



National Universities Commission

Core Curriculum and Minimum Academic Standards for the Nigerian University System (CCMAS)

Veterinary Medicine 2022

Ten Unique Features

1. Teaching and learning are competency-based with ample period assigned to clinical exposure at the fifth and sixth years of the programme.
2. Clinical management as a course has been introduced to acquaint students with setting-up of veterinary clinic/hospital, client reception and patient management procedures.
3. The structure of Veterinary Medicine programme being categorised into the pre-clinical, para-clinical and clinical phases and the flow of subjects from one phase to another is global standard.
4. Common courses from the Faculty of Science and General Studies courses would be taken at 100 level to 300 level.
5. The programme will produce resourceful, creative, and knowledgeable veterinary doctors that will be responsible for the health of domestic and non-domestic animals using 21st century skills.
6. Graduates are prepared for entry-level practice in major domestic and non-domestic animal species.
7. The program will also prepare graduates to pursue non-traditional practice careers such as public health and biomedical research.
8. Veterinary graduates will be equipped with ethical principles of the profession which they will apply while discharging their duties.
9. The curriculum is presented in a variety of formats including small and large group clinical exercises, lectures, laboratory activities, field/farm engagements, seminar presentations and discussions.
10. Students are nurtured to acquire knowledge and skills in science, technology and principles that will shape the future of veterinary profession and encourage them to be lifelong learners.

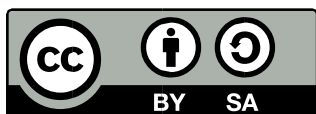
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Foreword

In furtherance of the “change” mantra of the present administration, I published a roadmap to guide my Ministry on ways of addressing the multiple problems that faced the education sector of the country shortly after my assumption of office in 2016. Known as “***Education for Change: Ministerial Strategic Plan – 2016-2019***” (updated to 2018-2022), the content of the document reaffirms government’s commitment to strengthening institutional structures and establishing innovative approaches that would quickly revamp the education sector.

The nations’ universities hold a pride of place in the execution of such a strategy, being at the peak of the educational system and charged in an overall manner, with the responsibility of catalysing the sustainable and inclusive growth and prosperity that the “change” mantra envisions. Thus, a “rapid revitalization of the Nigerian university system”, which is proceeding apace, became imperative. Improvement in research, teaching and learning facilities, deepening ICT penetration and the provision of enhanced power supply in our university campuses are some of the areas receiving stringent attention. In the same vein, the need was felt to radically review the curricula which universities had used for more than a decade so as to put in place one that would more directly address local issues, meet international standards and is fit for purpose for the training of 21st century graduates.

The National Universities Commission has concluded the review of the former *Benchmark Minimum Academic Standards (BMAS)* of 14 disciplines into those of *Core Curriculum and Minimum Academic Standards (CCMAS)* of 17 disciplines. I am therefore pleased to present these documents to the universities, the general public and the international community as I am sure that their application would tremendously uplift scholarship in our universities. I thank all and sundry who worked assiduously to bring this seminal enterprise to fruition.

Malam Adamu Adamu

Honourable Minister of Education



Preface

Section 10 (1) of the Education (National Minimum Standards and Establishment of Institutions) Act, Cap E3, Laws of the Federation of Nigeria 2004, empowers the National Universities Commission to lay down minimum standards for all universities and other degree awarding institutions of higher learning in the Federation and the accreditation of their degrees and other academic awards. The earliest efforts at giving effect to this legal framework in the Nigerian University System (NUS) started in 1989 following the collaboration between the Commission and Nigerian Universities, which led to the development of the Minimum Academic Standards (MAS) for all programmes in Nigerian universities. The MAS documents were subsequently approved by the Federal Government for use as a major instrument for quality assurance in the Nigerian University System (NUS). The documents were employed in the accreditation of programmes in the NUS for over a decade.

In 2001, the Commission initiated a process to revise the documents because the said MAS documents were essentially content-based and merely prescriptive. In 2004, the Commission developed outcome-based benchmark statements for all the programmes through a workshop that allowed for exhaustive deliberations by relevant stakeholders. Following comments and feedback from the universities to the effect that the Benchmark-style Statements were too sketchy to meaningfully guide the development of curriculum and inadequate for the purpose of accreditation, the Commission, in 2007 put in place a mechanism for the merger of the Benchmark-style Statements and the revised Minimum Academic Standards, which birthed the Benchmark Minimum Academic Standards (BMAS). The resultant BMAS, an amalgam of the outcome-based Benchmark statements and the content-based MAS clearly articulated the Learning Outcomes and competencies expected of graduates of each academic programme in Nigerian Universities without being overly prescriptive while at the same time providing the requisite flexibility and innovativeness consistent with institutional autonomy. In all, the BMAS documents were developed for the thirteen existing disciplines namely, **Administration and Management, Agriculture, Arts, Basic Medical Sciences, Education, Engineering and Technology, Environmental Sciences, Law, Medicine and Dentistry, Pharmaceutical Science, Sciences, Social Sciences and Veterinary Medicine.**

The Commission, in 2016, in its sustained commitment to make the NUS adaptable to global trends in higher education, constituted a group of relevant academic experts to develop a BMAS in **Computing**, thus increasing the number of disciplines in Nigerian Universities to fourteen.

In keeping with its mandate of making university education in Nigeria more responsive to the needs of the society, the National Universities Commission commenced the journey to restructure the BMAS in 2018, introducing in its place, the **Core Curriculum and Minimum Academic Standards (CCMAS)**, to reflect the 21st Century realities, in the existing and new disciplines and programmes in the Nigerian University System. The new CCMAS is a product of sustained stakeholder interactions over two years. The composition of each panel took into consideration, the triple helix



model, as a unique feature. This involved a blend of academic experts, academies, government (represented by NUC), professional bodies and of course, the private sector represented by the Nigerian Economic Summit Group (NESG). In order to enrich the draft documents, copies of each discipline were forwarded to all critical stakeholders including the relevant academic units in Nigerian Universities, the private sector, professional bodies and the academies for their comments and input. These inputs along with the curriculum of programmes obtained from some foreign and renowned universities served as major working materials for the various panels constituted for that purpose.

Bearing in mind the need to adhere to covid-19 protocol as prescribed by the National Centre for Disease Control (NCDC), the Commission was compelled by prevailing circumstances to finalize the curriculum virtually. General Assemblies were also held via Zoom, comprising, the NUC Strategic Advisory Committee (STRADVCOM), Chairpersons/Co-Chairpersons of the various disciplines and Panel Members of the respective programmes. Each Discipline and Programme had NUC representatives who assisted panellists with all the tools and working materials. Several online meetings were held at programmes level, where the real business of developing the CCMAS took place. The products of the various programme-based virtual meetings were submitted to the corresponding discipline group and then to the National Universities Commission. These documents were further scrutinized and fine-tuned by a smaller group of versatile subject matter specialists and relevant private sector practitioners.

In line with the dynamism in higher education provisioning, the Commission took cognizance of complaints by the universities on the high number of General Studies (GST) courses in the BMAS, and was subsequently streamlined. Entrepreneurship courses such as Venture Creation and Entrepreneurship, and innovation found generous space. In addition, the new curriculum unbundled the Bachelor of Agriculture, Bachelor of Science in Mass Communication and the Bachelor of Architecture Programmes, while establishing some emerging specializations in these fields as obtained globally. This is in furtherance of the goal of producing fit for purpose graduates. The Allied Health Sciences was also carved out as a new Discipline from the existing Basic Medical Sciences discipline.

Preceding the completion of the curriculum review content and language editing, a 3-day validation workshop (face-to-face mode) involving critical stakeholders, including STRADVCOM, Vice-Chancellors and Directors of Academic Planning of Nigerian Universities, as well as the Nigerian Economic Summit Group (NESG) was organized by the Commission to validate the CCMAS documents, and to engender ownership for ease of implementation.

Consequent upon the afore-mentioned processes, seventeen CCMAS documents were produced for the following academic disciplines in the NUS:

1. Administration and Management
2. Agriculture
3. Allied Health Sciences



4. Architecture
5. Arts
6. Basic Medical Sciences
7. Computing
8. Communication and Media Studies
9. Education
10. Engineering and Technology
11. Environmental Sciences
12. Law
13. Medicine and Dentistry
14. Pharmaceutical Science
15. Sciences
16. Social Sciences
17. Veterinary Medicine

The CCMAS documents are uniquely structured to provide for 70% of core courses for each programme, while allowing universities to utilise the remaining 30% for other innovative courses in their peculiar areas of focus. In addition to the overall Learning Outcomes for each discipline, there are also Learning Outcomes for each programme and course. In general, programmes are typically structured such that a student does not carry less than 30 credit units or more than 48 credit units per session.

Consequently, the Commission is optimistic that the 2022 CCMAS documents will serve as a guide to Nigerian Universities in the design of curriculum for their programmes with regards to the minimum acceptable standards of input and process, as well as, measurable benchmark of knowledge, 21st century skills and competences expected to be acquired by an average graduate of each of the academic programmes, for self, national and global relevance.

Professor Abubakar Adamu Rasheed, *mni, MFR, FNAL, HLR*
Executive Secretary



Contents

Foreword	6
Preface	7
Introduction	11
Doctor of Veterinary Medicine (DVM)	14
Overview	14
Philosophy	14
Objectives	14
Unique Features of the Programme	15
Employability Skills	15
21st Century Skills.....	16
Admission and Graduation Requirements.....	16
Global Course Structure.....	17
Minimum Academic Standards	57



Introduction

Two Acts provide the legal framework for the quality assurance and regulatory mandates of the National Universities Commission. The first is the **National Universities Commission Act No. N81 Laws of Federation Nigeria (L.F.N.) 2004**.

*This Act sets up the National Universities Commission as a body corporate charged with the responsibility of advising the Federal and State Governments of all aspects of university education and the general development of universities in Nigeria. The second, **Education (National Minimum Standard and Establishment of Institutions) Act No. E3 L.F.N. 2004**, empowers the National Universities Commission to lay down minimum standards for all universities and other institutions of higher learning in the Federation and the accreditation of their degrees and other academic awards in formal consultation with the universities for that purpose, after obtaining prior approval therefor through the Minister, from the President.*

Following the enactment of NUC Act No. E3 L.F.N. 2004, the National Universities Commission developed the first set of Minimum Academic Standards (MAS) in 1989 for all the academic programmes existing in the Nigerian University System (NUS) at that time under the 13 major disciplines of Administration, Agriculture, Arts, Education, Engineering and Technology, Environmental Sciences, Law, Medicine and Dentistry, Management Sciences, Pharmaceutical Science, Science, Social Sciences and Veterinary Medicine. The Minimum Academic Standard served as the reference documents for the first accreditation of programmes conducted in NUS in 1990.

In its bid to review the Minimum Academic Standard documents, which was predicated on the fact that they were prescriptive, the Commission decided to develop the outcome-based Benchmark Statements for all programmes in the Nigerian University System in line with contemporary global practice in 1999. In the first comprehensive review of the Minimum Academic Standards by NUC, which was in 2004, the Commission decided to merge the Benchmark Statements and the revised Minimum Academic Standards into a new document called Benchmark Minimum Academic Standards (BMAS). These documents were approved for use in Nigerian universities in 2007. A second attempt at reviewing the BMAS was in 2011. It must however be noted that stand alone BMAS for new programmes were at different times developed by the Commission on request from some Nigerian universities.

The Current Review of the BMAS

The journey of the current curriculum review efforts commenced in 2018, when the National Universities Commission circulated the 2018 draft BMAS to all Nigerian universities and other stakeholders for their comments. In addition to the harvested comments, the curriculum of different programmes of some world-class universities were downloaded. The draft 2018 BMAS, compiled comments of Nigerian universities and other stakeholders and the downloaded curriculum of some foreign universities served as the working documents for the curriculum review panels. A multi-



stakeholder approach was deployed in constituting the panels for the curriculum review exercise. The constituted panels included:

- i. Academic staff of Nigerian universities;
- ii. Representatives of the Academies;
- iii. Representatives of Professional bodies/associations
- iv. Representatives of the private sector

In addition to the reviewers working individually and in consultation with their subject area peers, over 512 cumulative online meetings of the general assembly (Vice-Chancellors, Discipline Chairmen/Chairpersons, programme-specific reviewers and Heads/representatives of international quality assurance agencies and institutions); Discipline groups; and programme groups were held between March and November, 2021. Physical meetings were also held to finalize the curriculum review exercise.

The reviewers carried out their assignments with a view to producing a curriculum for their respective programmes that will reflect both national and international expectations. Specifically, the reviewers focused on ensuring that the emerging curriculum will be adequate to train Nigerian university students in the 21st Century. By implication and in addition to current trends in the various programmatic areas, the curriculum will be ICT oriented, promote Artificial Intelligence, enhance skills acquisition (including soft skills), inculcate and sharpen entrepreneurship mindset of students and capable of steering the deployment of evolving technologies to deliver its content.

The Core Curriculum and Minimum Academic Standards (CCMAS)

The major highlights of the new curriculum are:

1. Change of nomenclature from **Benchmarks Minimum Academic Standards (BMAS)** to **Core Curriculum and Minimum Academic Standards (CCMAS)**;
2. The curriculum provides for 70% minimum core courses requirements for graduation. Nigerian universities are expected to provide the remaining 30%;
3. In consonance with global best practice, the curriculum is to stimulate blended learning in its delivery;
4. Mass Communication has been unbundled to create a distinct discipline of Communications comprising degree programmes in Advertising, Broadcasting, Development Communication Studies, Film and Multimedia, Information and Media Studies, Journalism and Media Studies, Mass Communication, Public Relations and Strategic Communication;
5. Agriculture has been unbundled into programmes in its contributing components of B.Sc Agricultural Economics, B.Sc. Animal Science, B.Sc. Crop Science and B.Sc. Soil Science;
6. The unbundling of Architecture and introduction of Architecture as a new discipline with programmes like Architecture, Architectural Technology, Furniture Design, Interior Architecture Design, Landscape Architecture and Naval architecture;
7. The split of the Basic Medical Sciences discipline into two – Basic Medical Sciences and Allied Health Sciences;



8. Reduction of the General Studies (GST) course from 36 credit units to 12 credit units of 6 courses as follows:
 - i. Communication in English;
 - ii. Nigerian People and Culture;
 - iii. Philosophy, Logic and Human Existence;
 - iv. Entrepreneurship and Innovation;
 - v. Venture creation; and
 - vi. Peace and Conflict resolution.
9. Entrepreneurship has been repackaged with the introduction of programme-specific entrepreneurship;
10. The number of academic disciplines has been increased from 14 to 17 as follows:
 - i. Administration and Management
 - ii. Agriculture
 - iii. Allied Health Sciences
 - iv. Architecture
 - v. Arts
 - vi. Basic Medical Sciences
 - vii. Communications and Media Studies
 - viii. Computing
 - ix. Education
 - x. Engineering and Technology
 - xi. Environmental Sciences
 - xii. Law
 - xiii. Medicine and Dentistry
 - xiv. Pharmaceutical Science
 - xv. Sciences
 - xvi. Social Sciences
 - xvii. Veterinary Medicine

Having reviewed the curriculum of Nigerian universities, the next steps will include training and retraining of academic staff of Nigerian universities to effectively deliver the content of the curriculum.



Doctor of Veterinary Medicine (DVM)

Overview

These Core Curriculum and Minimum Academic Standards (CCMAS) are designed for the education and training of undergraduate students wishing to obtain first degree in Veterinary Medicine in the Nigerian university system. Basic operational elements that serve to define the minimum academic standards required to achieve the cardinal goal of producing graduates in Veterinary Medicine are provided. This is to ensure sufficient academic background, practical and clinical exposure to face the challenges of a developing economy in the increasingly globalised world economy. It is pertinent to note that this CCMAS document is expected to guide institutions in the design of curricula for their Veterinary Medicine programme by stipulating the minimum requirements.

The core professional courses of the Doctor of Veterinary Medicine (DVM) programme are designed to prepare students for three main areas of emphasis, namely: pre-clinical; para-clinical; and clinical courses that satisfy students' learning objectives. The pre-clinical courses at 200 and 300 levels are meant to prepare students for knowledge of normal body forms and functions in domestic and non-domestic animals. It begins at the molecular and cellular levels to whole organism. The para-clinical courses at the 300 and 400 levels will prepare students for application of central biological principles and mechanisms that underlie animal health and disease manifestations at organism and population levels in a diverse global society. The clinical courses at the 500 and 600 levels are to equip students with the ability to use problem-solving skills to analyse a patient, synthesise a diagnosis, use medical and surgical skills for case management, prevent diseases, institute biosecurity measures as well as identify zoonotic diseases and food safety issues and to promote awareness of the public.

The Doctor of Veterinary Medicine degree in Nigeria is currently a single-track programme. It is presented as such in the current CCMAS document to enhance the development of strong comparative medicine and primary clinical skills for different species. This will ensure the versatility of veterinary graduates for the different sectors of animal and public health. The curriculum is competency-based to guarantee that graduates are career-ready and business-oriented.

Philosophy

The philosophy underlying the programme in Veterinary Medicine is the production of Veterinary Doctors with knowledge and practical skills to solve clinical problems and prevent diseases that affect animal health. It also pertains to relief of animal suffering, conservation of livestock resources, promotion of animal production and public health as well as advancement of veterinary knowledge. The programme will also provide a range of transferable skills that are of value in Veterinary Medicine and non-Veterinary employment and create in the graduates, entrepreneurial knowledge, a sense of public responsibility and a spirit of self-reliance. In addition, it will create awareness of the moral, ethical, legal, and professional obligations needed to function as part of a professional enterprise in a global society.

Objectives

The broad objective of Veterinary medical education is to achieve the goals and objectives of the national policy on food security, animal and public health in the context of global best practice of "One-World One-Health". Therefore, the curriculum has the following specific objectives:



1. development of resourceful, creative, and knowledgeable Veterinary Doctors to be responsible for the health of domestic and non-domestic animals as well as public health;
2. enable graduates to apply and compare the knowledge of normal animal body function, pathophysiologic mechanisms and natural history of important domestic and non-domestic animal disease manifestations in a diverse global society;
3. training of Veterinary personnel with vast knowledge of causes of animal diseases having requisite skills in therapeutics, disease management and control;
4. understanding of transmission dynamics of zoonotic diseases, their importance to public health and control strategies;
5. production of Veterinary graduates with understanding of ethical principles of the profession while discharging their duties; and
6. production of Veterinary graduates with 'Day One Competencies' including entrepreneurial skills, registrable by the Veterinary Council of Nigeria.

Unique Features of the Programme

Some inherent outstanding features geared towards producing graduates with very high intellectual mind and diverse practical skills for self-reliance, national development and global best practices are highlighted below.

1. Teaching and learning are competency-based with ample period assigned to clinical exposure at the fifth and sixth years of the programme.
2. Clinical management as a course has been introduced to acquaint students with setting-up of veterinary clinic/hospital, client reception and patient management procedures.
3. The structure of Veterinary Medicine programme being categorized into the pre-clinical, para-clinical and clinical phases and the flow of subjects from one phase to another is global standard.
4. Common courses from the Faculty of Science and General Studies courses would be taken at 100 level to 300 level.
5. The programme will produce resourceful, creative, and knowledgeable Veterinary doctors that will be responsible for the health of domestic and non-domestic animals using 21st century skills.
6. Graduates are prepared for entry-level practice in major domestic and non-domestic animal species.
7. The programme will also prepare graduates to pursue non-traditional practice careers such as public health and biomedical research.
8. Veterinary graduates will be equipped with ethical principles of the profession which they will apply while discharging their duties.
9. The curriculum is presented in a variety of formats including small and large group clinical exercises, lectures, laboratory activities, field/farm engagements, seminar presentations and discussions.
10. Students are nurtured to acquire knowledge and skills in science, technology and principles that will shape the future of Veterinary profession and encourage them to be lifelong learners.

Employability Skills

Graduates of Veterinary Medicine should be able to:

1. use problem-solving skills to analyse a patient and to synthesise a diagnosis or differential diagnosis by applying appropriate use of clinical laboratory tests;
2. apply basic medical skills to evaluate cases, develop a comprehensive treatment plan and patient referral when indicated;



3. apply anaesthesia, manage pain, relieve animal suffering and apply basic surgical skills in case management;
4. manage emergencies and intensive cares in animals;
5. identify ways to prevent disease, institute biosecurity measures, identify zoonotic diseases and food safety issues and promote awareness on public and animal health;
6. communicate effectively with clients and patients and exhibit ethical conduct while interacting with a diverse population of clients; and
7. manage people, funds, materials, and equipment.

21st Century Skills

1. Critical thinking
2. Creativity
3. Collaboration
4. Communication
5. Information literacy
6. Media literacy
7. Technology literacy
8. Flexibility
9. Leadership
10. Initiative
11. Productivity
12. Social skills.

Admission and Graduation Requirements

Admission Requirements

Candidates are admitted into the degree programme through any of the following two entry modes:

1. Unified Tertiary Matriculation Examination (UTME)
2. Direct Entry

Unified Tertiary Matriculation Examination (UTME)

Candidates should possess credit level passes in five subjects at O'Level in nationally recognised examinations including English Language, Mathematics, Physics, Biology and Chemistry at not more than two sittings. It is also desirable for candidates to have Agricultural Science at credit level.

Direct Entry

Candidates should possess at least two GCE Advanced level/IJMB passes in Chemistry, Biology/Zoology/Botany, with Physics or Mathematics as combination. Special consideration is given to candidates with first degrees in Zoology, Basic Medical Sciences and Animal Husbandry/Production. Holders of HND in Animal Health with minimum of Upper Grade level are eligible for consideration for admission into 200 level provided the candidates have met the O/L requirements.

Duration

The minimum duration of training in Veterinary Medicine programme is six academic sessions for candidates admitted through the UTME mode. Direct Entry candidates admitted to the 200 level of the programme will spend a minimum of five academic sessions.



Graduation Requirements

1. Candidates must have registered and passed all the compulsory and required courses specified for the programme.
2. Compulsory courses failed at any one phase may not be carried into the next phase.
3. Students must satisfy the provisions of the professional conduct as required for registration with the Veterinary Council of Nigeria.
4. The maximum length of time for the award of the Doctor of Veterinary Medicine Degree shall be eighteen semesters for the 6-year degree programme and sixteen semesters for students admitted directly into the 200 level.
5. Students who transfer from other universities shall be credited with only those courses deemed relevant to the programme, which they have already passed prior to their transfer. Such students shall however be required to pass the minimum number of units specified for graduation for the number of sessions he/she has spent in the Faculty; provided that no student shall spend less than five sessions (10 semesters) in order to earn a degree. Students who transfer from another programme to the DVM programme for any approved reason shall be credited with those units passed that are within the curriculum of the programme to which they have transferred. Appropriate decisions on transfer cases shall be subjected to the approval of Senate on the recommendation of the Faculty.

Global Course Structure

100 level

Course Code	Course Title	Units	Status	LH	PH
GST 111	Communication in English	2	C	15	45
GST 112	Nigerian Peoples and Culture	2	C	30	-
BIO 101	General Biology I	2	C	30	-
BIO 102	General Biology II	2	C	30	-
BIO 107	General Biology Practical I	1	C	-	45
BIO 108	General Biology Practical II	1	C	-	45
CHM 101	General Chemistry I	2	C	30	-
CHM 102	General Chemistry II	2	C	30	-
CHM 107	General Practical Chemistry I	1	C	-	45
CHM 108	General Practical Chemistry II	1	C	-	45
PHY 101	General Physics I	2	C	30	-
PHY 103	General Physics III	3	C	45	-
PHY 107	General Practical Physics I	1	C	-	45
PHY 108	General Practical Physics II	1	C	-	45
VMD 101	Introduction to Veterinary Medicine	2	C	30	-
	Total	27			

200 Level

Course Code	Course Title	Units	Status	LH	PH
GST 212	Philosophy, Logic and Human Existence	2	C	30	-
ENT 211	Entrepreneurship and Innovation	2	C	15	45
VAN 201	Gross Veterinary Anatomy I	3	C	30	45



VAN 202	Gross Veterinary Anatomy II	3	C	30	45
VAN 203	Histology	3	C	30	45
VPY 201	Veterinary Physiology I	3	C	30	45
VPY 202	Veterinary Physiology II	3	C	30	45
VPY 204	Veterinary Physiology III	3	C	30	45
VBC 201	Biochemistry I	3	C	30	45
VBC 202	Biochemistry II	3	C	30	45
VBC 204	Introductory Molecular Biology	2	R	15	45
VHM 201	Food Animal Production and Management	2	C	15	45
VHM 202	Companion and Wild Animal Management	2	C	15	45
VHM 203	Poultry and Fish Production and Management	2	C	15	45
VHM 204	Animal Welfare	2	C	30	-
VEX 299	Externship I	2	C	6 weeks	
Total		40			

300 Level

Course Code	Course Title	Units	Status	LH	PH
GST 312	Peace and Conflict Resolution	2	C	30	-
ENT 312	Venture Creation	2	C	15	45
VAN 305	Embryology	3	C	30	45
VAN 307	Comparative Gross Anatomy	2	C	15	45
VPY 305	Environmental Physiology	3	C	30	45
VPY 307	Reproductive Physiology and Endocrinology	2	C	15	45
VBC 305	Biochemistry III	3	C	30	45
VPC 301	General Pharmacology	2	C	30	-
VPE 302	General Veterinary Parasitology	3	C	30	45
VMB 302	Introductory Microbiology	3	C	30	45
VMB 304	Principles of Immunology	2	C	30	-
VMB 306	Pathogenic Bacteriology	3	C	30	45
VPT 302	Principles of General Pathology	3	C	30	45
VSR 302	Wound Management	2	C	15	45
VEX 399	Externship II	2	C	6 weeks	
Total:		37			

400 Level

Course Code	Course Title	Units	Status	LH	PH
VPC 403	Systemic Pharmacology	3	C	30	45
VPC 404	Chemotherapy	2	C	15	45
VPC 405	Toxicology	2	C	15	45
VPE 403	Protozoology	2	C	15	45
VPE 404	Helminthology	2	C	15	45
VPE 405	Entomology	2	C	15	45
VMB 407	Systemic Virology and Mycology	3	C	30	45
VPT 403	Systemic Pathology	3	C	30	45



VPT 404	Pathology of Infectious and Non-Infectious Diseases	3	C	30	45
VPH 401	Wildlife Ecology and Conservation	2	C	30	-
VSR 403	Anaesthesiology and Intensive Care	2	C	15	45
VSR 404	Introductory Surgery and Basic Radiology	2	C	15	45
VMD 401	Introductory Internal Medicine	2	C	15	45
VMD 402	Clinical Management	2	C	15	45
VTP 401	Veterinary Gynaecology	2	C	15	45
VTP 402	Veterinary Andrology and Artificial Insemination	2	C	15	45
VPM 402	Veterinary Extension and Rural Sociology	2	C	30	-
VHM 406	Farm Animal Breeding and Genetics	2	C	15	45
VEX 499	Externship III	2	C	6 weeks	
Total		42			

500 Level

Course Code	Course Title	Unit(s)	Status	LH	PH
VAN 509	Applied and Radiographic Clinical Anatomy	1	C	-	45
VPT 505	Clinical Pathology	2	C	15	45
VPH 503	Food Hygiene and Safety	2	C	30	-
VPH 504	Zoonoses and Environmental Health	2	C	30	-
VPM 505	Epidemiology and Principles of Disease Prevention	2	C	30	-
VPM 506	Veterinary Administration, Jurisprudence and Ethics	2	C	30	-
VPM 508	Veterinary Biostatistics and Economics	2	C	30	-
VMD 503	Aquatic and Wild Animal Medicine	2	C	30	-
VMD 504	Avian Medicine	2	C	30	-
VMD 505	Small Animal, Laboratory Animal and Microlivestock Medicine	2	C	30	-
VMD 506	Ruminant Medicine	2	C	30	-
VMD 507	Porcine Medicine	2	C	30	-
VMD 508	Equine Medicine	2	C	30	
VSR 505	Diagnostic Imaging	2	C	30	-
VSR 506	Soft Tissue Surgery	2	C	30	-
VSR 507	Orthopaedic Surgery	2	C	30	-
VSR 508	Large Animal Lameness	2	C	30	
VTP 503	Veterinary Obstetrics and Neonatology	2	C	30	-
VTP 504	Large Animal Theriogenology	2	C	30	-
VTP 505	Small Animal, Laboratory Animal and Microlivestock Theriogenology	2	C	30	-
VCH 501	Clinics I	2	C	-	90
VCH 502	Clinics II	2	C	-	90



VEX 599	Externship IV	2	C	6 weeks
Total		45	-	

600 Level

Course Code	Course Title	Units	Status	LH	PH
VPM 609	Computer Application in Veterinary Medicine	2	C	15	45
VPC 607	Applied Pharmacology	2	C	15	45
VCH 603	Clinics I	10	C	-	450
VPC 608	Veterinary Pharmacy, Agrochemicals and Quality Control of Veterinary Pharmaceuticals	2	C	30	-
VCH 604	Clinics II	10	C	-	450
VCH 605	Clinical Seminar I	1	C	-	45
VCH 606	Clinical Seminar II	1	C	-	45
VRP 608	Research Project	4	C	-	180
VEX 698	Rural Posting	1	C	2 weeks	
Total		33			

NOTE:

C = Compulsory

LH = Lecture Hours per semester

PH = Practical Hours per semester

Course Contents and Learning Outcomes

100 Level

GST 111: Communication in English

(2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. identify possible sound patterns in English Language;
2. list notable Language skills;
3. classify word formation processes;
4. construct simple and fairly complex sentences in English;
5. apply logical and critical reasoning skills for meaningful presentations;
6. demonstrate an appreciable level of the art of public speaking and listening; and
7. write simple and technical reports.

Course Contents

Sound patterns in English Language (vowels and consonants, phonetics and phonology). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Sentence in English (types: structural and functional, simple and complex). Grammar and Usage (tense, mood, modality and concord, aspects of language use in everyday life). Logical and Critical Thinking and Reasoning Methods (Logic and Syllogism, Inductive and Deductive Argument and Reasoning Methods, Analogy, Generalisation and Explanations).



Ethical considerations, Copyright Rules and Infringements. Writing Activities: (Pre-writing , Writing, Post writing, Editing and Proofreading; Brainstorming, outlining, Paragraphing, Types of writing, Summary, Essays, Letter, Curriculum Vitae, Report writing, Note making etc. Mechanics of writing). Comprehension Strategies: (Reading and types of Reading, Comprehension Skills, 3RsQ). Information and Communication Technology in modern Language Learning. Language skills for effective communication. Major word formation processes. Writing and reading comprehension strategies. Logical and critical reasoning for meaningful presentations. Art of public speaking and listening. Report writing.

GST 112: Nigerian Peoples and Cultures

(2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. analyse the historical foundation of the Nigerian culture and arts in pre-colonial times;
2. list and identify the major linguistic groups in Nigeria;
3. explain the gradual evolution of Nigeria as a political unit;
4. analyse the concepts of Trade, Economic and Self-reliance status of the Nigerian peoples towards national development;
5. enumerate the challenges of the Nigerian State towards Nation building
6. analyse the role of the Judiciary in upholding people's fundamental rights
7. identify acceptable norms and values of the major ethnic groups in Nigeria; and
8. list and suggest possible solutions to identifiable Nigerian environmental, moral and value problems.

Courses Contents

Nigerian history, culture and art up to 1800 (Yoruba, Hausa and Igbo peoples and culture; peoples and culture of the ethnic minority groups). Nigeria under colonial rule (advent of colonial rule in Nigeria; Colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914; formation of political parties in Nigeria; Nationalist movement and struggle for independence). Nigeria and challenges of nation building (military intervention in Nigerian politics; Nigerian Civil War). Concept of trade and economics of self-reliance (indigenous trade and market system; indigenous apprenticeship system among Nigeria people; trade, skill acquisition and self-reliance). Social justices and national development (law definition and classification. Judiciary and fundamental rights. Individual, norms and values (basic Nigeria norms and values, patterns of citizenship acquisition; citizenship and civic responsibilities; indigenous languages, usage and development; negative attitudes and conducts. Cultism, kidnapping and other related social vices). Re-orientation, moral and national values (The 3R's – Reconstruction, Rehabilitation and Re-orientation; Re-orientation Strategies: Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAI), War Against Indiscipline and Corruption(WAIC), Mass Mobilization for Self-Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

BIO 101: General Biology I

(2 Units C: LH 30)

Learning Outcomes

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

1. explain cell structure and organizations;
2. summarise functions of cellular organelles;
3. characterise living organisms and state their general reproduction;
4. describe the interrelationship that exists between organisms;
5. discuss the concept of heredity and evolution; and



6. enumerate habitat types and their characteristics.

Course Contents

Cell structure and organisation, functions of cellular organelles, characteristics and classification of living things, chromosomes, genes and their relationships and importance, general reproduction, interrelationships of organisms (competitions, parasitism, predation, symbiosis, commensalisms, mutualism, saprophytism), heredity and evolution (introduction to Darwinism and Lamarkism, Mendelian laws, explanation of key genetic terms), elements of ecology and types of habitat.

BIO 102: General Biology II

(2 Units C: LH 30)

Learning Outcomes

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

1. state the unique characteristics of plant and animal kingdoms;
2. describe ecological adaptations in the plant and animal kingdoms;
3. give a summary of the physiology of plants and animals;
4. explain nutrition, respiration, excretion and reproduction in plants and animals; and
5. describe growth and development in plants and animals.

Course Contents

A general survey of the plant and animal kingdoms based mainly on study of similarities and differences in the external features, ecological adaptations of these forms. Briefs on physiology to include nutrition, respiration, circulatory systems, excretion, reproduction, growth and development.

BIO 107: General Biology Practical I

(1 Unit C: PH 45)

Learning Outcomes

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

1. outline common laboratory hazards;
2. provide precautions on laboratory hazards;
3. state the functions of the different parts of microscope;
4. use the microscope and describe its maintenance;
5. draw biological diagrams and illustrations; and
6. apply scaling and proportion to biological diagrams.

Course Contents:

Common laboratory hazards: prevention and first aid; measurements in biology; uses and care of microscope; compound and dissecting microscope. Biological drawings and illustration, scaling, accuracy and proportion; use of common laboratory apparatus and laboratory experiments designed to illustrate the topics covered in **BIO 101**.

BIO 108: General Biology Practical II

(1 Unit C: PH 45)

Learning outcomes

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

1. describe the anatomy of flowering plants;
2. differentiate types of fruit and seeds;
3. state ways of handling and caring for biological wares;
4. describe the basic histology of animal tissues; and



5. identify various groups in the animal kingdom.

Course Contents

Anatomy of flowering plants, primary vegetative body: stem, leaf and root to show the mature tissues namely parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Care and use of dissecting kits and other biological wares. Dissection and general histology of animal tissues based on vertebrate forms. Morphology and functions of epithelial, muscular, nervous and connective tissues. Examination of various groups of lower invertebrates under microscopes, identification of various groups of organisms in Animal Kingdom, and any experiment designed to emphasise the practical aspects of topics in **BIO 102**.

CHM 101: General Chemistry I

(3 Units C: LH 45)

Learning Outcomes

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

1. define atom, molecules and chemical reactions;
2. discuss the Modern electronic theory of atoms;
3. write electronic configurations of elements on the periodic table;
4. rationalise the trends of atomic radii, ionisation energies, electronegativity of the elements based on their position in the periodic table;
5. identify and balance oxidation – reduction equation and solve redox titration problems;
6. draw shapes of simple molecules and hybridised orbitals;
7. identify the characteristics of acids, bases and salts, and solve problems based on their quantitative relationship;
8. apply the principles of equilibrium to aqueous systems using LeChatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
9. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
10. determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents

Atoms, molecules, elements and compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridisation and shapes of simple molecules. Valence Forces; Structure of solids. Chemical equations and stoichiometry; Chemical bonding and intermolecular forces, kinetic theory of matter. Elementary thermochemistry; rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: General Chemistry II

(3 Units C: LH 45)

Learning Outcomes

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

1. state the importance and development of organic chemistry;
2. define fullerenes and its applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. state rules guiding nomenclature and functional group classes of organic chemistry;
6. determine rate of reaction to predict mechanisms of reaction;



7. identify classes of organic functional group with brief description of their chemistry;
8. discuss comparative chemistry of group 1A, IIA and IVA elements; and
9. describe basic properties of Transition metals.

Course Contents

Historical survey of the development and importance of Organic Chemistry; Fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures, nanochemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in Organic Chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The chemistry of selected metals and non-metals. Comparative chemistry of group 1A, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 107: General Chemistry Practical I (1 Unit C: PH 45)

Learning Outcomes

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

1. state the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out Chemical experiments;
3. identify the basic glassware and equipment in the laboratory;
4. state the differences between primary and secondary standards;
5. perform redox titration;
6. recording observations and measurements in the laboratory notebooks; and
7. analyse the data to arrive at scientific conclusions.

Course Contents

Laboratory experiments designed to reflect topics presented in courses CHM 101 and CHM 102. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

CHM 108: General Chemistry Practical II (1 Unit C: PH 45)

Learning Outcomes

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

1. state the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out Chemical experiments;
3. identify the basic glassware and equipment in the laboratory;
4. identify and carry out preliminary tests which includes ignition, boiling point, melting point, test on known and unknown organic compounds;
5. carry out solubility tests on known and unknown organic compounds; and
6. carry out elemental tests on known and unknown compounds;

Course Contents

Continuation of **CHM 107**. Additional laboratory experiments to include functional group analysis, quantitative analysis using volumetric methods. Carryout functional group/confirmatory test on known and unknown compounds which could be acidic/basic/neutral organic compounds.



PHY 101: General Physics I (Mechanics)**(2 Units C: LH 30)****Learning Outcomes**

At completion of the course, students should be able to:

1. identify and deduce the physical quantities and their units;
2. differentiate between vectors and scalars;
3. describe and evaluate motion of systems on the basis of the fundamental laws of mechanics;
4. apply Newton's laws to describe and solve simple problems of motion;
5. evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;
6. explain and apply the principles of conservation of energy, linear and angular momentum;
7. describe the laws governing motion under gravity; and
8. explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents

Space and time; units and dimension, vectors and scalars, differentiation of vectors: displacement, velocity and acceleration; kinematics; Newton laws of motion (Inertial frames, Impulse, force and action at a distance, momentum conservation); relative motion; application of Newtonian mechanics; Equations of motion; Conservation principles in physics, Conservative forces, conservation of linear momentum, Kinetic energy and work, Potential energy, System of particles, Centre of mass; Rotational motion; Torque, vector product, moment, rotation of coordinate axes and angular momentum. Polar coordinates; conservation of angular momentum; Circular motion; Moments of inertia, gyroscopes and precession; Gravitation: Newton's Law of Gravitation, Kepler's Laws of Planetary Motion, Gravitational Potential Energy, Escape velocity, Satellites motion and orbits.

PHY 103: General Physics III (Electricity and Magnetism)**(3 Units C: LH 45)****Learning Outcomes**

At the completion of this course, the Students should be able to;

1. describe the electric field and potential, and related concepts, for stationary charges;
2. calculate electrostatic properties of simple charge distributions using Coulomb's law, Gauss's law and electric potential;
3. describe and determine the magnetic field for steady and moving charges;
4. determine the magnetic properties of simple current distributions using Biot-Savart and Ampere's law;
5. describe electromagnetic induction and related concepts, and make calculations using Faraday and Lenz's laws;
6. explain the basic physical of Maxwell's equations in integral form;
7. evaluate DC circuits to determine the electrical parameters; and
8. determine the characteristics of ac voltages and currents in resistors, capacitors, and inductors.

Course Contents

Forces in nature; Electrostatics; electric charge and its properties, methods of charging; Coulomb's law and superposition; electric field and potential; Gauss's law; Capacitance; Electric dipoles; Energy in electric fields; Conductors and insulators, current, voltage and resistance, Ohm's law and analysis of DC circuits; Magnetic fields; Lorentz force; Biot-Savart and Ampère's laws; magnetic dipoles; Dielectrics; Energy in magnetic fields; Electromotive force; Electromagnetic induction; Self and mutual inductances; Faraday and Lenz's laws; Step



up and step down transformers: Maxwell's equations; Electromagnetic oscillations and waves; AC voltages and currents applied to inductors, capacitors, resistance, and combinations.

PHY 107: General Practical Physics I

(1 Unit C: PH 45)

Learning Outcomes

On completion, the student should be able to:

1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs; and
5. draw conclusions from numerical and graphical analysis of data.

Course Contents

This introductory course emphasizes quantitative measurements. Experimental techniques. The treatment of measurement errors. Graphical analysis. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, etc. (covered in PHY 101, 102, 103 and PHY 104). However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis, and deduction.

PHY 108: General Practical Physics II

(1 Unit C: PH 45)

Learning Outcomes

On completion, the student should be able to:

1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs;
5. draw conclusions from numerical and graphical analysis of data; and
6. prepare and present practical reports.

Course Contents

This practical course is a continuation of PHY 107 and is intended to be taught during the second semester of the 100 level to cover the practical aspect of the theoretical courses that have been covered with emphasis on quantitative measurements, the treatment of measurement errors, and graphical analysis. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

VMD 101: Introduction to Veterinary Medicine

(2 Units C: LH 30)

Learning Outcomes

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

1. present an overview of the discipline of Veterinary Medicine and existing opportunities;
2. describe the different phases of the programme; and
3. explain the importance of the different subjects to Veterinary practice.

Course Contents

History of the Veterinary profession in Nigeria. Organisation of veterinary services in Nigeria and clinical practice with reference to small animals, laboratory and exotic animals as well as equine practice. Nigerian livestock production (Ruminant, Swine, Poultry and Fish). Public Health and



the concept of 'One World, One Health'. The importance of theriogenology and surgery in veterinary clinical practice. Prospects and job opportunities in the Veterinary profession.

GST 212: Philosophy, Logic and Human Existence (2 Units C: LH 30)

Learning Outcomes

A student who has successfully gone through this course should be able to:

1. enumerate the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy & the centrality of logic in philosophical discourse;
3. determine the elementary rules of reasoning;
4. distinguish between valid and invalid arguments;
5. provide critical thinking and assess arguments in texts, conversations and day-to-day discussions;
6. critically assess the rationality or otherwise of human conduct under different existential conditions;
7. develop the capacity to extrapolate and deploy expertise in logic to other areas of knowledge; and
8. explain his or her actions, using the knowledge and expertise acquired in philosophy and logic.

Course Contents

Scope of philosophy; notions, meanings, branches and problems of philosophy. Logic as an indispensable tool of philosophy. Elements of syllogism, symbolic logic—the first nine rules of inference. Informal fallacies, laws of thought, nature of arguments. Valid and invalid arguments, logic of form and logic of content — deduction, induction and inferences. Creative and critical thinking. Impact of philosophy on human existence. Philosophy and politics, philosophy and human conduct, philosophy and religion, philosophy and human values, philosophy and character moulding, etc.

ENT 211: Entrepreneurship and Innovation (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation, and risk taking
2. state the characteristics of an entrepreneur;
3. analyze the importance of micro and small businesses in wealth creation, employment, and financial independence
4. engage in entrepreneurial thinking;
5. identify key elements in innovation;
6. describe stages in enterprise formation, partnership and networking including business planning;
7. describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world;
8. state the basic principles of e-commerce.

Course Contents

Concept of entrepreneurship (entrepreneurship, intrapreneurship/corporate entrepreneurship,). theories, rationale and relevance of entrepreneurship (schumpeterian and other perspectives, risk-taking, necessity and opportunity-based entrepreneurship and creative destruction). Characteristics of entrepreneurs (opportunity seeker, risk taker, natural



and nurtured, problem solver and change agent, innovator and creative thinker). Entrepreneurial thinking (critical thinking, reflective thinking, and creative thinking). Innovation (concept of innovation, dimensions of innovation, change and innovation, knowledge and innovation). Enterprise formation, partnership and networking (basics of business plan, forms of business ownership, business registration and forming alliances and joint ventures). Contemporary entrepreneurship issues (knowledge, skills and technology, intellectual property, virtual office, networking). Entrepreneurship in Nigeria (biography of inspirational entrepreneurs, youth and women entrepreneurship, entrepreneurship support institutions, youth enterprise networks and environmental and cultural barriers to entrepreneurship). Basic principles of e-commerce.

VHM 201: Food Animal Production and Management (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. identify livestock species (cattle, sheep and goats) by breed;
2. handle food animals; and
3. explain production systems and health management practices on farms.

Course Contents

Introduction to livestock husbandry. Livestock species, breeds and distribution. Animal behaviour. Livestock production systems: extensive, semi-intensive, intensive. Estimation of live-weight and age. Emphasis on birth weight, litter size, weaning age/weight, growth rate. Disbudding, dry hoof trimming. Tagging and branding. Restraint techniques and handling. Animal transportation. Nomadism, pasture management, animal housing.

VHM 202: Companion and Wild Animal Management (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. demonstrate the handling of companion animals such as dogs, cats, horses, etc and analyse their behaviour; and
2. demonstrate how to handle and provide care for wild animals in captivity.

Course Contents:

Housing and grooming of companion animals. Types/breeds of dogs and cats. Uses of dogs. Bathing tips, tooth care. Basic training of puppies and adult dogs. Husbandry of camels, horses, buffaloes, donkeys and their uses. Restraint techniques and animal handling. Feeds and feeding of companion animals. Kennel and stable management. Application of modern techniques in routine management and health of companion and wild animals. Animal transportation. Care of the hoof.

VHM 203: Poultry and Fish Production and Management (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. identify the types and breeds of poultry and fish; and
2. explain housing, feeding and other health management practices necessary for poultry and fish production.



Course Contents

History of the domestic fowl. Types and breeds of poultry. Special husbandry (housing and feeding) requirements of broilers, layers, breeders and cockerels. Special husbandry requirements of turkey, guinea fowl, duck, ostrich and quail. Hatchery management. Inspection and care of day-old chicks. Biosecurity measures on poultry farms. Conditions that affect the health of fish stock. Aquaculture biosecurity protocols. Strategies to manage and maintain the health and well-being of fish in aquaculture facilities. Monitoring fish health. Health consideration in fishpond management.

VHM 204: Animal Welfare

(2 Units C: LH 30)

Learning Outcomes

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

1. state the legal and regulatory framework for animal welfare and animal euthanasia;
2. demonstrate social responsibility for animal well-being and reducing animal suffering;
3. determine the effective measures to apply when adverse events occur in animals; and
4. select the best practices for animal use in research.

Course Contents

Definition of the term 'Animal Welfare'. Legal and regulatory framework for animal welfare including right to kill. Animal population dynamics in relation to animal welfare. Humane transportation, killing, disposal and harvesting. Care of animals during disaster. Animal freedom and behaviour (freedom from pain, injury and disease, fear, stress and discomfort and freedom to express normal behaviour). Animal care in research (International standards and best practices in research and training). Provisions in the criminal and penal codes on animal mishandling and welfare.

VAN 201: Gross Veterinary Anatomy I

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the nomenclature of structures of the organ system;
2. describe relative positions of organs in the body and the relationships with one another; and
3. correlate the knowledge acquired to radiology and surgery courses at the clinical levels.

Course Contents

Definition of anatomic terms. The basic gross anatomy of the animal body, skeletal system, respiratory, digestive, circulatory and lymphatic systems of a type animal. Comparative anatomy of internal organs. General plan of circulation, heart, arterial and venous systems. Pulmonary and systemic circulation. Respiratory system; pleural cavity (visceral and parietal pleura). Larynx and tracheal anatomy, differences in sheep and goat. Digestive system (ruminant). Lymphatic system; major lymph nodes in thorax and abdomen. General osteology, myology, arthrology.

VAN 202: Gross Veterinary Anatomy II

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the nomenclature of structures of the organ system;
2. describe relative positions of bones and organs in the body; and



3. demonstrate competence in dissection to see, *in situ*, the organs of the body and their relationships with one another.

Course Contents

Urogenital System (Ruminant): Kidney (Large and Small Ruminants), ureter, bladder, and urethra. Male urogenital peculiarities (urethra to glans penis), urogenital folds, spermatic cord, testes and epididymis, inguinal canal, accessory sex organs. Female urogenital system, urethra to vulva, ovaries to vagina. Broad ligament. Recap blood and nerve supply to reproductive system. Neuroanatomy and structures in the head (Ruminant): superficial structures of the head, horn, canthus, commissures, nasal anatomy. Bones of the skull, special joints of the skull. Muscles of the head. Major blood and nerve supply to the head. Structures of the brain. Circle of Willis.

VAN 203: Histology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. identify each organ microscopically;
2. demonstrate the practical skill to use the microscope; and
3. identify histological uniqueness of some organs across species.

Course Contents

History and introduction to microscopy and microscopic techniques: History and introduction to the cell, membrane structure, and cell surface modification, nucleus, principle of protein synthesis, exocytosis and endocytosis, gap junction and cytoskeleton. Organelles: mitochondria, ribosomes, endoplasmic reticulum, Golgi apparatus, lysosomes. Epithelia tissue: different types, examples of where they are found, glandular epithelium (exocrine and endocrine). Connective tissue: Cells, fibres, ground substance. Muscular tissue: Skeletal, smooth, cardiac, basic ultrastructure of muscle unit. Nervous tissue: Basic neuron, neuron types, ultrastructure of neuron, myelin, synapse, glial cells, peripheral nerve ganglion, choroid plexus, sensory receptors, blood brain barrier. Systemic Histology: Microscopic study of the organ systems of the body of animals. Comparative Histology of the organ systems of animals.

VBC 201: Biochemistry I (Chemistry and Biochemistry of Carbohydrate and Protein. Abnormalities of Carbohydrate and Protein Metabolism) **(3 Units C: LH 30; PH 45)**

Learning Outcomes

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

1. explain the chemistry and biochemistry of carbohydrates and proteins;
2. describe the abnormalities of carbohydrates, protein, amino acids; and
3. explain haemoglobin metabolism.

Course Contents

Pathways of metabolism of glucose and fructose, and control of carbohydrate metabolism. The electron transport chain (ETC) and oxidative phosphorylation. Chemistry and structure of amino acids, peptides and peptic bonds, and metabolism of amino acids and amino sugars. Essential and non-essential amino acids. Classification, structure and functions of proteins. Urea cycle and its biochemical importance. Glucose-6-phosphate dehydrogenase (G6PD) deficiency. Inborn errors of metabolism of some amino acids e.g. (phenylketonuria, tyrosinosis, alkaptonuria, albinism, cystinuria). Structure, properties, and biochemical



functions of Haemoglobin, Porphyrins and Porphyrinurias. Functions of bile pigments; jaundice. Haemoglobinopathies, HBS, thalassemias, haemophilia, etc.

VBC 202: Biochemistry II (Chemistry and Biochemistry of Lipids. Nutritional Biochemistry. Fluid and Electrolyte Balance) (3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the chemistry and biochemistry of lipids, nutritional biochemistry, fluid and electrolyte balance; and
2. describe major nutritional, vitamins, fluid and electrolyte deficiencies.

Course Contents

Introduction, classification, chemistry, and functions of lipids. Digestion and absorption of lipids, formation of chylomicrons, transport of lipids in blood stream, lipoproteins. Biosynthesis of fatty acids, the triacylglycerols, phospholipids, sphingolipids and regulatory mechanism involved. Metabolism of cholesterol, biosynthesis and deregulation into bile acids and bile salts, etc. Biochemistry of prostaglandins and nutritional biochemistry: General nutritional requirements. Energy aspects of diets, basal metabolic rates (BMR), and specific dynamic action. Major nutritional disorders e.g. obesity, marasmus, kwashiorkor, and marasmic-kwashiorkor. The water-soluble vitamins, vitamin C and their biochemical importance in the body. The fat-soluble vitamins: A, D, E and K and their biochemical functions. Calcium and phosphorus metabolism and significance in the body. Trace elements: Mg^{2+} , Mn^{2+} , Zn^{2+} , P, Co, Li^{2+} , etc.

Fluid and electrolyte balance: Fluid intake and output, total body water distribution in intracellular and extracellular fluids. Functions of electrolytes, dehydration, and its correction. Water and the major ions: HCO_3^- , Cl^- , Na^+ , K^+ , H^+ Regulations of water balance. Iron: sources, absorption, distribution in the body and biochemical functions and excretion. Anaemia, haemochromatosis. Chemistry and biochemistry of carotenoid. Biochemistry of Vision. Coenzyme, structure, and roles in cellular metabolism.

VBC 204: Introductory Molecular Biology (2 Units; C: LH 15; PH 45)

Learning Outcomes

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

1. describe the principles and explain the interrelationships between structure, functions and molecular mechanisms that underlie the functions of a normal cell; and
2. acquire basic techniques in cell and molecular biology.

Course Contents

Sub-cellular and molecular basis of cell function and mode by which cells multiply, replicate and pass genetic information including DNA structure and protein synthesis. Methods of gene splicing and genetic engineering. Chemistry and structures of nucleic acids. Nomenclature of bases, nucleotides and nucleotide biosynthesis. Composition of DNA and RNA. The Watson-Crick DNA double helix. Genetic regulation of metabolism. Introduction to genetic engineering in veterinary medicine. Virus and oncogenes. Programmed cell death, Biochemistry of free radicals.



VPY 201: Veterinary Physiology I (Blood, Circulatory and Respiratory Systems) **(3 Units C: LH 30; PH 45)**

Learning Outcomes

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

1. describe morphology, function and disorders of blood cells;
2. describe oxygen supply to tissues and exchange of gasses in tissues; and
3. explain control of breathing and mechanisms of body temperature regulation.

Course Contents

Structure and functions of blood, production, degradation of blood cells. Anaemia, blood coagulation, plasma proteins and blood volume measurement. Cardiovascular physiology: structure and functions of the heart; the dynamics of blood and lymph flow. Blood pressure and heart rate control and regulation. Circulation of blood through special organs e.g., lungs, heart, brain, liver, and kidneys. Respiratory Physiology involves the function of the respiratory system and properties of gas. Mechanism of respiration and gas exchange in the lungs. Regulation of respiratory and buffers in the blood.

VPY 202: Veterinary Physiology II (Endocrinology, Renal and Digestive Systems) **(3 Units C: LH 30; PH 45)**

Learning Outcomes

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

1. determine the location of different endocrine glands;
2. describe the functions of endocrine factors;
3. explain the interrelationship between endocrine and nervous system;
4. explain the involvement of endocrine system in animal production and glomerular filtration;
5. describe the functions of the kidneys, glomerular filtration, water excretion, acidification of urine and bicarbonate excretion; and
6. explain electrolyte (e.g., potassium and sodium) excretion.

Course Contents

Introduction to endocrine system as a control system in the body; endocrine organs and their secretions. Characteristics and mode of action of hormones. Mechanism of secretion, regulation and function of hormones from the pituitary, thyroid, parathyroid, adrenal, pancreas and thymus glands. Effects of hypo- and hyper-secretions of the above-named glands in various animals. Physiological control systems and feedback mechanisms. The role of the kidney in homeostasis. Nephron - the functional unit of the kidney. Glomerular filtration and tubular functions. Water and electrolyte excretion and absorption. Digestion in monogastric animals, prehension, mastication and swallowing. Saliva production and function. Gastric juice production, digestion, and absorption of food items. Digestion in the ruminant stomach and intestinal motility. Hormones of the gut. Avian digestion.

VPY 204: Veterinary Physiology III (Central and Autonomic nervous systems, Special senses and Muscles) **(3 Units C: LH 30; PH 45)**

Learning Outcomes

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

1. describe the role of the nervous system in maintaining homeostasis;



2. explain nerve cell communication;
3. outline the structures and divisions of the nervous system including their roles;
4. describe how the brain and the spinal cord are protected and nourished;
5. distinguish between the parasympathetic and sympathetic division of the autonomic nervous system;
6. identify the special senses, their structure and function; and
7. relate types of sensory receptors to their function and the nervous pathways to the central nervous system.

Course Contents

Impulse propagation and conduction. Central and autonomic nervous systems. Reflex mechanisms and types. Neurotransmitters, motor functions of the spinal cord, ascending and descending fibre tracts of the spinal cord. The brain, hypothalamus, and limbic systems. Sleep and wakefulness. Physiological properties and functions of the autonomic nervous system, muscles and bones. Physiology of special senses, olfaction, gustation, hearing and vision.

VEX 299: Externship I (Animal Husbandry) (6weeks) (2 Units C: PH 90)

Learning outcomes

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

1. describe farm settings for specific animal species.
2. handle and restrain farm animals for specific procedures.
3. carry out specific farm practices like grooming, feeding, housing, etc.

Course Contents

A long vacation field practice of six weeks duration in a livestock, poultry or fish farm. Students are to participate in animal husbandry and health management activities on the farm under the supervision of the farm veterinary officer. Inspection visits may be conducted to such places by the staff of relevant departments to assess students' participation.

GST 312: Peace and Conflict Resolution (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. explain the concepts of peace, conflict and security;
2. list major forms, types and root causes of conflict and violence;
3. differentiate between conflict and terrorism;
4. enumerate security and peace building strategies; and
5. describe roles of international organisations, media and traditional institutions in peace building.

Course Contents

Concepts of peace, conflict and security in a multi-ethnic nation. Types and theories of conflicts: ethnic, religious, economic, geo-political conflicts. Structural conflict theory, realist theory of conflict, frustration-aggression conflict theory. Root causes of conflict and violence in Africa: indigene and settlers' phenomena; boundary/boarder disputes; political disputes; ethnic disputes and rivalries. Economic inequalities; social dispute. Nationalist movements and agitations. Selected conflict case studies – Tiv-Junkun; Zango Kartaf. Chieftaincy and land disputes, etc. Peace building, management of conflicts and security. Peace and human development. Approaches to peace & conflict management --- (religious, government, community leaders etc.). elements of peace studies and conflict resolution. Conflict dynamics assessment scales. Constructive and destructive, justice and legal framework. Concepts of



social justice; the Nigerian legal system. Insurgency and terrorism. Peace mediation and peace keeping. Peace and Security Council (international, national and local levels). Agents of conflict resolution – conventions, treaties, community policing. evolution and imperatives. Alternative Dispute Resolution (ADR). Dialogue, arbitration, negotiation, collaboration, etc. Roles of international organizations in conflict resolution - (a). the United Nations (UN) and its conflict resolution organs; the African Union and Peace Security Council. ECOWAS in peace keeping. The media and traditional institutions in peace building. Managing post-conflict situations; refugees. Internally Displaced Persons (IDPS). The role of NGOs in post-conflict situations.

ENT 312: Venture Creation

(2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students, through case study and practical approaches, should be able to:

1. describe the key steps in venture creation;
2. identify opportunities in problems and in high potential sectors regardless of geographical location;
3. state how original products, ideas, and concepts are developed;
4. develop business concept for further incubation or pitching for funding;
5. identify key sources of entrepreneurial finance;
6. implement the requirements for establishing and managing micro and small enterprises;
7. conduct entrepreneurial marketing and e-commerce;
8. apply a wide variety of emerging technological solutions to entrepreneurship, and
9. appreciate why ventures fail due to lack of planning and poor implementation.

Course Contents

Opportunity identification: sources of business opportunities in Nigeria, environmental scanning. Demand and supply gap/unmet needs/market gaps/market research. Unutilised resources, social and climate conditions and technology adoption gap. New business development: business planning, market research, etc. Entrepreneurial finance: venture capital, equity finance. Micro finance, personal savings, small business investment organizations and business plan competition. Entrepreneurial marketing and e-commerce. Principles of marketing, customer acquisition and retention. B2B, C2C and B2C models of e-commerce. First mover advantage, e-commerce business models and successful e-commerce companies. Small business management/family business. Leadership & management: basic book keeping, nature of family business and Family Business Growth Model. Negotiations and business communication: strategy and tactics of negotiation/bargaining. Traditional and modern business communication methods. Opportunity Discovery Demonstrations: business idea generation and presentations. Business idea contest, brainstorming sessions, idea pitching, etc. Technological Solutions: the concepts of market/customer solution, customer solution and emerging technologies. Business Applications of new technologies: Artificial Intelligence (AI), Virtual/Mixed Reality (VR), Internet of Things (IoTs), Blockchain, Cloud Computing, Renewable Energy, etc. Digital business and e-commerce strategies).

VAN 305: Embryology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. discuss embryological origin of mammalian and avian organs; and
2. identify embryonic tissue and organ morphology and structure in clinical specimens.



Course Contents

Introduction to embryology, fertilization, cleavage, establishment of germ layers, primitive streak. Basic formation of body configuration, nervous system, digestive and respiratory systems, mesoderm differentiation, mesonephros formation, circulatory system, extra-embryonic membranes. Differentiation and regulation. Mutation, radiation effect and teratogenesis. Normal development of mammalian and avian organ systems.

VAN 307: Comparative Gross Anatomy

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. compare gross anatomy of different animal species;
2. apply the knowledge of anatomy acquired to clinical exercises including surgery;
3. delineate the gross topographical and comparative gross anatomy of major domestic animals and birds;
4. identify the features of normal equine, ruminant, porcine, canine and avian gross anatomy; and
5. demonstrate further knowledge of the interrelationships among anatomical structures and functions of the animal body.

Course Contents

General and Comparative studies of the digestive, reproductive, respiratory and circulatory systems, nervous, urogenital, endocrine, sense, and sex organs and integument of domestic animals. Basic differences in organ-gross morphology amongst major domestic animals (pigs, cattle, dogs, horses) and birds. Comparative osteology and arthrology. Dental formula, buccal wall anatomy, simple versus complex stomachs, differences in small and large intestines. Foetal circulation. Anatomy of avian organ systems: Skeleton, myology, joints, digestive, circulatory, respiratory, urogenital and integument.

VPY 305: Environmental Physiology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain various components of the environment and their impact on animal physiology;
2. discuss how adaptation (biochemical, behavioural and ecological) techniques allow animals to cope especially in extreme environments;
3. explain the concept of homeostasis and allostatic techniques in various conditions;
4. identify the role of epigenetic changes in developmental plasticity and how it could foster adaptation in an extreme environment; and
5. identify various environmental stressors and their effects on animal survival.

Course Contents

Physiologic response to heat and cold temperature regulation: body temperature. Function of renal system. Micturition, structure and general physiology of the skin. Water, electrolyte, and acid-base balance. Environment and its effects on animal adaptation and survival. Mechanisms adopted by animals to adjust to changes in environmental conditions including climate, weather, environmental temperature, humidity and pressure; salinity and altitude (sudden change or over a period). The impacts of animal and other biotic factors such as predation, desertification and pollution.



**VPY 307: Reproductive Physiology and Endocrinology
15; PH 45)**

(2 Units C: LH

Learning Outcomes

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

1. describe changes that occur in the reproductive system over the lifetime of an animal;
2. distinguish the major hormones involved in reproduction and describe their role in regulating reproduction in male and female animals;
3. describe processes that can lead to dysfunction of the reproductive system;
4. describe the basic properties of muscles;
5. explain isotonic and isometric contraction; and
6. describe electromyography.

Course Contents

Functions of male and female reproductive systems. The role of reproductive hormones in reproductive functions. Oestrus cycle, puberty, and lactation. Reproduction in males and females. Pregnancy. Spinal cord and brain stem functions.

**VBC 305: Biochemistry III (Hormones and their Characteristics)
(3 Units C: LH 30; PH 45)**

Learning Outcomes

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

1. discuss the general characteristics of hormones, their biosynthesis and molecular mechanisms of action; and
2. explain how their synthesis is regulated and their assay methods.

Course Contents

General characteristics of hormones and the molecular mechanisms of action. Hormones of the adrenal cortex: the glucocorticoids and the mineralocorticoids-biosynthesis, regulation of biosynthesis and metabolic functions. Adrenocortical insufficiency: Addison's disease, hyper-aldosteronism. Hormones of testes, ovary, and the placental testosterone, androgens, estrogens, progesterone; biosynthesis, functions, metabolism, and regulations. Assay of hormones-biological, chemical, and radio-displacement assay. Hormones of the adenohypophysis; ACTH, GH, TSH, LH, Prolactin, and MSH. The neurohypophysis; vasopressin and oxytocin.

VPC 301: General Pharmacology

(2 Units C: LH 30)

Learning Outcomes

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

1. define pharmacology and drug, and identify their sources;
2. describe routes of drug administration, their disposition in the body and how they are excreted;
3. explain drug interaction and toxic effects on the whole animal and the environment;
4. explain basic concepts of mechanism of drug action, misuse, and abuse; and
5. enumerate the legislations governing the development and use of drugs in animals.

Course Contents

Definitions and historical development of Pharmacology. Sources and formulations of drugs. Mode of drug administration and disposition in the body (absorption, distribution,



biotransformation and excretion). Mechanisms of drug action. Groups of chemotherapeutic agents, dosages, routes of administration, labelling and packaging. Prescription, interpretation and dispensing. The concept of drug misuse and abuse, and toxicity.

VMB 302: Introductory Microbiology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the contributions of scientists to microbiology;
2. identify key features of prokaryotes, eukaryotes and viruses;
3. recognize the key features of microscopy and techniques for staining microbes;
4. discuss the physiology and biochemistry of microbial respiration and cell division;
5. identify growth and biochemical characteristics of bacteria;
6. list the agents for sterilisation and disinfection of surfaces and explain their effects on viability of microbes; and
7. explain the concept of antimicrobial resistance.

Course Contents

History of microbiology. Introduction to bacteriology, virology and mycology. Classification, nomenclature and morphology of bacteria, viruses, fungi and other pathogens of veterinary importance. Growth, enumeration, reproduction, isolation and identification of bacteria and viruses. Purification of viruses. Control of microbial population (sterilisation and disinfection). Environmental bacteriology. morphology and classification of viruses. Interference and interferon. Growth of viruses in tissue culture.

VMB 304: Principles of Immunology

(2 Units C: LH 30)

Learning Outcomes

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

1. define antigen, immunogen, and hapten;
2. explain the concept of self or non-self, and relate the anatomy of immune organs and tissues, to their functions;
3. compare innate and acquired immune responses;
4. explain antigen-antibody interactions *in vitro* and their diagnostic applications;
5. determine the differences in immune responses to various pathogens including parasites and tumor cells as well as the different mechanisms; and
6. explain the different mechanisms involved in hypersensitivity reactions, immune defects and autoimmunity.

Course Contents

Historical perspectives. Anatomy and histology of Immunological organs, macrophages, lymphocytes, and plasma cells. Immune responses. Antibody-antigen reaction, hypersensitivity reactions, auto-immune diseases, and immune-deficiency diseases. Principles of immunotherapy and vaccination; immunisation and immunological aspects of cancer. Immunological methods for diagnosis of diseases.

VMB 306: Pathogenic Bacteriology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. describe different types of bacteria in relation to the diseases they cause in animals;



2. explain key virulence factors associated with the different genera and species of pathogenic bacteria including antimicrobial resistance;
3. prepare culture and isolation of bacteria from clinical specimens and other samples
4. use bacterial growth characteristics, microscopic appearances and dichotomous biochemical tests to identify pathogenic Gram-positive, Gram-negative and higher bacteria; and
5. interpret other appropriate diagnostic assays for bacterial identifications and antimicrobial sensitivity tests

Course Contents

Bacterial agents of veterinary importance with emphasis on mechanisms of disease production. Class of bacterial agents for each body system. Establishing different diagnostics for disease syndrome and developing diagnostic approach.

VPE 302: General Veterinary Parasitology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. demonstrate knowledge of basic concepts and terminologies used in parasitology;
2. determine parasites of veterinary and medical importance infecting organs of domestic and non-domestic animals; and
3. describe basic distinguishing features of parasites of veterinary importance.

Course Contents

Definitions, concepts and terminologies related to parasitology. Classification and economic importance of parasites of domestic animals. Specific parasites of the gastrointestinal tract and respiratory system. Structure, classification, life cycle and transmission of protozoan and other tick-borne parasites of domestic stock. Insects and ectoparasites of veterinary importance. Vectors and vector-borne diseases. Basic information on prevention and control of parasites of veterinary and medical importance.

VPT 302: Principles of General Pathology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the nature of disease processes from the standpoint of interactions of causation and effects on tissue and organ morphology and function: and
2. classify these processes into degenerative, inflammatory, neoplastic, etc.

Course Contents

History of pathology. Definitions and terminologies in Veterinary Pathology. Degeneration and necrosis, circulatory disturbances. Inflammations and repair. Disturbances of growth. Neoplasia. Fundamental immunopathology. Lectures and practical demonstrations of veterinary disease processes with emphasis on degeneration and necrosis, circulatory disturbances, inflammation and repair. Disturbances of growth and neoplasia. Tissue reaction to injury and basic immunopathology.

VSR 302: Wound Management

(2 Units C: LH 15; PH 45)

Learning Outcomes



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

1. describe categories of wounds and decide the treatment required based on level of contamination;
2. identify signs of healing in wounds; and
3. determine the therapy for malignant wounds and concurrent blood tests to preclude toxicity during cancer therapy.

Course Contents

Signs and symptoms of wounds. Types of wounds. Wound dressing and management, types of bandages, their uses and management. Uses of honey in wound treatment. Cancer, causes of cancer. Carcinogens. Treatment of cancer.

VEX 399: Externship II (Diagnostics) (6 weeks)

(2 Units C: PH 90)

Learning Outcomes

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

1. relate topics in Veterinary microbiology and pathology to disease diagnosis.
2. carry out diagnostic procedures towards making confirmatory diagnosis in disease occurrence.
3. demonstrate laboratory ethics and conduct.

Course Contents

A long vacation field practice of six weeks duration in diagnostic laboratories during the long vacation following 300 level. Inspection visits may be conducted to such places by lecturers from the coordinating departments to assess student's participation.

VPC 403: Systemic Pharmacology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain drug actions on different body systems including cardiovascular, respiratory, etc;
2. determine dosage regimens of these drugs in the management of organ dysfunction;
3. discuss the use of fluids, minerals, and vitamins to correct deficiencies; and
4. explain adverse and secondary effects of drugs in the animal body.

Couse Contents

Drugs affecting organ systems and the reproductive systems. Vitamins, minerals, fluids and hormones influencing metabolism and body growth. Locally acting drugs as well as drugs used in treating non-infectious diseases.

VPC 404: Chemotherapy

(2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. define chemotherapy and chemotherapeutics and relate the history of chemotherapy;
2. explain the basic mechanisms of action of chemotherapeutic agents (antibacterials, anthelmintics, ectoparasitics, antiseptics/disinfectants, antiviral and antineoplastics);
3. explain antimicrobial drug resistance and prudent use of anti-infectious agents; and
4. discuss immunological treatment of diseases as well as gene therapy.



Course Contents

History and development of modern chemotherapeutic agents. Use and misuse of chemotherapeutic agents in infectious disease control and neoplasia. Drug tolerance, drug resistance and hypersensitivity reactions in the use of antimicrobial and antitumour agents. Immunotherapy and gene therapy.

VPC 405: Toxicology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. define toxicology;
2. explain and provide information on how to assess the likelihood of poisoning and possible differential diagnoses;
3. describe the procedures and therapy to implement in the event of poisoning;
4. explain the agents that cause poisoning in animals and the environment;
5. describe and carry out sample collection from both live and dead animals to obtain laboratory confirmation of toxic agents in question; and
6. carry out simple tests to determine potential toxicant and degree of toxicity.

Course Contents

General principles of toxicity and toxicological evaluation. Pesticide use and misuse. Heavy metal and chemical poisoning. Teratogenic toxicity. Poisonous plants in the environment. Mycotoxins. Animal venoms. Environmental toxicology including persistent organic pollutants. Study of diagnostic methods in poisoning, use of antidotes and preventive measures.

VHM 406: Farm Animal Breeding and Genetics

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the concepts of breeding and genetics and related terminologies;
2. demonstrate the estimation of genetic parameters; and
3. enumerate the importance of quality foundation to livestock production.

Course Contents

Variance, co-variances, partitioning of phenotypic variance. Genotype by environmental interaction. Statistical tools for studying inheritance. Estimation of genetic parameters (heritability, repeatability, genetic correlations); inbreeding, linebreeding and relationships, cross-breeding in practice, selection principles and methods; breeding (mating) systems; breeding plans for different farm animal species; foundation stock development. Genetic improvement for various livestock traits

VSR 403 Anaesthesiology and Intensive Care

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. distinguish between anaesthesia and sedation and the drugs to achieve either;
2. differentiate between classes of drugs and contraindications; and
3. analyse emergencies and respond appropriately.



Course Contents

General principles of anaesthesia and analgesia. Mode of administration of inhalant anaesthetics; effect on operational procedure, complications, and management of general anaesthesia in various species. Instrumentation and anaesthetic drugs commonly used as well as drugs for controlling pain. Crash cart drugs and supplies. Simple calculations of drug dosages.

VSR 404: Introductory Surgery and Basic Radiology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. conduct themselves professionally in surgical theatre and prepare for surgery;
2. perform basic skills required to carry out surgical operations;
3. explain the principles of image formation with every imaging modality;
4. explain the meaning and distinction of radiology from diagnostic imaging; and
5. demonstrate the use of diagnostic imaging instruments.

Course Contents

Definitions. Surgical preparation of the surgeon and patient, and instrumentation. Hospital design; clean and contaminated areas. Citing of specialised surgical areas like the radiology suite, intensive care unit and neonatal wards. Pre-and Post-operative management. Suture materials and patterns. Uses of radiology, instrumentation in radiology. Preparing and positioning patients for x-ray. Exposure and developing techniques. Exposure to ultrasonography, fluoroscopy, scintigraphy. Safety and techniques in radiology.

VMB 407: Systemic Virology and Mycology (3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. demonstrate knowledge of the morphology of various families of viruses and fungi of veterinary and zoonotic importance;
2. describe the pathogenesis of important viral and fungal diseases of domestic and wild animals;
3. demonstrate competence in laboratory tests for isolation, identification and characterization of viruses and fungi; and
4. demonstrate knowledge of vaccination and control of viral diseases of domestic and companion animals.

Course Contents

Specific viruses of veterinary importance including viruses of Foot-and-mouth disease, Marek's disease, Equine encephalomyelitis, Canine parvovirus, Canine distemper, Feline panleukopenia, Porcine circovirus, Severe acute respiratory syndrome (SARS-CoVs), etc. Fungi of veterinary importance including Dermatophytes, Aspergillus, and toxic fungi.

VPE 403: Protozoology (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. classify protozoa of veterinary and medical importance;
2. describe distinguishing features of parasites, host preferences and predilection sites.



3. illustrate life cycles of protozoa of veterinary importance;
4. demonstrate basic laboratory and field diagnostic procedures for detecting protozoa of veterinary importance; and
5. propose appropriate control and preventive measures for protozoa of veterinary and public health importance.

Course Contents

Introduction and classification of protozoa of Veterinary importance. Protozoa transmitted by insects – Trypanosome, Plasmodium, Leishmania, Leucocytozoon and Haemobartonella. Protozoa transmitted by resistant cysts: Eimeria, Balantidium, Giardia, Toxoplasma, Entamoeba, Sarcocystis and Bedsonia.

VPE 404 Helminthology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. classify helminths of veterinary and medical importance;
2. discuss the distinguishing features of parasites, host preferences and predilection sites;
3. illustrate life cycles of helminths of veterinary and medical importance;
4. demonstrate basic laboratory and field diagnostic procedures for detecting helminths of veterinary and medical importance; and
5. propose appropriate control and preventive measures for helminths of veterinary and public health importance.

Course Contents

Identification, classification, and study of life cycle of helminths of veterinary and medical importance. Morphology, pathogenicity and control of helminths including: Platyhelminths, trematodes (Digenea and Aspidobothria) cestodes (Pseudophyllidea, Cyclophyllidea); Nematohelminths. Nematodes (Trichostrongyloidea, Strongyloidea, Rhabditiidea, Spirurids, Filarioidea). Aphasmoda parasites. Laboratory tests which include egg counting techniques, larval culture, worm recovery and preservation of the helminths.

VPE 405 Entomology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. classify ectoparasites of veterinary and medical importance;
2. describe distinguishing features of ectoparasites, their host preferences and predilection sites;
3. illustrate life cycles of pathogens within various vectors of veterinary importance;
4. demonstrate basic laboratory and field procedures for the collection and identification of ectoparasites of veterinary importance; and
5. propose appropriate control and preventive measures for ectoparasites of veterinary and public health importance.

Course Contents

Introduction to phylum, Arthropoda, Order-Nematocera, Brachycera and Cyclorhapha, Acarology-Ixodidae, Argasidae, Siphonaptera (fleas), Phthiraptera (lice). Life cycles and vectorial capacity of members of phylum Arthropoda. Techniques needed for diagnosis. Binomial system of nomenclature. Ecology of vectors and their role in disease transmission,



distribution (local and worldwide) and population dynamics. Ectoparasitic control methods and insecticide resistance in vectors of veterinary and medical importance.

VPT 403: Systemic Pathology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. recognise the peculiarities of various body systems of animals in disease processes;
2. describe common diseases that affect various systems and be conversant with their gross- and histopathology;
3. obtain, preserve and process diagnostic materials from either live animals or at post-mortem;
4. record and present their observations and findings; and
5. conduct systematic derivation of morphological, tentative, differential, and definitive diagnoses.

Course Contents

System-based study of the pathology of congenital, hemodynamic, inflammatory, infectious, metabolic, environmental, and neoplastic diseases that affect various systems of the animal body. The systems include alimentary, respiratory, cardiovascular, skin, special senses, musculoskeletal, nervous, haemopoietic, urinary, genital and endocrine. Introduction to routine post-mortem diagnostic procedures in various species of animals. Biopsy techniques and routine post-mortem sample collection procedures. Disease reporting and formulation of appropriate morphological and disease diagnosis. Ancillary tools in disease diagnosis.

VPT 404: Pathology of Infectious and Non-infectious Diseases (3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. identify specific clinical signs and lesions associated with infectious and non-infectious diseases;
2. deduce relevant differential diagnoses; and
3. use knowledge acquired from Systemic Pathology and approach necropsy from disease point of view.

Course Contents

Pathology of endemic and emerging diseases of animals (including poultry and fish species) that are of importance in the tropical environment. Aetiology, clinical manifestation, pathology and diagnosis of infectious and non-infectious diseases.

VMD 401: Introductory Internal Medicine

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the concept of disease;
2. identify diseased animals;
3. use common clinical/diagnostic instruments; and
4. interpret clinical findings.



Course Contents

General systemic disease conditions of domestic and wild animals: Cardiovascular, digestive, nervous system, endocrine, etc. Use of common diagnostic instruments and diagnostic methods. Cardiopulmonary resuscitation in domestic and wildlife. General systemic ailments: shock, fever, anorexia, etc. Vital signs, reference values and interpretation of aberrations. Principles of treatment and prognosis.

VMD 402: Clinical Management

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. demonstrate competence at setting up veterinary clinic/hospital with its basic facilities;
2. exhibit customer service skills;
3. demonstrate skills for basic approach to examination of lethargic animals; and
4. demonstrate competency at sample collection and preservation as well as general hospital management.

Course Contents

The setting up of the veterinary clinic/hospital, client reception and basic facilities. Inpatient and outpatient management procedure. Clinic equipment for small and large animals. Cleaning and sterilisation of hospital equipment. Examination of sick animals. Collection and preservation of specimens from sick animals.

VTP 401: Veterinary Gynaecology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss causes and treatments of reproductive diseases in animals; and
2. explain reproductive implications of the diseases.

Course Contents

Functions and clinical examination of female reproductive organs of large animals. Puberty and sexual reproductive glands and hormones. Oestrous cycle. Act of copulation. Fertilisation and gestation. Anomalies of foetal development, including genetic and acquired causes. Oogenesis. Disturbances of ovulation and nidation. Causes of infertility and sterility in female animals. Diseases that influence sexual functions.

VTP 402: Veterinary Andrology and Artificial Insemination (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. demonstrate clinical examination of male reproductive system;
2. explain service behaviours of male animals;
3. discuss male infertility and assisted reproductive techniques;
4. discuss Artificial Insemination, its advantages and disadvantages;
5. demonstrate semen collection, preservation, transportation, and insemination techniques; and
6. discuss reproductive disorders affecting insemination.



Course Contents

Clinical examination of the male reproductive system. Service behaviours. Male infertility. Diseases of testes and accessory sex organs. Servicing ability and semen disorders. Inability of male to copulate or fertilise. History of artificial insemination, its advantages and disadvantages. Semen collection, evaluation, processing, preservation, transportation, and insemination techniques. Reproductive disorders affecting insemination.

VPH 401: Wildlife Ecology and Conservation

(2 Units C: LH 30)

Learning Outcomes

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

1. identify species, characteristics, habitat requirements and life cycles of selected wildlife species;
2. discuss the general principles of ecology and how it relates to terrestrial and/or aquatic animal conservation;
3. apply knowledge acquired to solve problems related to wildlife conservation and management; and
4. explain the importance of wildlife as reservoirs of infectious diseases of man and domestic animals.

Course Contents

General principles of ecosystem and management. Ecology of wild animals. Challenges faced by wild animals while sharing the planet with humans and mitigation options. Wildlife conservation and its importance as reservoir of infectious diseases of domestic animals and man. Tools and techniques for monitoring wildlife habitats, communities, and population. Care and management of wild animal parks and zoological gardens.

VPM 402: Veterinary Extension and Rural Sociology

(2 Units C: LH 30)

Learning Outcomes

At the completion of this course, students will be able to:

1. examine the model extension efforts taken by individuals, groups and communities and the reasons for success or failure of each effort;
2. discuss livestock rearing patterns in urban, rural and traditional settings;
3. explain perception, attitude and practices of rural dwellers and apply same to drive needed changes in animal health; and
4. execute farm, home and/or field visits to farmers to provide first-hand information on national goals.

Course Contents

Importance of Veterinary Extension in controlling diseases such as ticks and tick-borne diseases, helminths, etc. Rural sociology. Extension targets. Adoption of extension technologies. Components of livestock production and public health extension. Extension promotion and delivery.

VEX 499: Externship III (Clinics and Public Health) (6 weeks) (2 Units C: PH 90)

Learning outcomes

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

1. receive and clerk clinical cases.
2. carry out basic examinations towards achieving clinical diagnosis.
3. collect clinical samples and handle appropriately.



4. identify lethargic food animals during ante-mortem inspection.
5. identify aberrations in animals slaughtered for meat.

Course Contents

A long vacation field practice of six-weeks duration in Clinics and Veterinary Hospitals including 2 weeks in abattoir and control posts (under the supervision of a qualified veterinarian) during the long vacation following 400 level. Inspection visits may be conducted to such places by lecturers from the coordinating departments to assess student's participation.

VAN 509: Applied and Radiographic Clinical Anatomy (1 Unit C: PH 45)

Learning Outcomes

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

1. demonstrate a working translational knowledge of vital anatomical landmarks to clinical practice (medicine, surgery, and meat inspection); and
2. identify radiographic distinct features embedded in anatomical structures.

Course Contents

Application of Radiography in the study of normal bones of domestic animals. Topographic consideration of structures of domestic animals often involved in surgery and veterinary practice. A review of anatomy relevant to meat inspection such as the lymph nodes and internal organs. Topographic consideration of structures of domestic animals often involved in surgery and medical practice, bleeding sites in domestic and laboratory animals. Clinical anatomy of simple and ruminant stomachs and intestines. Applied anatomy of mammary gland and inguinal region. Osteology of the head and paranasal sinuses, landmarks for stunning in the head, and for regional anaesthesia in the cranial region. Anatomical basis of castration and spaying in domestic animals. Landmarks for intra-articular injection of joints. Anatomical consideration of avian anaesthesia. Landmarks of pelvis and pelvic cavity relative to reproductive functions of the female. Management of anatomical specimen, embalming techniques, preservation of fluids and tissue dissection facilities.

VPT 505: Clinical Pathology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. employ the tools of Clinical Pathology to diagnose and monitor disease processes and response to treatment; and
2. describe the processes underlying abnormal laboratory results.

Course Contents

Laboratory testing and data interpretation in the areas of haematology, serum chemistry, urinalysis, organ function tests, body fluid analysis and diagnostic cytology. These processes are to confirm and/or support the disease processes and assess prognosis. They are also to assist in determining treatment options and monitoring response to treatment.



VMD 503: Aquatic and Wild Animal Medicine**(2 Units C: LH 30)****Learning Outcomes**

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

1. demonstrate knowledge of diseases and disorders of fish and other aquatic animals and their control measures;
2. explain the effects of poor water quality on the health of aquatic animals; and
3. demonstrate knowledge of diseases that are specific to wild and captive animals and their control measures.

Course Contents

Common bacterial, fungal, viral, and parasitic diseases of fish and other aquatic animals with emphasis on clinical signs, lesions, diagnosis and treatment. Vaccination regimes in aquaculture. Environmental conditions due to extremes of water quality parameters will be reviewed. Physical and chemical restraints of wild animals. Diseases specific to wild and captive animals.

VMD 504: Avian Medicine**(2 Units C: LH 30)****Learning Outcomes**

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

1. recognise sick birds;
2. diagnose diseases and disorders of poultry and other birds using appropriate diagnostic tools and methods; and
3. treat and/or institute necessary measures to control their diseases.

Course Contents

Description, aetiology, clinical signs, diagnosis and treatment or management of diseases of poultry species e.g. bacterial (Salmonellosis, Pasteurellosis, Colisepticaemia, Mycoplasmosis, etc), viral (Newcastle disease, infectious bursal disease, avian encephalomyelitis, chicken infectious anaemia, avian influenza, etc), fungal (mycoses and mycotoxicoses), metabolic and nutritional (fatty liver syndrome, gout, nutritional deficiencies, etc), and diseases of pet/aviary birds.

VMD 505: Small/Laboratory Animal and Microlivestock Medicine
C: LH 30)**(2 Units****Learning Outcomes**

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

1. recognise sick dogs, cats, and micro-livestock such as grass-cutters;
2. diagnose diseases and disorders of these species using appropriate diagnostic tools and methods; and
3. institute treatment and other necessary control measures.

Course Contents:

Lectures on infectious diseases viz bacterial, fungal and algal, protozoal, viral, prions and rickettsia. Diseases of organ systems, e.g., cardiovascular, gastroenteric, nervous, etc; metabolic and nutritional diseases of dogs, cats, rabbits, guinea pigs and experimental animals as well as micro-livestock such as grass-cutters. Emphasis will be placed on clinical signs, diagnosis, treatment and control.



VMD 506: Ruminant Medicine

(2 Units C: LH 30)

Learning Outcomes

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

1. identify sick domestic ruminants such as cattle, sheep and goats;
2. diagnose diseases and disorders of these species using appropriate diagnostic tools and methods; and
3. institute treatment and other necessary control measures.

Course Contents

Infectious diseases of cattle, buffaloes, elands, antelopes, sheep and goats e.g. (bacterial {such as tetanus, tuberculosis, black quarters, and anthrax}, viral {such as Foot and Mouth Disease and Peste des Petit Ruminants}, fungal {such as cutaneous lymphatic diseases}, protozoal {such as babesiosis, trypanosomiasis, theileriosis}, rickettsial {such as toxoplasmosis and anaplasmosis}). Non-infectious diseases e.g. metabolic (such as ketosis, toxemia, and milk fever) and nutritional (such as bloat, diarrhoea, and constipation). Emphasis will be placed on the epidemiology, clinical signs, diagnosis, treatment, and control.

VMD 507: Porcine Medicine

(2 Units C : LH 30)

Learning Outcomes

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

1. identify sick pigs;
2. diagnose diseases and disorders of this species using appropriate diagnostic tools and methods; and
3. institute treatment and other necessary control measures.

Course Contents

Diseases of the porcine species e.g., bacterial (Swine erysipelas, Swine dysentery, Infectious atrophic rhinitis, Colibacillosis, Salmonellosis, Clostridiosis etc), viral (African Swine Fever, Swine influenza, Transmissible gastroenteritis, Foot and Mouth Disease etc), parasitic (internal parasites, external parasites, coccidia etc), fungal (mycoses and mycotoxicoses), metabolic and nutritional diseases of pigs will be covered. Emphasis will be placed on the epidemiology, clinical signs, diagnosis, treatment and control of relevant diseases of importance.

VMD 508: Equine Medicine

(2 Units C: LH 30)

Learning Outcomes

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

1. recognise sick horses and donkeys;
2. diagnose diseases and disorders of equidae using appropriate diagnostic tools and methods; and
3. institute treatment and other necessary control measures.

Course Contents

Infectious, non-infectious (including metabolic and nutritional) diseases of equidae with reference to horses used for polo and security patrols of the mounted troops. Emphasis will be placed on the clinical signs, diagnosis, treatment and control of specific diseases of economic importance in the tropics. The course highlights problem-oriented approach in the management of equine diseases and disorders.



VSR 505: Diagnostic Imaging

(2 Units C: LH 30)

Learning Outcomes

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

1. explain the principles of radiography and the process of taking radiographs using manual and digital methods;
2. use X-rays safely;
3. explain the basis of ultrasonography and its specialised use in cardiology;
4. state indications for Computed Tomography (CT) scan use and interpret images shown; and
5. recognise the use of imaging in theriogenology.

Course Contents

Introduction to X-rays, Radiation safety, X-ray film exposure and processing. Radiographic interpretation. Radiation therapy. Principles of ultrasound scanning. Applications of scanning in Veterinary Medicine. Echocardiography. Principles of CT scan. The uses of diagnostic imaging techniques in pregnancy diagnosis and in reproductive disorders. Review of clinical imaging cases.

VSR 506: Soft Tissue Surgery

(2 Units C: LH 30)

Learning Outcomes

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

1. describe the procedure required for preoperative assessment;
2. explain the history, clinical signs, laboratory tests and diagnostic imaging carried out; and
3. diagnose and treat lamenesses in animals.

Course Contents

Surgical management involving the head, neck and thorax as well as abdomen, limbs and lameness. Features of cosmetic surgery. Common operations of all regions will be discussed including indications and contraindications.

VSR 507 Orthopaedic Surgery

(2 Units C: LH 30)

Learning Outcomes

At the completion of this course, students will be able to:

1. describe lesions and decide treatment options that best fit the presentation;
2. determine appropriate implants and treatment options; and
3. determine the diagnostic method that best fits the clinical presentation and apply treatment.

Course Contents

Fractures and fracture healing; examination and evaluation of the orthopaedic patient, reduction and fixation of fractures; nursing care, diagnosis and treatment of fractures of long bones, pelvis, spine and skull of animal species. Management of bone infections; nutritional, neoplastic bone and joint diseases. Use of implants and fixation devices.



VSR 508: Large Animal Lameness**(2 Units C: LH 30)****Learning Outcomes**

At the completion of this course, students will be able to:

1. determine diagnostic tests that are required in cases of large animal lameness.
2. institute therapy and evaluate the effectiveness of therapy;
3. discuss breed predisposition to lameness in categories of horses based on use; and
4. explain how the lameness impacts the presentation of each individual case.

Course Contents

Causes, diagnosis and treatment of lameness in large animals with emphasis in horses. Lameness examination and its components - history, standing exam, movement exam, flexion and hoof tester exams, diagnostic anaesthesia and imaging the site of injury.

VTP 503: Veterinary Obstetrics and Neonatology**(2 Units C: LH 30)****Learning Outcomes**

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

1. acquire necessary skills in examining animals in order to detect conception, parturition and dystocia and its management;
2. conduct neonatal care to reduce neonatal loss; and
3. discuss neonatal periods in different animal species and physiological characteristics of neonates.

Course Contents

Pregnancy in cow, mare, ewe, doe, sow, bitch and queen. Parturition in different animal species. Management of dystocia. Care of the new-born in cattle, horses, pigs, dogs. Factors influencing neonatal mortality. The neonatal periods in different species. Physiological characteristics of the neonate. Clinical examination of healthy and sick new-born. Congenital malformations of the neonate. Premature birth and its management. Obstetrical injuries affecting neonates.

VTP 504: Large Animal Theriogenology**(2 Units C: LH 30)****Learning Outcomes**

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

1. demonstrate case-based problem-solving skills in ruminants, equidae and swine pregnancy and parturition; and
2. explain reproductive defects such as postpartum acyclicity and induction of ovulation.

Course Contents

Review of anatomy and functions of different reproductive structures in ruminant, equine, and swine; Puberty and factors affecting its timing. Induction of puberty. Ovarian cycle, Oestrous cycle patterns and Ovulation. Behavioural characteristics of Oestrous in different species, Oestrous detection accuracy; Oestrous detection aids; false Oestrous. Fertilisation, Conception and Pregnancy: Fertilisation process and types; embryo development; formation and function of embryonic membranes and pregnancy establishment; identification of embryos; placenta; pregnancy recognition and its maintenance. Pregnancy diagnosis: Relevant methods of pregnancy diagnosis in ruminants, Equidae and swine and their efficacy.



VTP 505: Small/Laboratory Animal and Microlivestock Theriogenology (2 Units C: LH 30)

Learning Outcomes

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

1. differentiate the peculiarities of breeding, conception and parturition in dogs, cats, and microlivestock such as grass-cutters;
2. explain abnormal sexual behaviours of dogs and cats; and
3. discuss fertilisation processes in these animal species.

Course Contents

Review of reproductive anatomy and functions of different reproductive structures in canine, feline and microlivestock such as grass-cutter. Puberty in bitches and queens. Oestrous cycle, its induction and prevention in bitches and queens. Breeding management of the bitch and queen. Physiology and endocrinology of canine and feline pregnancy. Fertilisation, Conception and Pregnancy: Fertilisation process and types; embryo development; formation and function of embryonic membranes and pregnancy establishment; identification of embryos; placenta; pregnancy recognition and its maintenance. Pseudocyesis and its complications. Management of pregnancy in the bitch and queen. Relevant methods of pregnancy diagnosis in the bitch and queen. Normal and abnormal parturitions in the dog and the bitch. Developmental congenital anomalies of reproductive tract. Inherited lethal and non-lethal defects in dogs and cats. Relationship of ovaries and mammary gland diseases. Abnormal sexual behaviour in canine and feline species.

VPH 503: Food Hygiene and Safety

(2 Units C: LH 30)

Learning Outcomes

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

1. express their social responsibility for detecting pathogens and lesions in food animals and their products and how to control them;
2. discuss public health importance of animal hygiene;
3. conduct meat, milk, egg and fish inspection procedures; and
4. describe specific non-infectious agents, including drug residues which pose health risk to both humans and animals.

Course Contents

Principles of meat hygiene. Biological and chemical bases of meat hygiene. Ante-mortem and post-mortem inspection procedures. Inspection of poultry meat, eggs, milk, fish. Description of categories of slaughter facilities. Basic construction and principles of a functional abattoir. Methods of food preservation. Food micro-flora and spoilage. Food poisoning. Food-borne diseases. Detection of drug residues in meat, eggs and milk. Public health significance of food hygiene.

VPH 504: Zoonoses and Environmental Health

(2 Units; C: LH 30)

Learning Outcomes

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

1. discuss diseases that are naturally transmitted from animals to man; and
2. discuss the importance of a healthy environment to human and animal health.



Course Contents

Concepts, definitions, and classification of zoonoses. Studies of specific bacterial, viral, prions, parasitic, rickettsial, protozoal and fungal zoonoses with emphasis on prevention, early detection, control, and eradication. Ecology, water sources and purification. Waste disposal. Public health significance of rodents, birds, flies and mosquitoes. Environment pollution and control.

VPM 505 Epidemiology and Principles of Disease Prevention (2 Units C: LH 30)

Learning Outcomes

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

1. discuss model epidemiological efforts taken by individuals, groups and communities in the past and the reasons for success or failure of each effort;
2. explain various sources of epidemiologic data including household survey, clinics, farms and laboratories;
3. explain the determinants of diseases and set goals for their epidemiological survey on farms, homes and identified fields/communities; and
4. determine and report the monthly/annual incidence of specific animal and/or human illnesses and associated deaths in a given location.

Course Contents

Definition, scope and uses of epidemiology and disease prevention. Basic concepts of epidemiology. Ecology of disease. Disease-host-agent-environment. Web of causation. Statistical and biological significance of epidemiologic associations. Methods of epidemiologic investigations. Patterns of disease occurrence. Principles and procedures for screening diseases. Screening tests and evaluation. Vaccinations. Dairy Herd Health. Submission of specimens.

VPM 506: Veterinary Administration, Jurisprudence and Ethics (2 Units C: LH 30)

Learning Outcomes

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

1. demonstrate knowledge of the basic framework of animal health-related legislation in Nigeria and related global legislations;
2. discuss the application of these laws to animal health and enterprises, including the issue of health certificate, post-mortem certificate, clinical and professional practice certification, etc;
3. interpret and administer laws relating to ethical use of animals; and
4. explain cruelty to animals and common offenses committed by animal owners.

Course Contents

Organisation of veterinary services at national and international levels. Legislation on veterinary practice at national and international levels. Control of animal importation, exportation and movements. Dogs and public health. Laws regulating meat inspection, veterinary drugs, fish and wildlife. Disease Reporting. National and international public health administration.



VPM 507: Veterinary Biostatistics and Economics**(2 Units C: LH 30)****Learning Outcomes**

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

1. conduct basic computer recording and be familiar with sampling methods;
2. explain micro- and macro-economic concepts of livestock production systems and cost of public health schemes;
3. compute and interpret epidemiological measures, formulate simple, measurable and relevant veterinary hypotheses;
4. demonstrate acquaintance with relevant statistical software for veterinary application; and
5. demonstrate knowledge and application of basic economic concepts in setting costs, benefits and prices in food and non-food animal health enterprise.

Course Contents

Veterinary recording and data types. Classification and tabulation of data. Descriptive and inferential statistics. Measures of central tendency and variability. Population and sample inferences. Test of hypotheses, chi-square tests, normal and other distribution, t-tests, introduction to simple linear regression, sampling methods. Uses of statistics in veterinary practice and research. Basic micro- and macro-economics concepts. Cost of public health schemes. Demand and supply of veterinary services. Economics of livestock production. Economics of operating a veterinary practice and managing veterinary clinic/hospital. Benefit-cost analysis. Business organisations, administration, and promotion. Business management. Project appraisal and feasibility reports.

VEX 599: Externship IV (Clinics) (6 weeks)**(2 Units C: PH 90)****Learning Outcomes**

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

1. relate teachings in Veterinary medicine, surgery and theriogenology to cases presented at Veterinary hospitals/clinics.
2. analyze clinical presentations in lethargic animals and use ancillary diagnostic methods to achieve disease diagnosis.
3. demonstrate the knowledge of appropriate treatment regimen for diagnosed diseases.

Course Contents

A long vacation field practice of six weeks duration in Clinics and Veterinary Hospitals (under the supervision of a qualified veterinarian) during the long vacation following 500 level. Inspection visits may be conducted to such places by lecturers from the coordinating departments.

VCH 503 Clinics I**(2 Units; C) (PH 90)****Learning outcomes**

At the completion of this course, students will be able to:

1. receive and clerk clinical cases presented at the different clinics;
2. examine animal patients clinically and utilize appropriate diagnostic tools to arrive at a confirmatory diagnosis;
3. institute treatment and make recommendations as necessary; and
4. carry out or organize prophylactic measures in Veterinary practice including vaccinations and biosecurity.



Course Contents

Clinics I is to be further divided into clinical modules in Medicine, Surgery, Theriogenology, Public Health and Preventive Medicine & Diagnostics. Clinical exercises involving familiarization with methods of case reception, clinical manipulations, sample collection from clinical cases, diagnosis, and treatment should be undertaken.

VCH 504 Clinics II

(2 Units ; C) (PH 90)

Learning outcomes

At the completion of this course, students will be able to:

1. receive and clerk clinical cases presented at the different clinics;
2. examine animal patients clinically and utilize appropriate diagnostic tools to arrive at a confirmatory diagnosis;
3. institute treatment and make recommendations as necessary; and
4. carry out or organize prophylactic measures in Veterinary practice including vaccinations and biosecurity.

Course contents

Clinics II is to be further divided into clinical modules in Medicine, Surgery, Theriogenology, Public Health and Preventive Medicine. During the rotations, the students participate in clinical practice involving case reception, clerking, clinical manipulations, sample collection, diagnosis and treatment.

VPC 607: Applied Pharmacology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. demonstrate ability to accurately calculate and safely administer enteral, parenteral, and percutaneous medications to patients in various clinical settings after making definitive diagnosis; and
2. demonstrate knowledge of the principles of drug action, interaction, correct dosing regimen, adverse reactions, and other interactions.

Course Contents

Rational use and choice of drug therapy in specific treatments. Drug formulation and incompatibilities. Iatrogenic illnesses and prevention of drug toxicities. Principles of drug dependency, compounding and prescription. Common drug abbreviations. Apothecary and Avoirdupois weights, household equivalents of weights and measures. Therapeutic strategies in a veterinary hospital. Medicinal plants of veterinary importance.

VPC 608: Veterinary Pharmacy, Agrochemicals and Quality Control of Veterinary Pharmaceuticals

(2 Units C: LH 30)

Learning Outcomes

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

1. define pharmacy with special reference to Veterinary Medicine and Agrochemicals;
2. have intimate knowledge of Veterinary Drug Formulations and storage; animal growth promoters and agrochemicals;



3. explain all the relevant aspects of veterinary drugs dosage forms and routes of drug administration in veterinary practice;
4. demonstrate knowledge of veterinary vaccines and other biologic preparations as well as veterinary supplements.
5. produce some Nigerian medicinal herbal compounds; and
6. ascertain the requirements for registration and standardisation of Nigerian medicinal herbs.

Course Contents

Definition and introduction to Veterinary pharmacy. Formulation and storage of Veterinary drugs and agrochemicals. Administration of Veterinary drugs. Growth promoters. Agrochemicals. Veterinary dosage forms and routes of drug administration in veterinary practice. Vaccines and other biologics. Vitamins, haematinics, dietary supplements, digestants. Equipment, raw materials and facilities required for the production of Veterinary pharmaceuticals. Production, quality control of Veterinary products and some Nigerian medicinal herbs. Requirements for registration and standardisation of Nigerian medicinal herbs. Veterinary dosage forms. Formulations, packaging, labelling and storage of veterinary drugs and vaccines. Official specifications and standardisation of Veterinary dosage forms. and other feed additives. Insecticides, ascaricides and rodenticides. Disinfectants/antiseptics (topical and urinary).

VPM 609: Computer Application in Veterinary Practice (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe computer hardware and software features;
2. design and operate computer-based disease reporting systems;
3. apply geographic information system in biologic risk management;
4. use global positioning system in estimating pattern of spread of disease; and
5. conduct digital animal population census.

Course Contents

History of computers. Hardware components. Operating and application software. Features and uses of word processing packages. Introduction to Spreadsheets. Database Management Systems and designing Computer-based veterinary disease reporting systems. Introduction to Geographic Information System (GIS) and its use in biological risk management. Use of Global Positioning System (GPS) in geo-referencing and estimating pattern of spread of disease. Computer aided animal population census and ecosystem health. Other uses of microcomputers in veterinary practice.

VEX 698: Rural Posting

(1 Unit C :2 weeks)

Learning outcomes

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

1. apply knowledge of treatment of animal diseases in rural settings.
2. demonstrate ability to communicate animal health issues with animal owners in rural areas.

Course Contents

A two-week posting of students to serve in a rural area starting from the last two weeks of the long vacation after the 500 level. Students will be involved in rural veterinary practice and extension services. Student's participation and report is to be assessed by lecturers from the coordinating departments.



VCH 603: Clinics I**(10 Units C: PH 450)****Learning Outcomes**

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

1. receive and clerk clinical cases presented at the different clinics.
2. examine animal patients clinically and utilize appropriate diagnostic tools to arrive at a confirmatory diagnosis.
3. institute treatment and make recommendations as necessary.
4. carry out or organize prophylactic measures in Veterinary practice including vaccinations and biosecurity.

Course Contents

Clinics I is to be further divided into clinical modules in Medicine, Surgery, Theriogenology, Public Health and Preventive Medicine & Diagnostics. Clinical exercises involving familiarization with methods of case reception, clinical manipulations, sample collection from clinical cases, diagnosis, and treatment should be undertaken.

VCH 604 : Clinics II**(10 Units C : PH 450)****Learning outcomes**

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

1. receive and clerk clinical cases presented at the different clinics.
2. examine animal patients clinically and utilize appropriate diagnostic tools to arrive at a confirmatory diagnosis.
3. institute treatment and make recommendations as necessary.
4. manage emergencies and intensive cares in animals;
5. carry out or organize prophylactic measures in Veterinary practice including vaccinations and biosecurity.

Course Contents

Clinics II is to be further divided into clinical modules in Medicine, Surgery, Theriogenology, Public Health and Preventive Medicine. During the rotations, the students participate in clinical practice involving case reception, clerking, clinical manipulations, sample collection, diagnosis, and treatment.

VCH 605: Clinical Seminar I**(1 Unit C: PH 45)****Learning outcomes**

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

1. demonstrate the art of clinical case investigation, treatment, documentation, and presentation.
2. demonstrate collaboration and teamwork skills.
3. discuss clinical cases handled each week.

Course Contents

A course involving case workups and seminar presentations by each student during the first semester, to be coordinated by the Faculty. The course shall be assessed by lecturers in all clinical departments.



VCH 606: Clinical Seminar II

(1 Unit C: PH 45)

Learning outcomes

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

1. demonstrate the art of clinical case investigation, treatment, documentation, and presentation.
2. demonstrate collaboration and teamwork skills.
3. discuss clinical cases handled each week.

Course Contents

A course involving case workups and seminar presentations by each student during the second semester, to be coordinated by the Faculty. The course shall be assessed by lecturers in all clinical departments.

VRP 608: Research Project

(4 Unit C: PH 180)

Course Contents

A project involving a research topic in any subject area in Veterinary Medicine. Each student shall be allowed to carry out the study in his/her area of interest as may be moderated by the Faculty and the relevant Department.

Minimum Academic Standards

Staffing

Academic Staff

The NUC guidelines on staff/student ratio of 1:10 for Veterinary Medicine shall apply. However, there should be a minimum of six full-time equivalent of staff in a Department. The proportion of academic staff with Ph.D. should constitute not less than 70% of the teaching staff. All academic staff should be computer literate and continue to be productive in teaching, research, and publications.

Administrative Support Staff

The services of the administrative support staff are indispensable in the proper administration of Departments and Faculty offices. It is important to recruit very competent senior administrative staff that are computer literate.

Technical Support Personnel

The services of technical support staff such as laboratory technologists, radiographers and veterinary nurses/animal health technologists who are indispensable in the proper running of laboratories and clinics are required. It is important to recruit very competent senior technical staff to maintain teaching and research equipment. They are also to undergo regular trainings to keep them abreast of developments in animal health, equipment operation and maintenance.

The NUC recommends the following physical space requirement:

	m ²
Professor's Office	- 18.50
Head of Department's Office	- 18.50
Tutorial Teaching Staff's Office	- 13.50
Other Teaching Staff Space	- 7.00
Technical Staff Space	- 7.00



Secretarial Space	-	7.00
Science Staff Research Laboratory	-	16.50
Veterinary Staff Research Laboratory	-	14.50
Seminar Space/per student	-	1.85
Clinics Space		3.60
Laboratory Space	-	7.50

Physical Facilities

Departmental Equipment.

Veterinary Anatomy

Students learning objective in Veterinary Anatomy is to acquire knowledge of normal body structures, their forms in domestic and non-domestic animals at cellular, gross and developmental levels. The laboratories for these shall preserve whole animal bodies for students' dissection and have sufficient number of microscopes for students to view and study the slides on animal body cells.

List of Equipment

Veterinary Anatomy Laboratories/Workshops Equipment

1. Gross Anatomy Laboratory allowing 1.9m² per student
2. Histology Laboratory allowing 1.9m² per student
3. Histotechnique (Preparation) Laboratory measuring 10m²
4. Transmission Electron Microscopy Laboratory
5. Walk-in Cold-Room (20m²)
6. Anatomy Museum-10m²

Gross Anatomy Laboratory

Post-mortem Table (1 per 5 students)
 Giant Freezer
 Refrigerator (large)
 Storage Tanks - 4 m³
 Knife Sharpener
 Dissecting sets
 Weighing Balance
 Analytical Balance
 Hot Air Oven
 Electric Saw
 X-ray Viewing Machine
 Digital Camera

Histology Laboratory

Tissue Processor (automatic)
 Water Bath
 Microtome (Rotary)
 Freezing Microtome (Cryostat)
 Paraffin Embedder
 Bench Centrifuge
 Demonstration Microscope



Binocular Microscope (1 per 2 students)
Camera-mounted Microscope
Still Camera with Kit
PH Meter
Transmission Electron Microscope

Anatomy Museum

Museum Specimen of Animal Species
Articulated and Unarticulated Skeletons
Models
Embalmed Bodies

Veterinary Physiology and Biochemistry

Student's learning objectives in Veterinary Physiology and Biochemistry are to acquire knowledge of normal body functions in domestic and non-domestic animals at the molecular level (Biochemistry), cellular and gross (Physiology) levels. Laboratories should be able to harvest live animal tissues for study, both qualitative and quantitative assessment with sufficient number of equipment for students to observe, enumerate and experiment with animal body cells, tissues and organs.

Physiology Laboratory Equipment:

Physiograph (1 per 5 students)
Kymograph (1 to 4 students)
Spectrophotometer
Analytical Balance
Top-loading Balance
Water Distiller
Water Deionizer
Autoclave
Fume Chamber
Haemoanalyser
Haemocytometer
Refrigerated Centrifuge
Regular Centrifuge
Microhaematocrit
Refrigerator
Deep Freezer
Demonstration Microscope
Binocular Microscope (1 to 2 students)
Fluorescent Microscope
PH Meter
Soxhlet Extractor
Rotary Evaporator
Multimedia Projector
Patient monitor

Biochemistry Laboratory:

Autoclave
Water Bath
Bench Centrifuge
Micro-Centrifuge
Water Distiller



PH Meter
Vacuum Pump
Spectrophotometer
Kjehldhal auto analyser
Fibre Digester
Ether Extractor
Gas Chromatography
Electrophoresis
Multimedia Projector

Animal Management

Students learning objective in animal health management is to acquire knowledge of the various breeds, feeds, nutrition, housing, restraint, and management of companion animals (dog, cat, donkey, and horse), farm animals (fish, poultry, ruminants and swine) and zoo animals. Horse stables, dog kennels and livestock farm are, therefore, required to keep some horses, dogs, and farm animals for training of students, and a nutrition laboratory for students to practice compounding of animal feed.

Animal Management Laboratories/Workshops and Equipment

Animal /Nutrition Laboratory

Flame analyser
Spectrophotometer
Calorimeter
Animal cages
Water Bath
Kjehldhal auto analyser
Fibre Digester
Ether Extractor
Multimedia Projector
Deep Freezer
Refrigerator
PH meter
Weighing balance
Top-loading Balance
Autoclave
Fume Chamber
Large Drying Oven
Vacuum Oven
Rotary evaporator
Flame analyser
Water bath
Grinding Machine
Cold centrifuge
Furnace
Calorimeter
Air oven
Infrared spectrophotometer
Fluorimeter
Auto sampler
Atomic Absorption Spectrophotometer
Specpolus



Brabender Amylograph
Brabender Frarinograph
Gas Chromatography machine
Water Distiller

Wild Animal Management Studio

Snake tongs (1 per 5students)
Snake hooks (1 per 5students)
Squeeze cages (1 per 5students)
Dog catcher
Crates
Digital Camera
Pole Syringes
Dart Pistol
Dart Rifle
Deep freezer
Weigh-bridge Scale
GPS Instrument
Blow pipe

Veterinary Pharmacology and Toxicology

Students learning objectives in Veterinary Pharmacology and Toxicology are to acquire knowledge of drugs and their effects on normal body functions and disease situation. This includes the effect of various therapeutic agents on disease causing agents and the side effects on animals at molecular, cellular and systemic levels. Laboratories in this Department shall prepare live animal tissues for experimentation and response to various active ingredients of drugs. Dose-effect response, toxicity reactions and effects of multiple dosing in drugs interactions.

Veterinary Pharmacology and Toxicology Laboratories/Workshop

1. Pharmacology and Pharmacy Laboratory (allowing 1.9 m² per student)
2. Toxicology Laboratory (allowing 1.9 m² per student)
3. Herpetarium
4. Herbarium for Medicinal and Poisonous plants (50 m²)

Pharmacology and Pharmacy Laboratory Equipment

Giant Freezer
Refrigerator
Regular Centrifuge
Refrigerated Centrifuge
Haematocrit Centrifuge
High Performance Liquid Chromatography
Spectrophotometer
pH Meter
Colorimeter
Soxhlet Extractor
Fume Chamber
Analytical Balance
Top-loading Balance
Water Distiller
Rotary Evaporator
Autoclave



Tissue Bath
Fume Chamber
Freeze Dryer

Toxicology Laboratory Equipment

Tissue Processor (automatic)
Water Bath
Water Distiller
pH Meter
Colorimeter
Microtome
Freezing Microtome (Cryostat)
Bench Centrifuge
Demonstration Microscope
Binocular Microscope (1 per 2 students)
Camera-mounted Microscope
Still Camera with Kit

Veterinary Microbiology

Students learning objective in Veterinary Microbiology is to acquire knowledge of various pathogens (bacteria, fungi and viruses) that are of veterinary importance locally, nationally and globally. The laboratories in the Department should be capable of preparing students to culture, identify and possibly characterise these pathogens, with a view to understand how they cause disease in man and animals.

Microbiology Laboratory Equipment

Demonstration Microscope
Binocular Microscope (1 to each Student)
Phase Microscope
Fluorescent Microscope
Photo-Microscope
Refrigerator
Giant Freezer
REVCO (Ultra low temperature) Freezer
Weighing Balance
Top-Loading Balance
Analytical Balance (Metler-type)
PH Meter
ELISA Machine
Colony Counter
Hot Air Oven
Autoclave
Water Bath
Multimedia Projector
Digital Camera

Virology Laboratory Equipment

Egg Incubator
PCR Machine
Water Bath
Giant Freezer (-80°C)
Humidifier



Fume Chamber
Bench Centrifuge

Veterinary Parasitology and Entomology

Students learning objective in Veterinary Parasitology and Entomology is to acquire knowledge of the various protozoa, helminths and arthropods that are of veterinary importance nationally and globally. The laboratories in the Department should be capable of preparing students to identify, characterise and culture parasites *in-vitro* and *in-vivo* with a view to understanding how they cause disease in man and animals.

Parasitology Laboratory Equipment

(allowing 1.9 m² per student with Preparation Room-30 m²)

Giant Freezer
Demonstration Microscope
Dissecting Microscope (1 per 5 students)
Binocular Microscope (1 per 2 students)
Fluorescent Microscope
Thermohygraph
Humidifier
Incubator
Centrifuge (Bench-type)
Hand Centrifuge
Top-loading Balance
Autoclave
Liquid Nitrogen
Multimedia Projector
Digital Camera

Entomology Laboratory Equipment

(allowing 1.9 m² per student with Preparation Room-30 m²)

Giant Freezer
-86°C freezer
Refrigerator
Demonstration Microscope
Dissecting Microscope (1 per 5 students)
Binocular Microscope (1 per 2 students)
Fluorescent Microscope
Phase contrast microscope
Thermohygraph
Humidifier
Incubator
Air dryer/ dessicator
Centrifuge (Bench-type)
Hand Centrifuge
Top-loading Balance
Autoclave
Suction pump
Light/CO₂ Insect traps
Magnifying lens
Dissecting kits
Liquid Nitrogen tank



Multimedia Projector
Digital Camera

Veterinary Pathology

Students learning objective in Veterinary Pathology is to acquire knowledge of diseases in animal body. The clear understanding of cellular, molecular and functional bases of disease in domestic and non-domestic animals shall be acquired, to the point of appreciating the individual clinical manifestation of diseases. The laboratories shall prepare animal tissues that have lesions at cellular and gross levels for students to study microscopically and on whole animal body at post-mortem.

Veterinary Pathology Laboratories/Workshops

1. Necropsy Room/Laboratory (100 m²)
2. Histopathology Laboratory allowing 1.9 m² per student
3. Clinical Pathology Laboratory allowing 1.9 m² per student
4. Cold-Room (50 m²)

Necropsy Room/Laboratory Equipment

Necropsy Table (1 per 5 students)
Giant Freezer
Refrigerator
Electric Rotary Saw
Knife Sharpener
Electric Saw
Digital Camera
Incinerator-4m²

Histopathology Laboratory Equipment

Tissue Processor (automatic)
Water Bath
Paraffin Embedder
Microtome
Haemalyzer
Haemocytometer
Water Distiller
PH Meter
Freezing Microtome (Cryostat)
Bench Centrifuge
Demonstration Microscope
Binocular Microscope (1 per 2 students)
Camera-mounted Microscope
Still Camera with Kit
Multimedia Projector

Clinical Pathology Laboratory Equipment

Autoclave
Haemoanalyser
Haemocytometer
Fluorescent Microscope
Spectrophotometer



Bench Centrifuge
Micro-Centrifuge
Water Distiller
pH Meter
ELISA Reader
Liquid Nitrogen
REVCO (Ultra low temperature) Freezer

Veterinary Medicine

Students learning objectives in Veterinary Medicine are to acquire knowledge of diagnostics. Prepare students for ability to use problem-solving skills to analyse patient, synthesize diagnosis or differential diagnosis. Appropriate use of clinical laboratory testing and therapeutic skills for case management. Offer emergency and intensive care for a wide range of animal species. Clinics in this Department shall preferably be specific for each animal or each group of domestic animal species.

Veterinary Medicine Laboratories/Workshops

1. Large Animal Demonstration Hall-100 m²
2. Small Animal Demonstration Hall-100 m²
3. Avian/Poultry Clinic
4. Research/Diagnostic Laboratories
5. Aquatic Animal Clinic

Veterinary Medicine Equipment

Refrigerator
Freezer
Battery CagesCrush
Weigh-bridge Scale
Thermometer
Wall mounted drug box
ENT Set
Tonometer
Woods Lamb (UV-light)
Haemalyser
Binoculars microscopes (1/5 students)
Haematocrit centrifuge
Centrifuges.
Egg incubators
Waterbaths
Walk-on scale for large and small animals
Debeaking machine
Dan-inject dart gun (with accessories)
Automatic syringe
Poultry post-mortem tools/kit
Post-mortem apron and gloves
Veterinary blood pressure monitor
Veterinary Pulse Oximeter
Canine and Feline Urinary Catheter
Warming pad
Littman stethoscopes
Video Otoscope



Aquatic Animal Research/Diagnostic Laboratory Equipment

Deep freezer
Refrigerator
Metler balance
Autoclave
Camera-mounted microscope
Dissolved Oxygen Meter
Haemoanalyser
TDS/Electrical Conductivity/Salinity Meter
Dissecting sets
Stainless Steel trays for dissection (1 per 5 students)
Multimedia Projector
Projector screen

Veterinary Surgery

Students learning objectives in Veterinary Surgery are to prepare students for ability to use problem solving skills. Analyse patients, synthesise diagnosis or differential diagnosis and appropriate use of basic surgical skills for case management, pain relief and intensive care for a wide range of animal species.

Veterinary Surgery Laboratories/Workshops

1. Small Animal Surgical Theatre
2. Large Animal Surgical Theatre
3. One Exercise Yard (fenced) (50m²)
4. Recovery (Hospitalization) Ward
5. Radiology suite

Veterinary Surgery Laboratories/Workshops Equipment

General Surgical Packs (8)
Orthopaedic General Packs
Ophthalmic Surgical Packs
Gastrointestinal Packs
Jacobs Chuck
Intra medullary Pins (various Sizes)
Cerclage Wire (4 rolls)
ASIF kit (2 sets)
Screws (Cortical and Cancellous) various sizes (24 each)
Enteroscope
Arthroscope
Derma Drill
Power Drills – Saw, Drill and Drill bits (1 set each)
P. O. P. Removal (Manual) (2)
P. O. P. Removal (Powered) (2)
X-Ray Viewers - 3 Units Set
X-Ray Viewer
X-Ray Dryer (2)
Dark Room Facility
High Resolution Camera and Flash (35mm)
Multimedia Projector
Auto Clave
Computer
Ultrasound multi-probe machines



Automatic processors for radiographs

Therigenology and Production

Students learning objectives in therigenology are to acquire knowledge of normal reproductive functions in domestic and non-domestic animals at hormonal, cellular and systemic levels. Students learn about diseases affecting reproduction in male and female animals and the process of delivery of new-born. Clinics and laboratory in this Department cover all aspects of examination and therapy, including surgical obstetrics for various animal species.

Reproduction Laboratory (100 m²) Equipment

Autoclave
Giant Freezer
Refrigerator
Bench Centrifuge
Nitrogen Flask
pH Meter
Water Distiller
Incubator
Water Bath
Top-Loading Balance
Analytical Balance
Binocular Microscope (1 per 2 students)
Demonstration Microscope
Phase Microscope
Calorimeter
Digital Camera
Camera-mounted Microscope

Phantom Training Laboratory (100 m²) Equipment

Electro ejaculator
Artificial Insemination Equipment (Inseminator)
Artificial Vagina
Dummy (for semen collection)
Obstetrical Equipment
OB Gloves
Vaginal Speculum (Large Animals)
Vaginal Speculum (Small Animals)
Tissue Processor (automatic)
Water Bath
Microtome
Freezing Microtome (Cryostat)
Digital Camera

Veterinary Public Health and Preventive Medicine

Students learning objectives in Veterinary Public Health and Preventive Medicine are to prepare students for ability to use problem-solving skills to analyse a herd of animals, synthesise a diagnosis or differential diagnosis about their state. To prepare students for appropriate use of clinical laboratory tests. To equip students with the competence to identify



and prevent diseases. Identify organisms that require biosecurity measures, zoonotic diseases and food safety issues. To promote awareness of the public and animal health. Also, students are trained in the monitoring and evaluation of disease control projects.

Public Health and Food Safety Laboratory Equipment

Giant Freezer
Refrigerator
Meat Inspection Kit (1 per 5 Students)
Knife Sharpener
Hot Air Oven
Fume Chamber
pH Meter
Weighing Balance
Incubator
HPLC
Digital Camera
Colony Counter
Water Distiller
Water bath
Tissue Blender
Automatic Multiple Pipette
ELISA Reader
Binocular Microscope
Demonstration Microscope
Grinding Machine
Freeze Dryer
Tissue Culture Chamber
Multimedia Projector

Epidemiology Laboratory Equipment

Global Positioning System Instrument (Motorola)
Compasses
Ambulatory Vehicle (Four-wheel drive)
Water Bath
Dog catcher
Snake tong
Snake hook
Pole syringe
Umbrellas
Camp beds (10)
Bench Centrifuge
Demonstration Microscope
Binocular Microscope (1 per 2 students)
Camera-mounted Microscope
Still Camera with Kit

Computer Laboratory

Students of Veterinary Medicine are to be exposed to computing in all its facets so that they can utilize the expertise in the practical and analytical aspects of their training. The computer laboratory should be adequately equipped to ensure reasonable contact hours by students.



Most importantly the laboratory is expected to install software packages such as EPIINFO for epidemiological studies.

1. Desktop Computers (20 Nos)
2. Flatbed Scanners
3. Software Packages for Epidemiological studies such as Epi-info, data analysis, Digital mapping.
4. Printers (4 No.s)
5. Internet Modem

Other Facilities

Walk-in Cold-Room

Centralized Facilities

Dean's office, Subdeans' offices, Faculty Board room, etc. with adequate spaces

Classroom and Lecture Room Facilities

1. Faculty Board room
2. Lecture theatres for every level
3. Faculty Auditorium to sit 1000.
4. Seminar rooms (one for each department)
5. Adequate space for the Dean's office, Subdeans' offices, etc.
6. **Faculty bus** for the movement of clinical students.

Veterinary Teaching Hospital

To enhance clinical training at undergraduate and postgraduate levels, a Veterinary Teaching Hospital (VTH) provides specialised facilities for effective teaching of clinical students. The training attempts to synthesize and practicalize all the information received over the earlier years.

Clinics and Workshops

1. Small Animal Operating Theatre-100 m²
2. Large Animal Operating Theatre-100 m²
3. Small Animal Clinic – 200 m²
4. Infectious Diseases Unit/Clinic – 100 m²
5. Large Animal Clinic – 200 m²
6. Poultry Clinic-50 m²
7. Fish Clinic
8. Wild Animal Clinic
9. Preventive Medicine Clinic-50 m²
10. Diagnostic Laboratories (Bacteriology; Mycology; Parasitology; Clinical Pathology)
11. Small Animal Hospital Wards – 100 m².
12. Large Animal Hospital Wards – 100 m².
13. Isolation Unit – 50 m².
14. Diagnostic Imaging Unit
15. Reception and Records-15 m²
16. Pharmacy-9 m²
17. Accounts Unit – 15 m²

Staff

Director

Coordinator of Veterinary Services/Deputy Director

Interns/Residents Veterinary Doctors (10)

Secretary



Veterinary Nurses/Animal Health Superintendents (15)
Radiographers (3)
Livestock Attendants (10)
Drivers (2)
Messengers/Cleaners
Pharmacy Technicians (2)

List of Equipment

Large Animal Anaesthetic Machine
Small Animal Anaesthetic Machine
X-Ray Machine Fixed (2)
Mobile X-ray machine (2)
X-Ray Reading Facility (3)
Ultrasound Equipment
Autoclave
Steam Sterilizer (2)
Surgical Table Small Animal (6)
Large Animal Surgical Table (2)
Surgical Lamps (10)
Freezer
Refrigerator
Ambulatory Van-Minibus
Vehicle (Pick-Up Van)
Video/CD Recorder
Video/CD Player
Multimedia Projector
Computer (4)
Binoculars microscopes
Haematocrit centrifuge
Centrifuges.
Waterbaths
Walk-on scale for large and small animals
Debeaking machine
Dan-inject dart gun (with accessories)
Automatic syringe
Poultry post-mortem tools/kit
Post-mortem apron and gloves
Veterinary blood pressure monitor
Veterinary Pulse Oximeter
Canine and Feline Urinary Catheter
Warming pad
Littman stethoscopes
Video Otoscope
Patient monitors (Small and Large Animals)

Veterinary Teaching and Research Farm

Each Faculty of Veterinary Medicine should have a Veterinary Teaching Farm with varieties of livestock for teaching and research by both staff and students.

Space and Buildings

Poultry Houses- 1000 m²
Porcine House- 1000 m²



Caprine House- 1000 m²
Cattle ranch
Fish ponds (2)
Horse stable
Dog kennel

List of Equipment/Tools

Wheelbarrows (10)
Transporting crates (poultry)
Shovels
Hanging scales
Weighbridge Scale
Halters
Complete saddle
Restraint tools
Ambulatory vehicles (4 Wheel Drive & Coaster Bus)
Crush (2)

Staff

- Chairman/Manager
- Animal Attendants (7)

Experimental Animal Unit

Each Faculty of Veterinary Medicine should have an Experimental Animal Unit for keeping laboratory animals (mice, rats, guinea pigs and rabbits) for teaching and research by both staff and students.

Space and Buildings

Rabbitry-1000 m²
House for Rats, mice, etc.
Cages (Feeders and drinkers)

Staff

- Chairman/Manager
- Animal Attendants (4)

Veterinary Field Station

Each Faculty of Veterinary Medicine should have an associated field station located in a suitable rural agricultural district to service contiguous States. It should be distinct from the Veterinary Teaching Hospital which is located within the University. The Veterinary Field Station is intended to provide instructional facilities for students on farm management, disease surveillance and control, and clinical research. It:

- i. provides a base for ambulatory clinics and extension services of the Veterinary Teaching Hospital;
- ii. serves as a means of exposing veterinary students to rural veterinary practice;
- iii. provides opportunities for commercial livestock production and entrepreneurship; and
- iv. provides an opportunity for breeding and management related research aimed at boosting livestock production and improved animal health delivery system.

Space and Buildings

At least 10 hectares of land for paddocks and arable cropping



Fish ponds (2)
Poultry Houses (3)
Cattle Shed (2)
Sheep and Goats Units
Rabbitry
Feed Mill
Administrative Offices
Veterinary Clinic
Diagnostic Laboratories
Students Hostel (for 20 Students)

Staff

Manager
Veterinary Clinicians (3)
Veterinary Nurses/Animal Health Superintendents (4)
Workshop Superintendent
Motor Mechanics
Motor Drivers
Tractor Driver
Animal Attendants
Hostel Superintendent
Cleaners
Typist
Security personnel

List of Equipment

Crush (2)
Weighbridge (1)
Refrigerator (2)
Spray-race Machine (1)
Battery Cages for 500 birds
Vehicle (Toyota Hilux and Truck)
Water supply
60 KVA Generating Set

Zoological Garden

Each Faculty of Veterinary Medicine should have an associated zoological garden. Students should have free access to the garden for the purpose of learning some aspects of wild animal medicine. The garden should be equipped with varieties of wild animals, clinic, isolation, and quarantine centres.

Library and Information Resources

Each Faculty of Veterinary Medicine should have a separate Veterinary Faculty Library and separate reading rooms for pre-clinical, para-clinical and clinical students. The library should be well stocked with very current books, manuals, journals, and other non-book collections. The collection of books and other resources should have adequate spread and in-depth coverage of all the relevant specialization areas of each section denoted as department in the programme. Electronic library section should also be equipped with computers with access and subscription to robust e-resources and photocopying and book binding facilities. The library and reading rooms should have capacity to sit at least 30 per cent of all the veterinary students at any one time.

