hormonal changes during parturition. Parturition induction; artificial control of parturition; post-partum physiology. Maternal behaviour and neonatal survival.

Seminar presentation: Four (4) topics per student.

ANP703: Environmental physiology of farm animals (3 Units)

Climate and livestock production: Influence of climatic factors on animal productivity. Acclimatization and adaptation: Physiological basis of adaptation; heat stress; physiological responses to heat stress; determination of heat stress index; modification of the micro-climate to enhance animal productivity; management of exotic breeds in a tropical environment.

Seminar presentation: Four (4) topics per student.

ANP704: Artificial insemination (3 Units)

Historical development of artificial insemination (AI). Role of AI in livestock improvement. Semen collection techniques in farm animals; semen evaluation; comparative study of the ejaculates of ram, boar, buck, bull and stallion; advanced methods of assessing sperm viability. Principles of semen preservation; sperm damage during preservation; fertility of in vitro stored spermatozoa. Insemination techniques: timing of insemination; determination of conception and parturition rates. Organization of AI practice: management of AI Centre; world trade in frozen semen.

Seminar presentation: Four (4) topics per student.

ANP701: Advanced endocrinology (2 Units)

Hormone biosynthesis and secretion; mechanisms of hormone action; hormonal control of male and female reproduction. Neural regulation of reproductive hormones; the pineal gland and mammalian method of birth control; hormonal-nutritional interaction. Anti-steroid immunization and effects on ovulation rate. Use of hormonal growth promoters in livestock fattening; physiologic effects of anti-somatostatin.

Seminar presentation: Four (4) topics per student.

ANP705: Multiple ovulation and embryo transfer in farm animals (2 Units)

Significance of multiple ovulation and embryo transfer (MOET) in livestock improvement. Endocrinology, follicular development and ovulation. Hormonal induction of oestrus, enhanced follicular development and ovulation. Comparative evaluation of multiple ovulation protocols in farm animals. Surgical and non-surgical methods of embryo recovery. In vitro storage of embryos; embryo splitting; sexing of mammalian embryos; assessment of viability of embryos. Surgical and non-surgical methods of embryo transfer.

Seminar presentation: Four (4) topics per student.

APH720: Reproductive management and controlled breeding (2 Units)

Definition and importance of reproductive management and controlled breeding. Flushing; steaming-up; neonatal management. Oestrus detection; mating system; pregnancy diagnosis; sire management; management of reproductive disorders. Management of breeding records; use of computer in reproductive data management. Synchronized breeding; accelerated lambing and kidding. Management of artificial insemination service.

Seminar presentation: Four (4) topics per student.

ANP706: Animal behaviour (2 Units)

Animal behaviour and livestock production; Neuroendocrine basis of animal behaviour; Evolutionary aspects of animal behaviour; Adaptive aspects of animal behaviour; Sexual behaviour; Aggression and dominance in farm animals; Behavioural considerations in animal housing and herding; Modification of behaviour patterns in farm animals; Temperament in dairy cattle; Maternal and neonatal behaviour.

Seminar presentation: Four (4) topics per student.

LIST OF RELEVANT STAFF IN THE DEPARTMENT

NAME	RANK	QUALIFICATION	SPECIALIZATION
Osinowo, O. A	Professor	B.Sc.(Ibadan), M.Sc(Sydney), Ph.D (ABU), FNSAP	Reproductive Physiology
Onagbesan, O. M	Professor	B. Sc (Ibadan), M. Sc(Edinburgh), Ph.D (Southampton)	Reproductive Physiology
Smith, O. F	Professor	B.Sc., M.Sc. Ph.D (Phillipines)	Physiology
Ladokun, A. O		B.Sc,M.Sc, Ph.D(Ibadan)	Artificial Insemination
Daramola, J. O		B.Ed(OAU) M.Sc, Ph.D (Ilorin)	Artificial Insemination

DEPARTMENT OF ANIMAL BREEDING AND GENETICS

SPECIALIZATION:
Animal Breeding and Genetics
Animal Biotechnology

STRUCTURE:

College Courses	(10 Units)
Core Courses	(13 Units)
Electives	(10 Units)
Seminar	(2 Units)
Projects	(6 Units)
TOTAL	**(36 Units)**

FIRST SEMESTER
COMPULSORY COLLEGE COURSES:

Course code	Course Title	Units
ABG 707	Biostatistics	3
CSC 701	Computer Application to Livestock Production	4
ANS 705	Advanced Techniques in Animal Science Research	3
	TOTAL	**10**

CORE COURSES

Course Code	Course Title	Units
ABG 703	Quantitative Genetics	3
ABG 711	Immunogenetics	3
ANS 797	Seminar	2
ANS 799	Thesis Research	5
		13

COURSES SYNOPSES

ABG 701: Introduction To Biotechnology And Animal Genetics (2 Units)

Genes/chromosomes: structures and functions, Role of genes in animal genetics, Quantitative heredity, Basic Mendelian genetics and molecular basis of inheritance.

ABG 702; Animal Breeding Theory And Programme Design (3 Units)

Theoretical basis of animal improvement programmes, population structure, design of breeding programmes and repeated measurements. (Variance components. Heritability and Repeatability estimates), Performance and progeny testing, Generation intervals, Dissemination of improvement, Genes and genotye x environmental interaction. (Prediction and evaluation of genetic changes, Prediction of breeding values, Selection indices, BLUP), Breed evaluation.

Tutorials: Problems and applications are discussed in tutorial sessions.

ABG 703: Quantitative Genetics (3 Units)

Genetics and phenotype variations. Genetic basis of quantitative traits, Heritability and repeatability, Correlation among traits. Selection in long and short term, Crossbreeding and selection for crossing ability. Design and analysis of selection experiments. Inbreeding depression and heterosis, genetic conservation.

Tutorials:Problems and applications are discussed in tutorials sessions.

ABG 704: Stock Improvement (3 Units)

Review of genetics basis and interrelationship of ecologically important traits in each of the principal livestock species. Breeding objectives, Development of breedig plans, Breeding and selection programmes in practice, Visiting of livestock breeding and research enterprises.

ABG 705: Populaton Genetics (2 Units)

Drawing revolution, Variation/evolutionary changes, sources/forces of variation and evolutionary changes, Hardy-Weinberg equilibrium, Gene frequencies and changes in gene frequency, Effects of sexual reproduction on variation, Variability among finite populations, synthesis of forces, Genetics structure of populations. Balance polymorphsm, Random events, Fitness, origin of species.

ABG 706: Advanced Biotecnology (3 UNITS)

Animal cell and tissue culture, Maturation of oocytes, In Vitro oocytes fusion, Cloning, species hybridization interspecies embryo transfer, DNA sequences, blood group analysis and genetic polymorphism, electrophoretic techniques, Genes and genetic markets. Linkage mapping by recombination. Mapping and map distances, Chi-square test, mitotic segregation and recombination, analysis of single meiosis, sex chromosome and sex linkages.

ABG 707 : Biostatistics (3 Units)

Planning of experiments, increasing accuracy of experiments, Regression and correlation's, Exerimental designs (CRD, RCB, Incomplete block. Latin squares, Qasi-Latin squares, Incomplete Latin squares, Factorial, Split plots, Split-split plots, missing data. Confounding effects, mixed model and least squares analyses.
Tutorial: Analyses of results o f series of experiments
Analyses of animal production and breeding data and use of CAN package programme.

ABG: 708 Molecular Genetics (2 Units)

Chromosome structure and functions, Chromosomal changes and duplication (aneuploidy, polyploidy etc), Sequence organisationms, Restriction enzymes and restriction analyses, Formation of recombinant DNA and recombinant DNA methodology/techniques. DNA assays, Polygenic reconstruction and estimations, Speciation and hybridization, Identification of disease/useful genes.

ABG 709: Advanced Biochemical Genetics (3 Units)

DNA structure and replication, DNA and the gene, types of gene action, genetic code, Mutation and Mutational site, Inversion sequence and transposes, Molecular basis of muuation, Spontaneous, induced and eversion mutuation analysis, Mutagens and Carcinogens, Biological repair mechanisms, protein synthesis, Gene splicing, Genetics of diseases resistance and feed utilization. Errors of metabolism, Resistance and control of parasite and pathogens.

ABG 710: Developmental Genetics (3 UNITS)

Cell totipotency, Establishment of basic animal body plan, Mutational and molecular analysis of basic body plan, Proteins as determinants of cellular charateristics, Regulation of protein synthesis. Application of regulatory mechanism to cell differentiation. Transcription regulation by tissue specific anhancers, Transcript processing and tissue specific regulation, Cancer as a developmental genetic disease, Genetics of farm animal behaviour.

ABG 711: Immunogenetics (2 units)

Monoclonal antibodies in selective breeding, Antigens, Immune systems, (IGs, MHC, HLA). Genetics regulation of immune systems, genetics of disease resistance, and screening of genetic diseases, Immundeficiencies.

LIST OF RELEVANT STAFF IN THE DEPARTMENT

Name	Rank	Degree/University Where Obtained	Specialisation
O.A. Adebambo	Professor	B.Sc.(Ibadan), Ph. D (Ibadan)	Animal Breeding and Genetics
Ikeobi, C. O. N	Professor	B.Sc (OAU) M.Sc., Ph.D (Ibadan)	Animal Breeding and Genetics
Ozoje, M. O	Professor	B.Sc (Calabar), M.Sc. Ph.D (Ibadan)	Animal Breeding and Genetics
Martha N Bemji	Lecturer I	B.Agric.(ABU) M.Sc(ABU), Ph.D (UNAAB)	Animal Breeding and Genetics
Peters, S. O	Lecturer I	B.Agric, M.Agric., Ph.D (UNAAB)	Animal Breeding and Genetics

DEPARTMENT OF PASTURE AND RANGE MANAGEMENT

Available Programmes (M.Agric/Ph.D) – Pasture Production & Management
- Range Management

1. Objectives:

The M.Agric. degree programmes aim to produce agriculturists (teachers, researchers and professionals) well versed in the science of feed/forage production and management for effective ruminant animal production.

2. Entry Requirement

The candidates for the M.Agric/Ph.D programmes are required to meet the University requirements for admission into Postgraduate programme. Candidates should have a minimum of second class (Upper division) in Agriculture, which should have given them a good background in both agronomy and animal science disciplines. In exceptional cases, candidates with a second class (Lower division) may be considered.

3. Duration:

M.Agric programme shall normally be for a period of two academic sessions (four semesters) for full time and three academic sessions (six semesters) for part time registrations.

4. Structure

Compulsory Univ/College courses	10 units
Core courses	16 units
Electives	3 units
Dissertation	6 units
Seminar	2 units
Total	37 units(Minimum units required)

Pastures production & Management Option (Core Courses)

Courses Code	Course Title	Units
PRM 701	Agronomy and ecology of pastures	3
PRM 702	Physiology and Utilisation of tropical pastures	3
PRM 703	Pasture research methodology	3
PRM 704	Forage quality and conservation techniques	2
PRM 705	Pasture seed production and marketing	3
PRM 708	Pastures in farming systems	2

Range Management Option (Core Courses)

Courses Code	Courses Title	Units
PRM 701	Agronomy and ecology of pastures	3
PRM 702	Physiology and utilization of tropical pastures	3
PRM 703	Pasture research methodology	3
PRM 706	Range Ecology	3
PRM 707	Range Improvement Methods	2
PRM 708	Pasture in farming systems	3

Electives Courses (for both options)

Courses Code	Courses Title	Units
PRM 709	Grazing Management	3
APH 702	Sheep and Goats Production	3
APH 703	Beef cattle production & dairying	3
APH 704	Dairy cattle Production & dairying	3
SOS 715	Soil Fertility & Plant Nutrition	3
EMT 708	Remote Sensing & GIS for environment	2

COURSE SYNOPSIS

PRM 701: Agronomy and Ecology of Pastures – 3 units.
Environmental adaptation of tropical pasture plants and pattern of geographical distribution. Origin of domesticated pasture species. Genetic variation and mode of reproduction. The role of man, modern technology and nature, Improvement and limitations of natural pastures. Establishment and management of improved pastures. Role of legumes. Degradation and persistence of pastures.

PRM 702: Physiology and Utilization of Tropical Pastures – 3 units
Response of tropical pastures to edaphic, physiographic and biotic factors. Factors affecting intake and selectivity of forage under grazing. Relationship between pasture structure and utilization. Variation in growth rate of tropical forage species and its effects on dry matter productivity. Anti nutritional factors in pasture species and related diseases.

PRM 703: Pasture Research Methodology – 3 units
Species evaluation by cutting and grazing in small plots, Grazing experiments objectives, choice of treatments, choice of animals and grazing methods, overcoming variability in grazing experiments, methods of reducing the size and biases in grazing studies. Animal and pasture measurements under experimentation. Measurement of primary productivity. Range surveys. Statistical analysis of pasture experiments.

PRM 704: Forage Quality and Conservation Techniques – 2 units

Deferred grazing. Silage and hay making. Chemical additives. Microbiological and chemical changes during ensilage. Forage quality techniques; digestibility, voluntary intake, chemical composition. Factors affecting nutritive value.

PRM 705: Pasture Seed Production and Marketing - 3 Units

Establishment and management of species for seed production. Seed harvesting and processing. Factors limiting seed production. Seed yields of grasses and legumes. Selection and Breeding of pasture spp. Seed quality and certification,. Seed storage. Marketing of forage seeds.

PRM 706: Range Ecology – 3 Units

World distribution of natural grassland, Rangeland plants and identification of ecological sites. Rangeland condition and trend. Management of range ecosystems. Range stability (plant succession, study of animal-soil-plant interactions). Environmental influences and ecological concepts. Fields trips of grazing reserves.

PRM 707: Range Improvement Methods – 2units

Uses of natural grassland. Limitations to livestock production on range. Brush control on rangeland. Effects of fire. Range reseeding and fertilization. Infrastructures and people on rangeland. Water resource management. Management of animals on the range. Economic implications of rangeland development.

PRM 708: Pastures in Farming Systems – 2 Units

Definition of farming systems. Role of legumes in crop-livestock systems. Integration of pastures in plantation and annual crops. Intensive feed garden. Fodder banks. Enhancing dry season feeding in farming systems. Fast growing nitrogen fixing trees and browse plants. Pasture and animal production systems.

PRM 709: Grazing Management – 3 units

Effect of grazing management on tropical pasture utilization. Grazing systems and distribution. Spatial patterns of grazing. Stocking rates. Grazing capacity and intensity. Nutrition and intake of grazing animals.

STAFF LIST

Name	Rank	Qualifications	Areas of Specialisation
Onifade, O. S	Professor	B.Sc. M.Sc., Ph.D (ABU)	Forage Agronomy & Utilization
Alaba O. Jolaosho	Reader	B.Sc.M.Sc. Ph.D(U.I)	Pasture Agronomy & Forage Utilization/Intake Modelling
Arigbede, O. M	Senior Lecturer	B.Sc.M.Sc.,Ph.D(U.I)	Ruminant Nutrition/Forage Science
Olanite, J. A	Senior Lecturer	B.Agric(Ago-Iwoye) M.Sc.(Ilorin) M.Phil., Ph.D (Ibadan)	Pasture Agronomy

DEPARTMENT OF ANIMAL NUTRITION

M.AGRIC/Ph.D IN ANIMAL NUTRITION

STRUCTURE:

Units

COLLEGE COURSES	**15**
CORE COURSES (including restricted elective)	9
ELECTIVES	6
PROJECT	6
SEMINAR	2
TOTAL	**38**

MONOGASTRIC ANIMAL NUTRITION OPTION

A. CORE COURSES

ANN 704 - Metabolism of Proteins and Nucleic Acids (3 Units)
Metabolism of proteins and nucleic acids. Amino acids precursors and function of nucleic acids in protein structure. Recent trends in protein and nucleic acid research. Special techniques for protein and nucleic acid determination and identification.

ANN 705 - Metabolism of Carbohydrates and Lipids (3 Units|)
Metabolism of carbohydrates and fats as it relates to various monogastric species. Recent trends in carbohydrates and lipid research. Special techniques for metabolic study relating to carbohydrates and lipids. Control mechanisms of CHO and lipid metabolism.

ANN 706 - Laboratory Animals in Nutritional Studies (3 Units)
Conventional, alternative and new feed resources. Tropical feed type, availability and extent of utilization. General aspects of livestock feed formulation. Methods of formulation. Methods of formulation for various classes of livestock. Computer in formulation and least cost diets. Quality assessment and standardization of feeds. Recycling of waste and its nutritional potential. Current assessment of the feed industry.

ANN 707 - Bioenergetics (3 units)
Importance of energy, energy system. Estimation and prediction of energy values of feeds. Partitioning of energy and utilization for body functions. Physiology and biochemical aspects of energy metabolism.

ANN 711 - Laboratory Animals in Nutritional Studies (3 Units)
Different species of laboratory animals. Mode of feeding and types of feed consumed. Nutrient requirements of common species. Advantages, disadvantages in the use of lab. Animals in nutritional studies. Techniques and experimental methods adopted for studies. Ethical considerations in lab. Animals.

B. RESTRICTED ELECTIVES

ANN 712 - Advances in Swine Nutrition (3 Units)

Physiology of swine G.I.T. Feeding standards for swine. Requirements for temperate and tropical environments. Exhaustive consideration of foodstuffs for swine feeding, their chemical composition nutritive value and toxicity. Alternative feeding for swine. Determination of nutritive value of ingredients for swine DE, ME, (single ingredients and compounded ration), protein quality, digestibility trials. Planning nutritional research for swine.

ANN 713 - Advances in Rabbit Nutrition (3 Units)

Physiology of G.I.T. Coprophagy in rabbits and its implications. Protein and energy allowances for rabbits. Feeding resources. Feed formulation and feed compounding. Determination of nutritive value of feedstuffs. Planning nutritional research.

ANN 714 - Advances in Poultry Nutrition (3 Units)

Feed resources and nutrient quality of ingredient for poultry. Feeding standards/NRC requirements for all classes and species of poultry. Methods for metabolic studies and determination of protein utilization and quality of proteins utilized by poultry. Importance of vitamins and minerals for poultry and associated deficiency symptoms.

C. ELECTIVES

ANN 701 - Vitamins and Minerals (3 Units)

METABOLISM

Chemistry of vitamins and minerals. Function of vitamins and minerals in the metabolism and physiology of farm animals and their deficiency symptoms. Inter-relationships between vitamins and minerals.

ANN 702 - Instrumentation in Animal Nutriton (3 Units)

Use of various instruments in the analysis of feeds, feeding stuffs and animal products. Principles and techniques of chromatography, spectrophotometry, electrophoretic methods, calorimeters, thiorimeters, fermentation vats, etc. Recent advances in instrumentation.

ABG 707 : BIOSTATISTICS (3 Units)

Planning of experiments. Ways of increasing accuracy of experiments. Regression and correlation. Mixed models, complete randomized designs, randomized block, latin squares, factorial experiment, confounding, split plots design. Qasi-Latin squares, method of the study of response. Incomplete block designs. Lattice designs, lattice squares, missing data, analysis of results of a series of experiments. Analysis of data arising from animal production/breeding. Use of package programmes for analysis of data arising from animal experimentation.

Course Code	Course Title	Units
ANS 798	Seminar	2
ANS 799	Project	6

RUMINANT ANIMAL NUTRITION OPTION

A. CORE COURSES

ANN 704 - Metabolism of Proteins and Nucleic Acids (3 Units)
Metabolism of proteins and nucleic acids. Amino acids precursors and function of nucleic acids in protein structure. Recent trends in protein and nucleic acid research. Special techniques for protein and nucleic acid determination and identification.

ANN 705 - Metabolism of Carbohydrates and Lipids (3 Units|)
Metabolism of carbohydrates and fats as it relates to various monogastric species. Recent trends in carbohydrates and lipid research. Special techniques for metabolic study relating to carbohydrates and lipids. Control mechanisms of CHO and lipid metabolism.

ANN 706 - Laboratory Animals in Nutritional Studies (3 Units)
Conventional, alternative and new feed resources. Tropical feed type, availability and extent of utilization. General aspects of livestock feed formulation. Methods of formulation. Methods of formulation for various classes of livestock. Computer in ration formulation and least cost diets. Quality assessment and standardization of feeds. Re-cycling of waste and its nutritional potential. Current assessment of the feed industry.

ANN 710 - Digestion and Metabolism in Ruminant (3 Units)
Physiology of digestion and metabolism. Digestion and metabolism of various nutrient and their absorption by riminants. Regulations for metabolic pathways. Inter-relationship between metabolites. Metabolic disorders of the ruminants. Measurements of digestibility of feed resources. Transport and absorption of metabolites.

ANN 715 - Sheep and Goat Nutrition (3 Units)
Feeding habits of small ruminants. Conventional and non-conventional feed resources for sheep and goats. Feed conservation and improvement techniques. Nutrient requirements of sheep and goats for various productive purposes. Feed production for small holder asmall ruminant feeding in crop-livestock integration. Recent advances in sheep and goat nutrition.

B. RESTRICTED ELECTIVES

ANN 716 - Large Ruminant Nutrition (3 Units)
Fodder resources and management in bead cattle feeding. Nutrient requirement of beef cattle. Use of feed additives. Metabolic disorder in beef cattle. Recent advances in beef cattle feeding. Feed and feeding of various breeds/classes of dairy cattle. Nutrient requirements of dairy cattle. Ration formulation for dairy cattle. Recent advances in dairy cattle feeding.

C. ELECTIVES

ANN 708 - Dairy chemistry and Technology (2 Units)
The state of dairy industry in Nigeria. Nutritional value of milk. Chemical, physical and Microbiological changes in fresh and processed milk and by-products. Processing and handling of dairy products in the tropics. Local technology for dairy processing.

ANN 717 - Forage and Utilisation (3 Units)

Forage resources for livestock production in the tropics. Establishment, management, harvesting and preservation of forage. Forage quality considerations. New trends in forage processing (grass-legume mixtures). Range improvement. Grazing reserves for ruminant animal. Transporting and marketing of forage. Stocking rate and productivity evaluations. Digestibility assessment.

D. COLLEGE COURSES

As in Monogastric Animal Nutrition Option.

Staff Lists

Name	Rank	Degree/Universities Where Obtained	Specialisation
Oguntona, E. B	Professor	B.Sc.(Ibadan), M.Sc.(Lond.), Ph.D (Nottingham)	Biochemistry and Nutrition
Onwuka, C. F. I	Professor	B.Sc., M.Sc., Ph.D (Ibadan)	Ruminant Animal Nutrition
Eruvebetine, D.	Professor	B.Sc.(AndhraPradesh), M.Sc., Ph.D (Alberta)	Monogastric Animal Nutrition
Bamgbose, A. M	Professor	B.Sc., M.Sc., Ph.D (Ibadan)	Monogastric Animal Nutrition
Oduguwa, O. O	Professor	B.Sc., M.Sc., Ph.D (Ibadan)	Agric. Biochemistry and Nutrition
Isah, O. A		B.Sc, M.Sc, Ph.D (Ibadan)	Ruminant Animal Nutrition
Idowu, O. M. O		B.Sc., M.Agric., Ph.D (UNAAB)	Monogastric Animal Nutrition
Jegede, A. V		B.Sc, M.Agric, Ph.D (UNAAB)	Monogastric Animal Nutrition
Sobayo, R. A		B.Agric.Tech (Akure) M.Sc(Ibadan) Ph.D (UNAAB)	Monogastric Animal Nutrition
Oso, O. A		B. Agric, M.Agric, Ph.D (UNAAB)	Monogastric Animal Nutrition
Fafiolu, O. A		B.Agric, M. Agric, Ph. D (UNAAB)	Monogastric Animal Nutrition