UNIVERSITY OF NIGERIA, NSUKKA

FACULTY OF VETERINARY MEDICINE

DEPARTMENT OF VETERINARY ANATOMY

POSTGRADUATE PROGRAMMES

PHILOSOPHY

The Postgraduate programmes of the Department of Veterinary Anatomy are designed to give the students a broad-based background in all areas of anatomy, and equip them with comprehensive knowledge in a specialized area of anatomy, with particular emphasis on morphological sciences and their relationship to structure and function. The programme prepares the students for high level academic and research capabilities to enable successful candidates play leadership roles in biomedical research, and function effectively as teachers of anatomy in universities and research institutes.

OBJECTIVES

The general objective of the programme is to provide students with adequate knowledge, attitudes, values and skills in Veterinary Anatomy.

(i). The MSc programme provides the students with fundamental training in the basic areas of Veterinary Anatomy, including gross anatomy, microscopic anatomy (histology) and developmental anatomy (embryology).

(ii). The PhD programme seeks to expose the candidate to in-depth study in a selected area of specialization.

SCOPE

(i). The MSc programme provides the students with fundamental training in the basic areas of Veterinary Anatomy, and the masters degree student may specialise in any of the following areas namely: Neuroanatomy, Developmental Anatomy (Embryology), Microscopic Anatomy (Histology), Gross and Comparative Anatomy, Immunochemistry, Histochemistry, Applied Anatomy and Biotechnology.

(ii). The PhD student shall select an area of specialisation for an in-depth study. The student may specialise in any of the following areas namely: Neuroanatomy, Developmental Anatomy (Embryology), Microscopic Anatomy (Histology), Gross and Comparative Anatomy, Immunochemistry, Histochemistry, Applied Anatomy and Biotechnology.

ADMISSION REQUIREMENTS

a. Master Science (M. Sc)

(i). The candidate must possess a good Doctor of Veterinary Medicine (DVM) degree or its equivalent from a recognized Veterinary Council of Nigeria-accredited/approved University OR
(ii). The candidate must possess a Bachelor of Science (B. Sc) degree in Anatomy from a recognized University.

b. Doctor of Philosophy (Ph. D)

(i). The candidate must possess a good Doctor of Veterinary Medicine (DVM) degree or its equivalent from a recognized Veterinary Council of Nigeria-accredited/approved University OR

the candidate must possess a Bachelor of Science (B. Sc) degree in Anatomy from a recognized University.

(ii). In addition to (i) above, the candidate must also possess a Masters degree (M. Sc) in Veterinary Anatomy or Human Anatomy from a recognized University, and must have obtained a cumulative grade point average of at least 3.5 on a 5 point scale or 3.0 on a 4 point scale in the Masters degree programme.

AREAS OF SPECIALIZATION

i. Neuroanatomy
ii. Developmental anatomy (Embryology)
iii. Microscopic anatomy (Histology)
iv. Gross and comparative anatomy
v. Histochemistry
vi. Immunohistochemistry
vii. Applied anatomy and biotechnology

DURATION OF PROGRAMMES

(a). Masters Degree (MSc)

Full time - a minimum of 3 semesters and a maximum of 5 semesters
Part time - a minimum of 5 semesters and a maximum of 8 semesters

(b). Doctor of Philosophy (PhD)

Full time - a minimum of 6 semesters and a maximum of 10 semesters
Part time - a minimum of 8 semesters and a maximum of 12 semesters

REQUIREMENTS FOR GRADUATION

(a). Masters Degree (MSc)

The study for the degree of Master of Science is by coursework and research project. The MSc degree shall be awarded to a candidate only after he/she has passed all registered taught courses, and has achieved a successful oral defence of his/her research project. All MSc students are to register for a minimum of 33 units as follows:

(i). Three compulsory faculty-based courses - 8 units.
(ii). One compulsory Postgraduate course PGC 601 - 3 units.
(iii). Core departmental courses - 16 units
(iv). Research Project - 6 units
Total - 33 units

(b). Doctor of Philosophy (PhD)

The study for the PhD degree is by course work and comprehensive research to be embodied in a thesis. The PhD degree shall be awarded to a candidate only after a successful oral defence of his/her thesis. All PhD students are to register for a minimum of 33 units as follows:

(i). Compulsory faculty-based courses - 6 units
(ii). One compulsory Postgraduate course PGC 701 - 3 units

(iii). Thesis	-	24 units
Total	-	**33 units**

LIST OF APPROVED SUPERVISORS

Professors

1. Innocent C. Nwaogu; DVM, MSc, PhD, FCVSN	Gross and Comparative Anatomy/ Neuroanatomy
2. Udensi M. Igwebuike; DVM, MSc, PhD	Veterinary Embryology & Histology
3. Casmir O. Igbokwe; DVM, MSc, PhD	Gross and Comparative Anatomy/ Immunohistochemistry

Senior Lecturer

1. Godwin C. Okpe; DVM, MSc, PhD, FCVSN	Veterinary Histology/Histochemistry

JOB OPPORTUNITIES

Successful graduates of the Department's postgraduate programmes may be employed as teachers and researchers in veterinary and medical faculties of universities, and may serve in research and development capacities in agricultural, medical or biomedical research institutes. They may also serve as consultants to private and public sectors of the livestock industry.

COURSE CODES, TITLES AND UNITS FOR MASTERS DEGREE PROGRAMME

First Semester

Course Code	Title	Units
FVM 701*	Research Methods and Scientific Writing	3
VAN 701*	Basic Anatomical Techniques	2
VAN 703	Advanced Histology/Microscopic Anatomy	2
VAN 705	Advanced Neuro-anatomy	2
VAN 707	Advanced Cell Biology and Cytogenetics	2
VAN 709	Applied Electron Microscopy	2
VAN 711	Comparative Vertebrate Morphology	2
VAN 713	Advanced Surgical Anatomy	2
VAN 715*	Research Techniques	2
	Total	**19**

* Compulsory Courses

Second Semester

Course Code	Title	Units
PGC 601*	Research Methodology and application of ICT in Research	3
FVM 702*	Biometrics and Computer Applications	3
FVM 796*	Research Project Final Seminar	2
FVM 790*	Research Project	6
VAN 702	Advanced Systemic Anatomy and Imaging	2
VAN 704	Advanced Developmental Anatomy and Teratology	2
VAN 706	Principles of Histochemistry	2
VAN 708	Advanced Avian Anatomy	2
VAN 710	Advanced Comparative Anatomy	2
VAN 712	Cell and Tissue Culture	2

VAN 732	Advanced Comparative Morphological and Biochemical Aspects of Reproductive System	2
	Total	**28**
	Minimum Required Total	**33**

* Compulsory Courses

COURSE CODES, TITLES AND UNITS FOR DOCTORAL (PhD) DEGREE PROGRAMME

Course Code	Title	Units
FVM 895	Ph.D Research Project Proposal Seminar	2
FVM 896	Ph.D Research Project Progress Report Seminar	2
FVM 897	Ph.D Research Project Final Seminar	2
PGC 701	Synopsis and Grant writing	3
FVM 890	Thesis	24
	Total -	**33 units**

COURSE DESCRIPTION FOR MASTERS DEGREE PROGRAMME

(A). Compulsory Faculty-based MSc Courses

FVM 701 Research Methods and Scientific Writing [3 units]

Definitions, value and philosophy of research. Types of studies/research. Choice of research topics. Definition of background of study, statement of problem, research question, objectives and hypotheses. Research design, sampling, sourcing, collation and analysis of data. Presentation and interpretation of results. Technical report writing. Critique of published papers. Presentation of research findings.

FVM 702 Biometrics and Computer Applications [3 units]

Definitions and value of biometry in scientific research. Variability and normal distribution.Probability, binomial and Poisson distributions. Populations and sampling. Testing differences between means. Student t-test, Chi-square, Correlation and Regression analyses' Analysis of variance and other relevant statistics. Basics of computer appreciation. Software packages relevant to scientific and veterinary medical research and their use. Presentation of scientific reports

FVM 796 Research Project Final Seminar [2 units]

Final seminar on M.Sc research project highlighting background of the study, statement of problem, objectives of the study, methods used in carrying out the study and analysis of the data generated, results, discussion of the results and recommendations arising from the findings of the study.

FVM 790 Research Project [6 units]

Research project in the student's area of study, leading to a Project Report that shall be examined by an External Examiner.

(B). <u>Compulsory Postgraduate course</u>

PGC 601: Research Methodology and Application of ICT in Research [3 Units]

In-depth research work aimed at acquiring full knowledge and presentations in scholarly writing of the concepts, issues, trends in the definition and development of the study area from African and Western perspectives. Major steps in research: selection of problem, literature, literature review, Design, Data collection, analysis and interpretation, Conclusions. Study of various research designs, Historical, Case studies, Surveys, Descriptive, cross sectional, Experimental etc. Analysis, surveys and synthesis of conceptual and philosophical foundations of different disciplines. Identification of research problems and development of research questions and or hypotheses. Detailed treatment of methods of collecting relevant research data and the format for presenting research results (from designing the table of contents to referencing, bibliography and appendix). Data analysis and result presentation in different disciplines using appropriate analytical tools. Methods of project/dissertation writing. Application of appropriate advanced ICT tools relevant in every discipline for data gathering, analysis and result presentation. Essentials of spreadsheets, internet technology, and internet search engines. All registered Masters Degree students must attend a solution-based interactive workshop to be organized by the School of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course, conducted by selected experts.

(C). <u>Departmental MSc Courses</u>

VAN 701 – Basic Anatomical techniques [2 units]

Basic descriptive and relational terminologies in anatomy. Definition of anatomical land marks such as planes, tuberosity, crest etc. Histological review of basic osteology and techniques for embalming, museum specimen preparation including cosmetic embalming, bone maceration and plastination. Preparation of whole skeleton. Injection techniques for Blood vessels. Routine Procedures for Light and Electron Microscopy, Microphotography. Detailed tissue preparation procedures for scanning and transmission electron microscopy. Freeze fracture and freeze etching.

VAN 702 – Advanced Systemic Anatomy and Imaging [2 units]

Study of Anatomy in the living body including surface marking or projection of various internal structures such as heart, kidneys, liver, main arteries and nerves. Imaging Techniques. The study of normal radiological appearances of various parts and regions of the body whether using plane X-rays as for bone or by the use of radio-opaque substances to visualize soft tissues e.gphlebography, barium meals and enema, arteriography, ultrasonography, CAT Scan, Magnetic Resonance Imaging and other advanced techniques.

VAN 703 – Advanced Histology/Microscopic Anatomy [2 units]

An in-depth study of the microscopic and ultrastructural morphology of tissues and organs, emphasizing mainly the relationship between structure and function. Systemic histology of

domestic species and laboratory animals as applicable to the student's problem. Circulatory, digestive, respiratory, urinary, reproductive, and integumentary systems and special senses should be covered.

VAN 704 - Advanced Developmental Anatomy and Teratology [2 units]

Advanced Delopmental Anatomy and Teratology lectures and practicals in introductory and general embryology including sex determination, cleavage, gastrulation and mechanisms of development. Organogenesis and development of various systems, mechanisms of congenital abnormalities and general principles of action of teratogens.

VAN 705 - Advanced Neuroanatomy [2 units]

Introduction and classification of the nervous system, external and internal features of the brain and spinal cord, spinal and cranial nerves, CSF and nerve tracts, special senses. Autonomic nervous system. Detailed macroscopic and microscopic anatomy of the nervous system including the coverings, topography, blood supply; pathways and internal organizations as they relate to function.Tract tracing techniques.

VAN 706 – Principles of Histochemistry [2 units]

Lectures and practicals are designed to relate chemical phenomena and methods to the study of tissues; advances in histochemistry of lipids, carbohydrates, proteins, enzymes and exogenous and endogenous metals and pigments. Histochemical dyes, non-dyes, etc. preparation of tissues for histochemistry. Principles of enzyme histochemistry of different animal tissues as applicable in light and electron microscopy.

VAN 707 – Cell Biology and Cytogenetics [2 units]

Cell ultrastructure, growth, differentiation and function. Structure and functions of biological membranes; including cilia, villi, flagella, etc. pinocytosis, phagocytosis, etc. Molecular events in cell cycle, behaviour of cellular organelles, regulation and interaction of gene action, nuclear and cytoplasmic interaction, DNA profiling and gene manipulation including karyotyping as an aid to cytogenetic disorders and diagnosis. Cell structure related to its biochemical and physiological activities in health and disease. A study of chromosomes – number, structure, anomalies and their significance in health and disease.

VAN 708 – Advanced Avian Anatomy [2 units]

Detailed study of the anatomy of galiforms and anserforms. The concept of pneumatic bones and air sacs. The avian reproductive system. Gross and microscopic morphology of the features of avain organ systems and their bearing on physiological processes.

VAN 709 – Applied Electron Microscopy [2 units]

Introduction to the development, design and construction of the electron microscope. Types of electron microscope. Comparison of light and electron microscopy. Brief review of electron optics and application of electron microscopy to medicine and research including elucidation of ultrastructure.

VAN 710 - Advanced Comparative Anatomy [2 units]

A discussion and laboratory study of the anatomical regions and organ systems with emphasis on the comparative aspects in all the Domestic Animals.

VAN 711 – Comparative Vertebrate Morphology [2 units]

Advanced study of the type of animal species in relation or comparison of other mammalian or vertebrate types: man, primates. Examination of skeletal remains. Dating of fossils, sex determination and other osteometric methods.

VAN 712 - Cell and Tissue Culture [2 units]

In-vitro cultivation and growth of cells and tissues including methods, techniques and uses. Various media including the concept of medium (MEM). Organisation and care of cell/tissue culture laboratory and equipment, etc. Application of cell/tissue culture in medicine and research.

VAN 713 – Advanced Surgical/Applied Anatomy [2 units]

Major landmarks in the body regions of different domestic animals. Topographical anatomy of bones, muscles, blood vessels, nerves and viscera and their application during surgery in different animal species.

VAN 732 – Advanced Comparative Morphology and Biochemical Aspects of the Reproductive System [2 units]

Detailed study of structural and morphological aspects of spermatogenesis, sperm maturation and transport, capacitation and fertilization, oogenesis. Detailed comparative anatomy of reproductive system of domestic animals with emphasis on relationship between structure and type of placentation observed in each animal species.

VAN 715- Research techniques peculiar to each student's needs [2 units]

COURSE DESCRIPTION FOR DOCTORAL (PhD) DEGREE PROGRAMME

FVM 895 Ph.DResearch Project Proposal Seminar [2 units]

Seminar on proposed Ph.D research project highlighting background of the study, review of literature on current state of knowledge of the area of research, statement of problem, objectives of the study, proposed methodology and expected output/significance of the study.

FVM 896 Ph.DResearch Project Progress Report Seminar [2 units]

Progress report seminar on the Ph.D research project highlighting background of the study, statement of problem, objectives of the study, methods used so far in the study, results generated, challenges encountered, changes (if any) in the design of the study and general discussion of the future prospects of the study.

FVM 897 Ph.D Research Project Final Seminar [2 units]

Final seminar on the Ph.D research project highlighting background of the study, statement of problem, objectives of the study, methods used in carrying out the study and analysis of the data generated, results, discussion of the results and recommendations arising from the findings of the study.

PGC 701 Synopsis and grant writing [3 units]

Identification of types and nature of grant writing; mining of grants application calls on the internet. Determining appropriate strategy for each grant application. Study of various grant application structures and contents and writing of concept notes, detailed project description, budgeting and budget defense. Study of sample grant writings in various forms and writing of mock research and other grants. Identification of University of Nigeria synopsis structure requirements (Introduction, Methodology and Results). Determining the content of each sub-unit of the synopsis. Steps in writing of synopsis from the dissertation/Thesis document. Structural and language issues. Common errors in synopsis writing and strategies for avoiding them. The roles of the student and the supervisor in the production of a synopsis. Writing of mock synopsis. All registered Ph.D students must attend a solution based interactive workshop to be organized by the school of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course, conducted by selected experts.

FVM 890 Thesis [24 units]

Doctor of Philosophy research project in the student's area of study, under the guidance of an approved supervisor. The study must be original and the topic comprehensively researched. The output should contribute significantly to the existing body of knowledge in the area of study. The write-up (thesis) shall be examined by an External Examiner.