



NATIONAL BOARD FOR TECHNICAL EDUCATION

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

HIGHER NATIONAL DIPLOMA

IN

VETERINARY LABORATORY TECHNOLOGY

CURRICULUM AND COURSE SPECIFICATIONS

JUNE, 2026

PREFACE

The transformation of Nigeria's agricultural sector remains central to the nation's aspirations for sustainable economic growth, food security, job creation, industrial development, and poverty reduction. As agriculture continues to evolve in response to technological advancements, climate change, emerging global market demands, and the need for increased productivity across agricultural value chains, it has become imperative to ensure that curricula in Nigerian tertiary institutions remain relevant, responsive, and aligned with contemporary industry requirements. It is against this backdrop that we embarked on the comprehensive review and modernization of Agricultural curricula for Nigerian tertiary institutions. The review process was designed to address identified skills gaps, integrate emerging technologies and innovations, strengthen entrepreneurship and employability competencies, promote climate-smart agriculture, and align training programmes with the industry expectations and global best practices. The successful execution of this important project was made possible through the invaluable support and commitment of key stakeholders. I wish to express profound appreciation to the Honourable Minister of Education for providing the policy direction and leadership that facilitated this initiative.

I also extend sincere gratitude to the Honourable Minister of Agriculture and Food Security and the Honourable Minister of Livestock Development for their unwavering support, technical contributions, and commitment to strengthening agricultural education and workforce development in Nigeria. Special appreciation goes to the Tertiary Education Trust Fund (TETFund) for providing the special intervention grant that enabled the conduct of nationwide skills gap analyses and supported the series of national curriculum review and development workshops. The findings from the skills gap studies provided critical evidence and industry insights that guided the review process and ensured that the curricula reflect current and future workforce requirements within the agricultural sector. I also acknowledge with gratitude the immense contributions of the Sector Skills Council for Agriculture, whose expertise and industry perspectives greatly enriched the curriculum development process. Equally commendable are the efforts of members of the Implementation Committee, resource persons, industry experts, professional bodies, French Embassy in Nigeria, regulatory agencies, academic institutions, employers, development partners, and other stakeholders who devoted their time, knowledge, and experience to the various workshops and technical sessions. The revised curricula represent a collective national effort to produce graduates equipped with relevant knowledge, practical skills, digital competencies, entrepreneurial capabilities, and professional attitudes required to drive innovation and productivity across Nigeria's agronomy, forestry, fisheries and livestock sectors. It is my expectation that Institutions offering these programmes will faithfully implement the curricula and continue to collaborate with industry to ensure sustained relevance and quality. I commend all stakeholders for their dedication and contributions to this landmark achievement and look forward to the successful implementation of these curricula for the benefit of our dear nation.

Professor Idris M. Bugaje, FNSE
Chairman, Implementation Committee
EXECUTIVE SECRETARY
National Board for Technical Education (NBTE), Kaduna

ACKNOWLEDGEMENT

The National Board for Technical Education (NBTE) expresses its profound appreciation to all individuals and organizations whose invaluable support, expertise, and commitment made the successful review and modernization of the Agricultural Education curricula for Nigerian tertiary institutions possible. Our sincere gratitude goes to the Honourable Minister of Education for providing the policy direction and leadership that made this national initiative possible. We also appreciate the Honourable Minister of Agriculture and Food Security and the Honourable Minister of Livestock Development for their technical guidance, collaboration, and unwavering commitment to strengthening agricultural education and workforce development in Nigeria. The Board is particularly grateful to the Tertiary Education Trust Fund (TETFund) for providing the special intervention grant that funded the nationwide skills gap analyses, stakeholder engagements, curriculum review exercises, validation meetings, and development workshops. The evidence generated through these studies provided a solid foundation for developing curricula that are relevant, industry-driven, and responsive to national and global agricultural priorities.

Special appreciation is extended to the curriculum specialists, resource persons, academic experts, professional bodies, regulatory agencies, employers, industry practitioners, development partners, and representatives of public and private sector organizations who participated actively in the skills gap studies, technical sessions, validation exercises, and curriculum development workshops. Their diverse expertise and practical insights greatly enriched the quality and relevance of the curricula. We further appreciate the support of the French Embassy in Nigeria and other development partners for their collaboration in promoting excellence and innovation in technical and vocational education within the agricultural sector. Finally, NBTE expresses its gratitude to all tertiary institutions, researchers, facilitators, rapporteurs, technical staff, and administrative personnel whose commitment and hard work contributed to the successful completion of this important national assignment. The Board acknowledges that this achievement is the result of a collective effort and remains confident that the effective implementation of these curricula will contribute significantly to producing competent, innovative, and entrepreneurial graduates capable of advancing sustainable agricultural development, food security, and economic prosperity in Nigeria.

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GENERAL INFORMATION

1.0 PROGRAMME NOMENCLATURE

Higher National Diploma (HND) in Veterinary Laboratory Technology

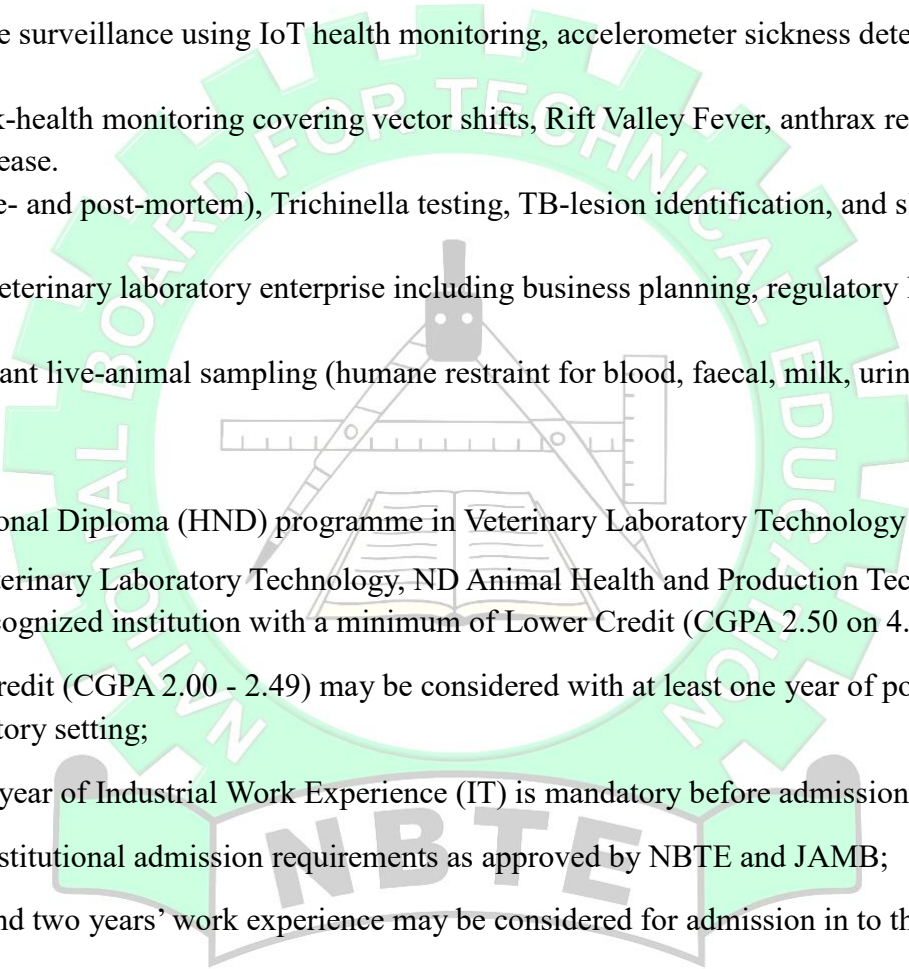
2.0 PROGRAMME GOAL

The Higher National Diploma in Veterinary Laboratory Technology programme is designed to produce diplomates capable of providing modern, digitally-enabled veterinary laboratory and clinical support services to veterinarians and Veterinary Para-Professionals, specializing in one of four practice areas (Diagnostic Imaging, Anaesthesiology, Microbiology, or Pathology) with strong cross-cutting competencies in livestock production support, digital diagnostics, cold-chain supply and logistics, One Health surveillance, point-of-care testing, climate-driven disease detection, and veterinary laboratory enterprise management.

3.0 OBJECTIVES OF THE PROGRAMME

On completion of the programme, the diplomates should be able to:

- i. Provide modern veterinary laboratory services including sample collection, processing, digital reporting, and quality assurance using Laboratory Information Management Systems (LIMS).
- ii. Support commercial livestock enterprises (cattle, small ruminants, poultry, swine, bees) through species-specific diagnostic workflows and reproductive diagnostics.
- iii. Specialize in one of four practice areas: Diagnostic Imaging, Anaesthesiology, Microbiology, or Pathology, with deep Knowledge and technical competence in the chosen field.
- iv. Conduct point-of-care (POC) and field diagnostics using lateral-flow tests, portable PCR, and handheld analyzers for rapid disease detection at farm and abattoir level.
- v. Manage cold-chain supplies and logistics for biological samples, vaccines and biologics including ultra-low-temperature storage, transport documentation protocols and audit-readiness.
- vi. Apply One Health surveillance for zoonotic diseases (rabies, brucellosis, anthrax, Lassa, avian influenza) and contribute towards inter-agency outbreak response.
- vii. Perform applied toxicology and residue screening including aflatoxin, pesticide residues, heavy metals, and prosecution-grade sample handling.
- viii. Carry out feed and nutrition laboratory analysis (proximate, mycotoxin, urea) with diet-related clinical-pathology interpretation.
- ix. Carry out apiary pathology diagnostics (Varroa, Nosema, AFB, EFB, chalk brood), small-ruminant diagnostics (PPR, CCPP, helminths), poultry & hatchery diagnostics (Newcastle, IB, AI, Marek), and swine diagnostics (ASF, CSF, PRRS).

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- The logo of the National Board for Technical Education (NBTE) is a large, light green gear-like shape. Inside the gear, there is a stylized illustration of a laboratory or industrial setting with various equipment like a microscope, a balance scale, and a beaker. The text "NATIONAL BOARD FOR TECHNICAL EDUCATION" is written around the perimeter of the gear, and "NBTE" is prominently displayed in the center.
- x. Apply digital laboratory technologies including automated qPCR, automated ELISA readers, digital slide scanning, and cloud-based result reporting.
 - xi. Conduct equipment maintenance and calibration for microscopes, centrifuges, autoclaves, haematology analyzers, incubators and spectrophotometers.
 - xii. Apply digital livestock disease surveillance using IoT health monitoring, accelerometer sickness detection, mobile-app reporting, and satellite outbreak monitoring.
 - xiii. Apply climate-smart livestock-health monitoring covering vector shifts, Rift Valley Fever, anthrax re-emergence, heat-stress pathologies, and drought-driven nutritional disease.
 - xiv. Conduct meat inspection (ante- and post-mortem), Trichinella testing, TB-lesion identification, and slaughterhouse sample-flow management.
 - xv. Set up and operate a private veterinary laboratory enterprise including business planning, regulatory licensing, QMS, client-sample logistics and digital marketing.
 - xvi. Apply animal-welfare-compliant live-animal sampling (humane restraint for blood, faecal, milk, urine, biopsy) with species-specific venipuncture sites.

4.0 ENTRY REQUIREMENTS

Entry requirements into the Higher National Diploma (HND) programme in Veterinary Laboratory Technology include:

- a) National Diploma (ND) in Veterinary Laboratory Technology, ND Animal Health and Production Technology, ND Public Health, ND Environmental Health from a recognized institution with a minimum of Lower Credit (CGPA 2.50 on 4.00 scale);
- b) Candidates with ND Lower Credit (CGPA 2.00 - 2.49) may be considered with at least one year of post-ND industrial work experience (IT) in an approved veterinary laboratory setting;
- c) Successful completion of one year of Industrial Work Experience (IT) is mandatory before admission to the HND programme;
- d) Candidates must satisfy the institutional admission requirements as approved by NBTE and JAMB;
- e) Candidates with Pass Grade and two years' work experience may be considered for admission in to the programme.

5.0 PROGRAMME STRUCTURE

The Higher National Diploma (HND), in Veterinary Laboratory Technology programme is structured to last for two (2) years (four semesters) of classroom work, laboratory, field practical.

Each semester shall be for 17 weeks, made up as follows:

- i) 15 contact weeks of teaching (i.e. lectures and practical sessions etc.) and
- ii) 2 weeks for registration, tests, quizzes and examinations.

The Higher National Diploma (HND) programme in Veterinary Laboratory Technology is a two-year (four-semester) full-time programme. HND I (Year 1) provide a common foundation across all options. HND II (Year 2) is split into four specialization options:

5.1 Diagnostic Imaging

Diagnostic Imaging is a course that focuses on the principles and use of imaging techniques for diagnosing diseases and injuries in animals. It covers the operation, safety, and interpretation of radiography (X-ray), ultrasonography, and other medical imaging methods used in veterinary practice. Students learn how to position animals correctly, produce quality images, and assist veterinarians in identifying abnormalities.

5.2 Anaesthesiology

Anaesthesiology focuses on the administration and monitoring of anaesthesia in animals during surgical and medical procedures. The course covers types of anaesthetic agents, methods of administration, patient preparation, monitoring & evaluation techniques, pain management, and emergency response. It equips students with skills to ensure animal safety and comfort before, during, and after procedures.

5.3 Microbiology

Microbiology is the study of microorganisms such as bacteria, viruses, fungi, and parasites that affect animal health. The course introduces laboratory techniques for isolation, identification, culture, and control of disease-causing organisms. Students learn the role of microbes in veterinary diseases, disease transmission, and laboratory diagnosis.

5.4 Pathology

Pathology is the study of diseases, their causes (aetiology), development (pathogenesis), and effects on animal tissues and organs. The course covers both gross and microscopic examination of diseased tissues, disease processes, and laboratory diagnostic methods. It helps students understand how diseases affect animal bodies and supports accurate diagnosis and treatment recommendations.

Students select one option at the start of HND II and complete the full option curriculum including specialized clinical posting and final project.

6.0 CURRICULUM

The HND Veterinary Laboratory Technology programme consists of four (4) main components. These are:

i) General Studies/General Education Courses

Courses that develop communication, ICT, entrepreneurship, and ethical skills needed in Veterinary Laboratory Technology practice.

ii) Foundation Courses

Basic science courses that provide knowledge in biology, chemistry, anatomy, physiology, and microbiology for understanding Veterinary Laboratory Technology.

iii) Professional Courses

Specialized courses that equip students with practical and technical skills in disease diagnosis, laboratory techniques, pathology, parasitology, and animal health management in Veterinary Laboratory Technology.

7.0 CONDITIONS FOR THE AWARD OF HND

The Higher National Diploma in Veterinary Laboratory Technology programme qualification shall be awarded by the authority of the Academic Board of the Institution.

For award of the Higher National Diploma, the candidate must have:

- a) Completed and passed all prescribed courses in HND I (Common) and HND II (chosen option) including the Final Project and Clinical Posting.
- b) Attained a minimum Cumulative Grade Point Average (CGPA) of 2.50 on a 4.00-point scale.
- c) Successfully participated in all clinical posting and seminar requirements.
- d) Met all financial and other administrative requirements of the institution.
- e) Candidate must have completed minimum of 72 to 80 credit units

7.1 Classification of Higher National Diploma

Distinction	– CGPA 3.50 – 4.00
Upper Credit	– CGPA 3.00 – 3.49
Lower Credit	– CGPA 2.50 – 2.99
Pass	– CGPA 2.00 – 2.49

7.2. FINAL YEAR PROJECTS

Final year students of the programme are expected to carry out project work, either on individual or group basis (maximum of two students per group).

The project topics should be related to Veterinary Laboratory Technology and should serve as useful tools for research and development.

Projects should be properly supervised and reports well presented.

8.0 ACCREDITATION OF PROGRAMME

The HND programme shall be accredited by the National Board for Technical Education (NBTE) before diplomates can be awarded the qualification.

Details about the process of accrediting a programme are available from the Board's website www.nbte.gov.ng or through correspondence to:

The Executive Secretary,
National Board for Technical Education (NBTE),
Plot 'B' Bida Road,
P.M.B 2239, Kaduna, Nigeria.

9.0 STAFFING REQUIREMENTS

9.1 Core Teaching Staff

A minimum number of four (4) qualified lecturers with relevant HND or BSc qualifications in Veterinary Laboratory Technology, Veterinary Medicine and related disciplines.

9.2 Head of Department (HOD)

The Head of Department shall:

- i. Have at least first degree and master degree in Veterinary Medicine, Microbiology, Animal Science, Animal Health and related field
- ii. Not be below the rank of a Senior Lecturer
- iii. Registered with relevant professional bodies
- iv. Must have a minimum of twelve (12) years' experience in both academic and industry

9.3 Technical Staff

There should be technical staff;

- i. **Technologist**

A Veterinary Laboratory Technologist is a highly skilled professional, usually at HND level, responsible for supervising laboratory operations, conducting advanced diagnostic procedures, interpreting laboratory results, and assisting veterinarians in disease diagnosis and animal health management.

ii. **Technician**

A technician is a middle-level manpower trained in Veterinary Laboratory Technology to perform routine laboratory tests, handle laboratory equipment, collect and process samples, and assist technologists and veterinarians in laboratory and field activities.

iii. **Farm Assistants**

Farm assistants support animal health and farm management activities by assisting in animal handling, feeding, sanitation, sample collection, and basic disease monitoring under the supervision of veterinary professionals and laboratory personnel.

10.0 CERTIFICATION

A diplomate of this programme shall be awarded: Higher National Diploma (HND) in Veterinary Laboratory Technology by the authority of the Academic Board of the awarding institution.

11.0 Grading of Courses:

Courses shall be graded as follows:

MARK RANGE	LETTER GRADE	WEIGHTING
75% and above	A	4.00
70% – 74%	AB	3.50
65% – 69%	B	3.25
60% – 64%	BC	3.00
55% – 59%	C	2.75
50% – 54%	CD	2.50
45% – 49%	D	2.25
40% – 44%	E	2.00
Below 40%	F	0.0

12.0 GUIDANCE NOTES FOR TEACHERS OF THE PROGRAMME

The new curriculum is drawn in unit courses. This is keeping with the provisions of the National Policy on education which stress the need to introduce the semester credit units, which will enable a student who so wish to transfer the units already completed in an institution of similar standard from which he is transferring.

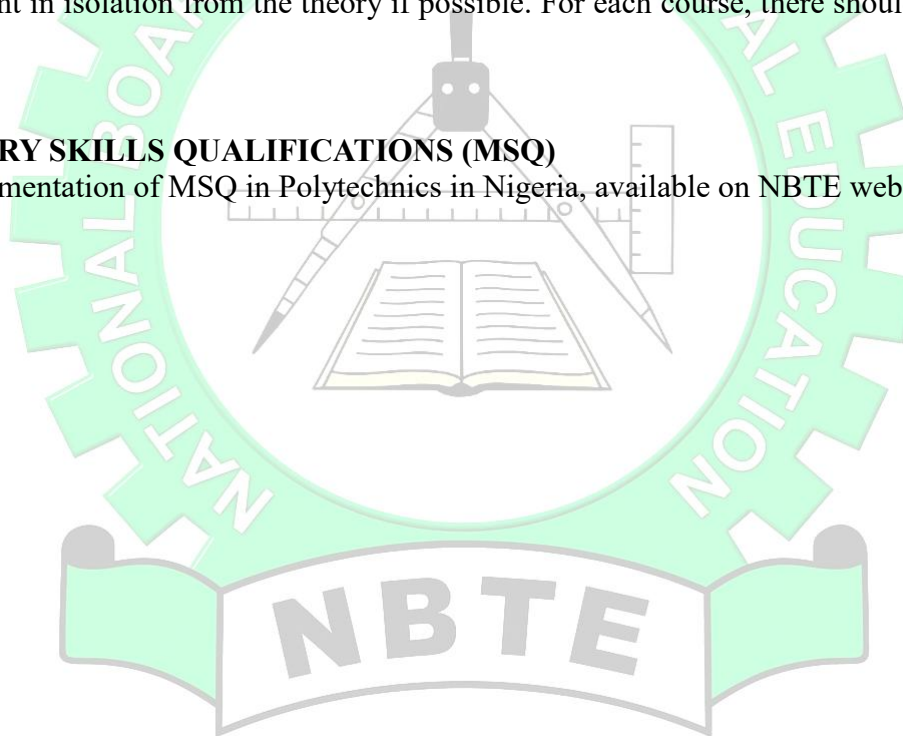
In designing the units, the principles of the modular system by product have been adopted; thus, making each of the professional modules when completed will provide the students with technical operative skills, which can be used for employment purposes.

As the success of the credit unit system depends on the articulation of programmes between the institutions and industry, the curriculum content has been written in the behavioral objectives, so that is clear to all, the special Learning objective of the student who successfully completed some of the courses or the diplomates of the programme. There is a slight departure in the presentation of the performance-based curriculum which state categorically, the special learning objective for the students, also, there is a deliberate attempt to further involve the staff of the department by having another column called Teaching activities. This is to ensure that the lecturers deliver the required learning objectives. There is a third column for the Resources required for each learning objective. Each department is expected to develop its own curriculum to facilitate learning from this minimum Guide curriculum and ensure that the resources required are available. The Academic Board of the institution may vet departmental submission on the final curriculum. The aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the TVET Institutions.

The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and laboratory work should not be taught in isolation from the theory if possible. For each course, there should be a balance of theory to practice in the ratio 20:80, or the reverse.

12.0 GUIDELINES ON MANDATORY SKILLS QUALIFICATIONS (MSQ)

Please, see the Guidelines for the Implementation of MSQ in Polytechnics in Nigeria, available on NBTE website (web.nbte.gov.ng/downloads).



CURRICULUM TABLES

HND I - SEMESTER I

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	GNS 301	Use of English III	2	0	0	2	2
2.	MSQ 311	Principles of Quality Assurance Assessment	1	0	1	2	2
3.	ANH 312	Gross Anatomy	1	0	3	4	4
4.	ANH 313	Veterinary Physiology	1	0	3	4	4
5.	VLT 311	Introduction to Laboratory Techniques	1	0	3	4	4
6.	VLT 312	Veterinary Biochemistry	1	0	3	4	4
7.	VLT 313	General Microbiology	1	0	3	4	4
8.	VLT 314	Veterinary Pharmacology	1	0	2	3	3
9.	VLT 315	Veterinary Jurisprudence	2	0	0	2	2
10.	VLT 316	Response for Disaster Situation	1	0	1	2	2
TOTAL			12	0	19	31	31

HND I - SEMESTER II

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	GNS 302	Communication in English III	2	0	0	2	2
2.	ENT 326	Practice of Entrepreneurship I	2	0	2	4	4
3.	MSQ 321	Practice of Quality Assurance Assessment	1	0	1	2	2
4.	ANH 321	Embryology and Histology	1	0	3	4	4
5.	VLT 321	Feed Analysis and Clinical Nutrition Diagnostics	1	0	2	3	3
6.	VLT 322	Laboratory Skills, Procedures and Safety	1	0	3	4	4
7.	VLT 323	Animal Diseases	1	0	3	4	4
8.	VLT 324	Veterinary Toxicology, Aflatoxin and Residue Screening	1	0	2	3	3
9.	VLT 325	Laboratory Operations and Management	1	0	2	3	3
10.	VLT 326	Biostatistics and Laboratory Data Analysis	1	0	2	3	3
TOTAL			12	0	20	32	32

HND II (DIAGNOSTIC IMAGING) - SEMESTER I

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	ENT 416	Practice of Entrepreneurship II	2	0	2	4	4
2.	AGR 401	Research Methodology and Scientific Writing	1	0	1	2	2
3.	VLD 411	Instrumentation and Digital Laboratory Technologies	1	0	2	3	3
4.	VLD 412	Radiation Biology	2	0	0	2	2
5.	VLD 413	Ultrasonography (incl. Reproductive Imaging)	1	0	3	4	4
6.	VLD 414	Mammography	1	0	3	4	4
7.	VLD 415	Radiology (Digital Imaging and PACS)	1	0	3	4	4
8.	VLD 416	Radiation Safety and Equipment Maintenance	1	0	1	2	2
TOTAL			10	0	15	25	25

HND II (DIAGNOSTIC IMAGING) - SEMESTER II

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	VLD 421	Magnetic Resonance Imaging (MRI)	1	0	3	4	4
2.	VLD 422	Scintigraphy and Digital Livestock Surveillance Imaging	1	0	3	4	4
3.	VLD 423	Computed Tomography (CT) and Climate-Driven Imaging	1	0	3	4	4
4.	VLD 424	Dental Procedures and Imaging	1	0	1	2	2
5.	VLD 425	Clinical Posting	0	0	6	6	6
6.	VLD 426	Final Project	0	0	4	4	4
TOTAL			4	0	20	24	24

L = Lectures (hours/week) P = Practical (hours/week) T = Tutorial (hours/week) CH = Contact Hours (Hours/week) CU = Credit Unit

HND II (ANAESTHESIOLOGY) - SEMESTER I

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	AGR 401	Research Methodology and Scientific Writing	2	0	0	2	2
2.	ENT 416	Practice of Entrepreneurship II	2	0	2	4	4
3.	VLA 411	Introduction to Anaesthesiology and Digital Monitoring	1	0	1	2	2
4.	VLA 412	Anaesthetic Instrumentation and Equipment Maintenance	1	0	3	4	4
5.	VLA 413	Anaesthetic Procedures and Laboratory Support	1	0	3	4	4
6.	VLA 414	Applied Physiology	1	0	3	4	4
TOTAL			10	0	16	26	26

HND II (ANAESTHESIOLOGY) - SEMESTER II

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	VLA 421	Anaesthetic Emergencies and Climate-Stress Anaesthesia	1	0	3	4	4
2.	VLA 422	Anaesthetic Monitoring and Evaluation	1	0	3	4	4
3.	VLA 423	Neuropharmacology	1	0	3	4	4
4.	VLA 424	Clinical Posting	0	0	6	6	6
5.	VLA 425	Final Project	0	0	4	4	4
TOTAL			3	0	19	22	22

L = Lectures (hours/week) P = Practical (hours/week) T = Tutorial (hours/week) CH = Contact Hours (Hours/week) CU = Credit Unit

HND II (MICROBIOLOGY) - SEMESTER I

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	ENT 416	Practice of Entrepreneurship II	2	0	2	4	4
2.	AGR 401	Research Methodology and Scientific Writing	1	0	1	2	2
3.	VLM 411	Instrumentation and Digital Laboratory Technologies	1	0	2	3	3
4.	VLM 412	Culture, Media and Staining Techniques	1	0	2	3	3
5.	VLM 413	Antiseptics and Disinfectants	1	0	2	3	3
6.	VLM 414	Immunology and Serological Diagnostics	1	0	2	3	3
7.	VLM 415	Sterilization and Cold-Chain Management	1	0	2	3	3
8.	VLM 416	Parasitology and Apiary Pathology	1	0	2	3	3
9.	VLM 417	Bacteriology (incl. Poultry, Swine and Small-Ruminant Diagnostics)	1	0	3	4	4
TOTAL			11	0	17	28	28

HND II (MICROBIOLOGY) - SEMESTER II

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	VLM 421	Virology and Climate-Driven Emerging Diseases	1	0	2	3	3
2.	VLM 422	Mycology and Mycotoxin Diagnostics	1	0	2	3	3
3.	VLM 423	Rickettsiology and Vector-Borne Disease Diagnostics	1	0	2	3	3
4.	VLM 424	Clinical Posting	0	0	6	6	6
5.	VLM 425	Final Project	0	0	4	4	4
TOTAL			3	0	16	19	19

L = Lectures (hours/week) P = Practical (hours/week) T = Tutorial (hours/week) CH = Contact Hours (Hours/week) CU = Credit Unit

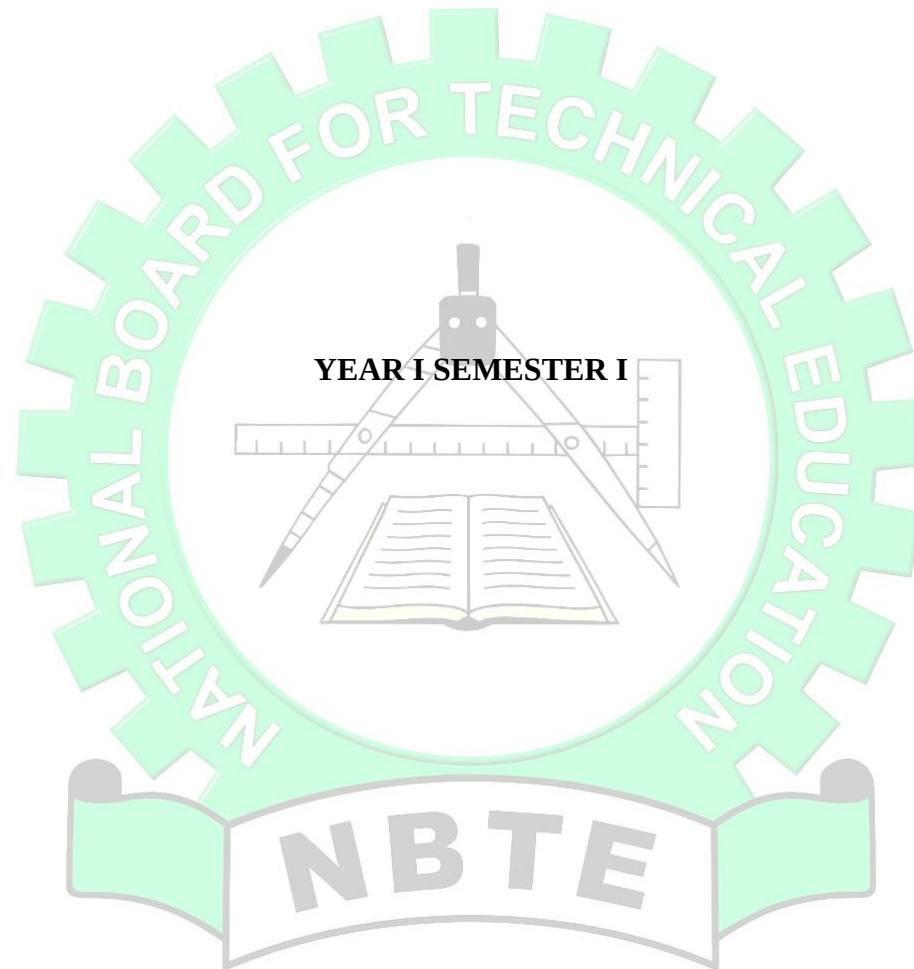
HND II (PATHOLOGY) - SEMESTER I

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	ENT 416	Practice of Entrepreneurship II	2	0	2	4	4
2.	AGR 401	Research Methodology and Scientific Writing	1	0	1	2	2
3.	VLP 411	Instrumentation and Safety Measures	1	0	2	3	3
4.	VLP 412	Post-mortem Examination Practice	1	0	2	3	3
5.	VLP 413	Haematology	1	0	3	4	4
6.	VLP 414	Immunology and Serological Diagnostics	1	0	2	3	3
7.	VLP 415	Clinical Biochemistry	1	0	3	4	4
8.	VLP 416	Cytology	1	0	1	2	2
9.	VLP 417	Histopathologic Techniques	1	0	2	3	3
10.	VLP 418	Urinalysis	1	0	1	2	2
TOTAL			12	0	18	30	30

HND II (PATHOLOGY) - SEMESTER II

S/N	COURSE CODE	COURSE TITLE	L	T	P	CH	CU
1.	VLP 421	Immunopathology	1	0	1	2	2
2.	VLP 422	Digital Microscopy and Photography	1	0	1	2	2
3.	VLP 423	Histochemistry and Immunochemistry	1	0	2	3	3
4.	VLP 424	Sample Collection, Preservation and Transportation	1	0	1	2	2
5.	VLP 425	Clinical Posting	0	0	6	6	6
6.	VLP 426	Final Project	0	0	4	4	4
TOTAL			4	0	15	19	19

L = Lectures (hours/week) P = Practical (hours/week) T = Tutorial (hours/week) CH = Contact Hours (Hours/week) CU = Credit Unit



INTRODUCTION TO LABORATORY TECHNIQUES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO LABORATORY TECHNIQUES	COURSE CODE: VLT 311	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of Laboratory Procedures.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know sample collection, labeling, and transportation; 2.0 Understand sample preparation, processing and asepsis techniques; 3.0 Know use of relevant chemicals/reagents; 4.0 Understand use of instrument/equipment; 5.0 Know the methods of laboratory analyses; 6.0 Understand methods of reporting results and interpretations; 7.0 Know the bio-safety measures in the laboratories;		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO LABORATORY TECHNIQUES			COURSE CODE: VLT 311		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of Laboratory Procedures.						
GENERAL OBJECTIVE 1.0: Know sample collection, labeling, and transportation						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Explain types of samples and their method of collection 1.2 Describe methods of recording and labeling samples, 1.3 Explain appropriate and safe methods of sample transportation and storage	- Explain types of samples and their method of collection - Describe methods of recording and labeling samples, - Explain appropriate and safe methods of sample transportation and storage	Books, Journals, Pictures, , Projector, white board marker, internet, Charts	- Identify types of samples and their methods of collection and transportation - Identify sample labeling methods - Identify proper sample packaging methods	Guide students to: - Identify types of samples and their methods of collection and transportation - Identify sample labeling methods - Identify proper sample packaging methods	Sterile bottle, spatulas, syringes and surgical blades, Microscope Ice pack, flask, transport media, Freezer
GENERAL OBJECTIVE 2.0: Understand sample preparation, processing and asepsis techniques						
3-4	2.1 Describe sample preparation 2.2 Explain proper	Discuss sample preparation	Books, Journals, Pictures, , Projector, white	Conduct sample preparation and	Guide students to: Conduct sample	Mortar and pestle, Centrifuge,

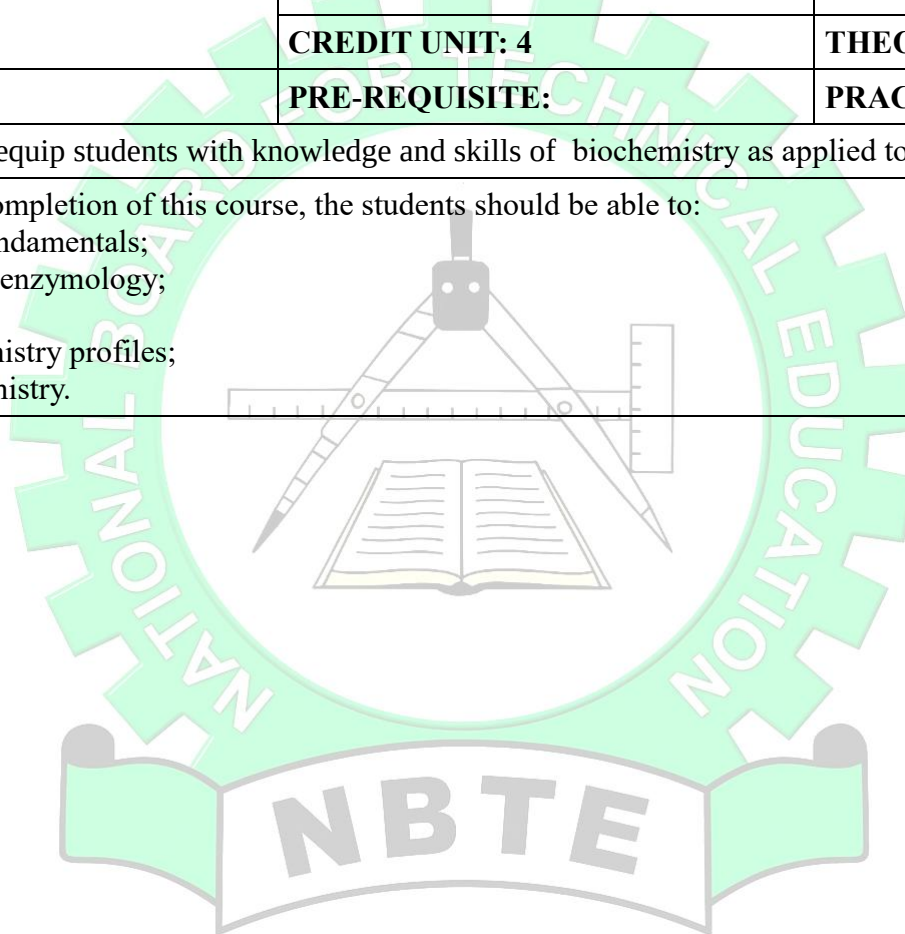
	sample processing e.g grinding, Centrifugation etc. 2.3 Explain different aseptic Techniques e.g disinfection, flaming	- Explain proper sample processing e.g grinding, Centrifugation etc. - Discuss different aseptic Techniques e.g disinfection, flaming	board marker, internet, Charts etc.	processing for easy diagnosis Identify different aseptic and disinfectant Agents	preparation and processing for easy diagnosis Identify different aseptic and disinfectant Agents	Filters, Spatula, Microscope, staining rack, Autoclave, Disinfectants, Antiseptics, Bunsen burner
GENERAL OBJECTIVE 3.0: Know use of relevant chemicals/reagents						
5-6	3.1 Explain relevant chemicals and reagents 3.2 Describe the use of relevant chemicals and reagents 3.3 Describe proper handling and storage of chemicals and reagents	- Explain relevant chemicals and reagents - Describe the use of relevant chemicals and reagents - Describe proper handling and storage of chemicals and reagents	Teaching aids such as: Books, Journals, Pictures, Projector, white board marker, internet, Charts, etc	Perform the application of relevant chemicals and reagents for sample processing	Guide students to: Perform the application of relevant chemicals and reagents for sample processing	Alcohols, Stains, Antigens, Antibodies, Buffers e.g phosphate buffered Saline (PBS), Salts e.g Bicarbonate salts
GENERAL OBJECTIVE 4.0: Understand use of instrument and equipment						
7-8	4.1 Describe instrument for sample processing and diagnosis 4.2 Describe the application of instruments/equipment to specific	- Describe instrument for sample processing and diagnosis - Describe the application of instruments/equipment to specific	Books, Journals, Pictures, , Projector, white board marker, internet, Charts etc.	Identify the instruments/equipment and their application to specific processing and diagnostic techniques	Guide students to: Identify the instruments and equipment and their application to specific processing and diagnostic techniques	Sterile bottles, Syringes and needles, Glass slides, Pipettes, Petri dishes, Flask and beakers, Microscopes,

	processing and diagnostic techniques 4.3 Explain relevant equipment for sample processing and diagnosis	processing and diagnostic techniques • Explain relevant equipment for sample processing and diagnosis				Water bath, Incubators, Weighing scales, Spectrophotometer
GENERAL OBJECTIVE 5.0: Know the methods of laboratory analyses						
9-10	5.1 Explain the various methods of laboratory analysis 5.2 Explain the criteria for selection of the laboratory analysis 5.3 Describe the various methods of analysis	• Discuss the various methods of laboratory analysis • Explain the criteria for selection of the laboratory analysis • Discuss the various methods of analysis	Books, Journals, Pictures, , Projector, white board marker, internet, Charts, etc	• Conduct the various methods of laboratory analysis	Guide students to: • Conduct the various methods of laboratory analysis	Microscope, Haematology analyzer, thermocycler, X-ray machine, anaesthetic machine, post mortem kit etc
General Objective: 6.0 Understand proper methods of reporting results and their interpretations						
11- 13	6.1 Explain the methods of reporting laboratory results 6.2 Describe the various methods of interpreting results e.g. Gram positive, Gram negative Acid fast etc. 6.3 Explain laboratory record keeping and	• Discuss the methods of reporting laboratory results • Explain the various methods of interpreting results e.g. Gram positive, Gram negative Acid fast etc. • Explain laboratory record keeping and data banking	Books, Journals, Pictures, , Projector, white board marker, internet, Charts etc.	• Report laboratory results • Interpret laboratory results • Keep laboratory records and establish data bank	Guide students to: • Report laboratory results • Interpret laboratory results • Keep laboratory records and establish data bank	Laboratory request forms, Log Book, computer, shelves, writing materials, cold chain facility etc.

	data banking					
General Objective: 7.0 Know the Bio-safety in the Laboratory						
14-15	7.1 Define Biosafety 7.2 List the importance of bio-safety in the laboratories 7.3 Mention levels of biosafety 7.4 Describe various biosafety measures	• Define Biosafety • List the importance of bio-safety in the laboratories • Mention levels of biosafety • Describe various biosafety measures	Books, Journals, Pictures, , Projector, white board marker, internet, Charts, etc	• Carry out various biosafety measures	Guide students to: • Carry out various biosafety measures	Fuming chamber, Personal protective equipment (PPE)
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

VETERINARY BIOCHEMISTRY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: VETERINARY BIOCHEMISTRY	COURSE CODE: VLT 312	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of biochemistry as applied to veterinary diagnostics.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand biochemistry fundamentals; 2.0 Know enzymes and clinical enzymology; 3.0 Understand metabolism; 4.0 Understand clinical biochemistry profiles; 5.0 Know point-of-care biochemistry.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: VETERINARY BIOCHEMISTRY			COURSE CODE: VLT 312		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of biochemistry as applied to veterinary diagnostics.						
GENERAL OBJECTIVE 1.0: Understand biochemistry fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain chemical bonds, water properties, buffer systems 1.2 Describe protein structure and function 1.3 Explain carbohydrate structure and metabolism 1.4 Explain lipid structure and metabolism	• Discuss chemical bonds, water properties, buffer systems • Explain protein structure and function • Discuss carbohydrate structure and metabolism • Discuss lipid structure and metabolism	Biochemistry textbooks, molecular models, LCD projector	• Prepare buffer solutions at specified pH • Verify with pH meter and titration • Run protein electrophoresis (SDS-PAGE) on serum samples • Identify bands • Test for reducing sugars (Benedict, Fehling) on biological samples • Analyse total lipids from sample tissues using	Guide students to: • Prepare buffer solutions at specified pH • Verify with pH meter and titration • Run protein electrophoresis (SDS-PAGE) on serum samples • Identify bands • Test for reducing sugars (Benedict, Fehling) on biological samples • Analyse total lipids from sample tissues	Buffer reagents, pH meters, SDS-PAGE equipment, sugar reagents, Solvents, Balances

				solvent extraction	using solvent extraction	
GENERAL OBJECTIVE 2.0: Know enzymes and clinical enzymology						
4-6	2.1 Explain enzyme structure, function, kinetics 2.2 Explain enzyme regulation and inhibition 2.3 Describe clinical enzyme assays (AST, ALT, ALP, CK, LDH, GGT) 2.4 Explain enzyme interpretation for organ-function tests	• Discuss enzyme structure, function, kinetics • Discuss enzyme regulation and inhibition • Explain clinical enzyme assays (AST, ALT, ALP, CK, LDH, GGT) • Discuss enzyme interpretation for organ-function tests	Enzymology textbooks, LCD projector white board	• Conduct enzyme kinetics experiment with alkaline phosphatase • Plot Lineweaver-Burk • Test enzyme inhibition with specific inhibitors; • Demonstrate competitive vs noncompetitive • Run AST, ALT, ALP, CK, LDH, GGT on serum samples using clinical chemistry analyser • Interpret enzyme profiles for 10 sample cases (liver, muscle, bone diseases)	Guide students to: • Conduct enzyme kinetics experiment with alkaline phosphatase • Plot Lineweaver-Burk • Test enzyme inhibition with specific inhibitors; • Demonstrate competitive vs noncompetitive • Run AST, ALT, ALP, CK, LDH, GGT on serum samples using clinical chemistry analyser • Interpret enzyme profiles for 10 sample cases (liver, muscle, bone diseases)	Spectrophotometers, enzymes, substrates, inhibitors, clinical analyser, sample sera, kits
GENERAL OBJECTIVE 3.0: Understand metabolism						
7-9	3.1 Explain carbohydrate	• Discuss carbohydrate metabolism	Metabolism textbooks,	• Measure blood glucose (fasted,	Guide students to: • Measure blood	Glucometers, BHBA strips,

	metabolism (glycolysis, TCA, gluconeogenesis) 3.2 Describe lipid metabolism (beta-oxidation, ketogenesis) 3.3 Explain protein and amino-acid metabolism 3.4 Explain nucleic-acid metabolism	(glycolysis, TCA, gluconeogenesis) • Explain lipid metabolism (beta-oxidation, ketogenesis) • Discuss protein and amino-acid metabolism • Discuss nucleic-acid metabolism	pathway charts, LCD projector	post prandial, glucose tolerance) in dogs • Measure ketone bodies (BHBA) in dairy cows • Diagnose ketosis cases • Test serum total protein and albumin • Calculate globulin and A:G ratio • Measure serum uric acid in poultry • Interpret renal function status	glucose (fasted, post prandial, glucose tolerance) in dogs • Measure ketone bodies (BHBA) in dairy cows • Diagnose ketosis cases • Test serum total protein and albumin • Calculate globulin and A:G ratio • Measure serum uric acid in poultry • Interpret renal function status	clinical analyser, sample animals, ketone test kits
GENERAL OBJECTIVE 4.0: Understand clinical biochemistry profiles						
10-12	4.1 Describe liver function tests (bile acids, bilirubin, total protein) 4.2 Explain kidney function tests (BUN, creatinine, urea, phosphorus) 4.3 Explain muscle function tests (CK, AST, myoglobin)	• Discuss liver function tests (bile acids, bilirubin, total protein) • Explain kidney function tests (BUN, creatinine, urea, phosphorus) • Explain muscle function tests (CK, AST, myoglobin)	Clinical biochemistry textbooks, LCD projector	• Run liver-function panel (ALT, ALP, GGT, bilirubin, total protein) on dog serum • Run kidney panel (BUN, creatinine, phosphorus) on dog and cat serum • Run muscle panel (CK, AST) on	Guide students to: • Run liver-function panel (ALT, ALP, GGT, bilirubin, total protein) on dog serum • Run kidney panel (BUN, creatinine, phosphorus) on dog and cat serum • Run muscle panel (CK, AST) on horse	Clinical analyser, reagent kits, sample sera, calibrators, controls, ion-selective electrodes

	4.4 Explain electrolytes (Na, K, Cl, Ca, Mg, P)	• Discuss electrolytes (Na, K, Cl, Ca, Mg, P)		horse serum after exercise • Run electrolyte panel on cattle samples; • Identify abnormalities	serum after exercise • Run electrolyte panel on cattle samples; • Identify abnormalities	
GENERAL OBJECTIVE 5.0: Know point-of-care biochemistry						
13-15	5.1 Explain portable analysers (i-STAT, Vet Scan, blood-gas) 5.2 Describe dipstick tests (urinalysis, ketones, glucose) 5.3 Explain quality control for POC devices 5.4 Explain troubleshooting and maintenance	• Discuss portable analysers (i-STAT, Vet Scan, blood-gas) • Explain dipstick tests (urinalysis, ketones, glucose) • Discuss quality control for POC devices • Explain troubleshooting and maintenance	POC biochem manuals, LCD projector	• Operate Vet Scan or I-STAT analyser on field samples; • Interpret results • Run dipstick urinalysis on multiple species • Identify abnormalities • Run daily QC on POC devices • Document Levey-Jennings charts • Troubleshoot and maintain POC analyser • Replace consumables	Guide students to: • Operate Vet Scan or I-STAT analyser on field samples; • Interpret results • Run dipstick urinalysis on multiple species • Identify abnormalities • Run daily QC on POC devices • Document Levey-Jennings charts • Troubleshoot and maintain POC analyser • Replace consumables	Vet Scan/I-STAT analysers, urine dipsticks, QC materials, maintenance kits

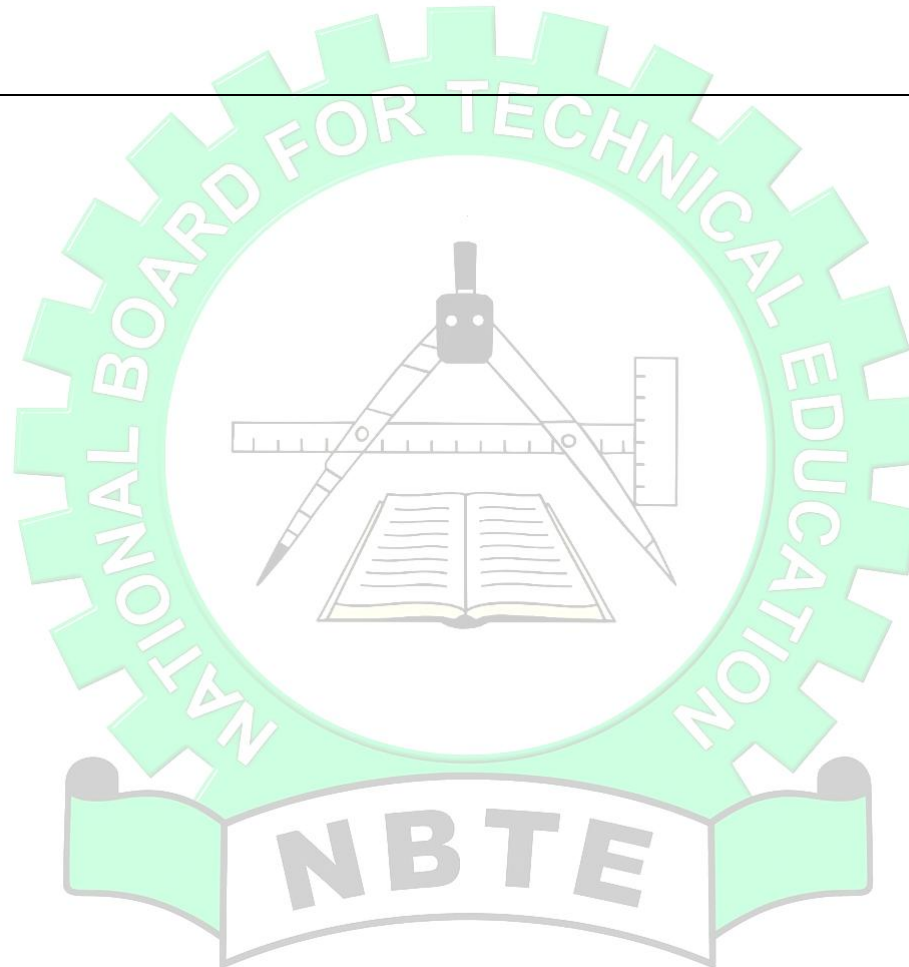
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

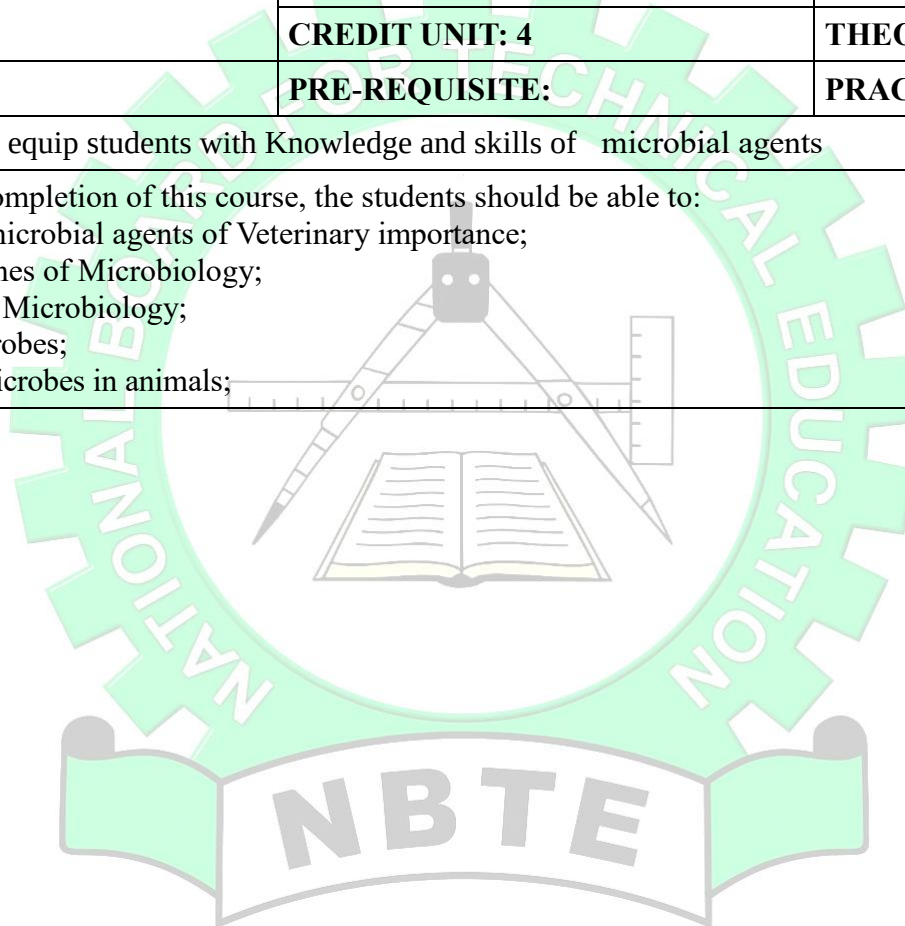
Practical 40%

Examination 40% = 100%



GENERAL MICROBIOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: GENERAL MICROBIOLOGY	COURSE CODE: VLT 313	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of microbial agents		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the classification of microbial agents of Veterinary importance; 2.0 Know the history and branches of Microbiology; 3.0 Know the common terms in Microbiology; 4.0 Know the cultivation of microbes; 5.0 Know the disease causing microbes in animals;		

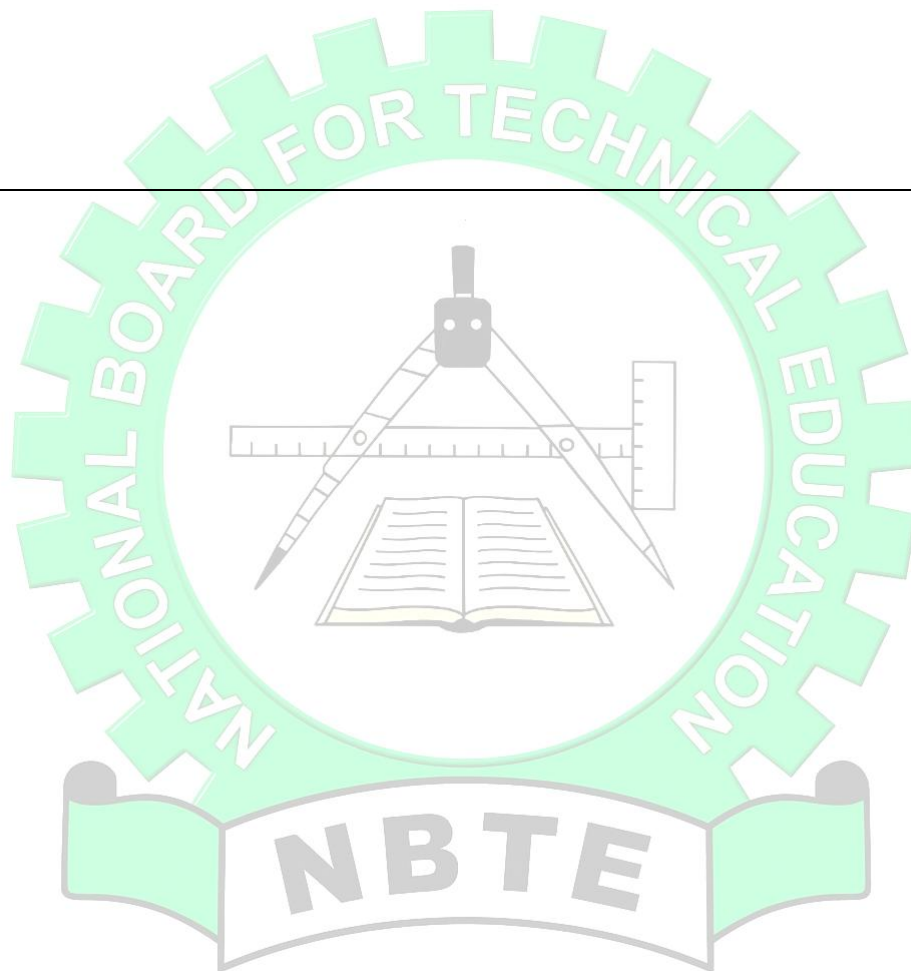


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: GENERAL MICROBIOLOGY			COURSE CODE: VLT 313		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of microbial agents						
GENERAL OBJECTIVE 1.0: Understand microbial structure and classification						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Microbiology 1.2 List the major groups of microorganisms of veterinary importance: i. Bacteria ii. Viruses iii. Parasitic iv. Protozoa v. Fungi. 1.3 Explain the biology of Bacteria, 1.4 Explain the biology of Virus, 1.5 Explain the biology	• Explain Microbiology • Explain the major groups of microorganisms of veterinary importance: - Bacteria - Viruses - Parasitic - Protozoa - Fungi. • Discuss the biology of Bacteria, • Discuss the biology of Virus, • Discuss the biology	Text books, Journals, Internet, projector	• Identify the morphology and staining characteristics of microbial agents	Guide students to: • Identify the morphology and staining characteristics of microbial agents	Microscope, Incubator, Autoclave, Hot air oven, Bunsen burner, Inoculating wire loop, Sterile bottle, Spatulas, and Ice pack, flask, media, Freezer etc.

	of Protozoa 1.6 Explain the biology of Fungi	of Protozoa • Discuss the biology of Fungi				
GENERAL OBJECTIVE 2.0: Know the common terms of microbes						
4-6	2.1 List the common terms in microbiology 2.2 Define the common terms used in microbiology 2.3 Explain the term to the various classes of microbes	• Explain the common terms in microbiology • Discuss the common terms used in microbiology • Explain the term to the various classes of microbes	Books Journals Internet PowerPoint, white board and markers, Charts and posters, Pictures or videos of microbial organisms			
GENERAL OBJECTIVE 3.0: Know the cultivation of Microbes						
7-9	3.1 Describe the morphological characteristic 3.2 Explain microbial Nutrition and growth requirement 3.3 Describe Multiplication	• Discuss the morphological characteristic • Explain microbial Nutrition and growth requirement • Discuss Multiplication	Books Journals Internet PowerPoint, white board and markers, Charts and posters, Pictures or videos of microbial organisms	• Determine the morphological characteristic and the Nutrient requirement (media)	Guide students to: • Determine the morphological characteristic and the Nutrient requirement (media)	Microscope, media, reagents, test tubes, autoclave, petri dish,
GENERAL OBJECTIVE 4.0: Know the disease causing microbes in animals						

10-12	4.1 Explain diseases Caused by Bacteria 4.2 Explain diseases caused by Parasites 4.3 Explain diseases caused by viruses 4.4 Explain diseases caused by fungi	• Explain diseases Caused by Bacteria • Explain diseases caused by Parasites • Explain diseases caused by viruses • Explain diseases caused by fungi	Books Journals Internet, white board and markers, Charts and posters, Pictures or videos of microbial organisms			
GENERAL OBJECTIVE 5.0: Understand antimicrobial susceptibility testing						
13-15	5.1 Explain Kirby-Bauer disc diffusion 5.2 Describe Minimum Inhibitory Concentration (MIC) determination 5.3 Explain CLSI/EUCAST interpretation 5.4 Describe antimicrobial resistance detection (ESBL, MRSA)	5.1 Explain Kirby-Bauer disc diffusion 5.2 Describe Minimum Inhibitory Concentration (MIC) determination 5.3 Explain CLSI/EUCAST interpretation 5.4 Describe antimicrobial resistance detection (ESBL, MRSA)	Antimicrobial susceptibility manuals, LCD projector	• Perform Kirby-Bauer disc diffusion on 5 bacterial isolates • Measure inhibition zones • Determine MIC using broth dilution for 3 isolate-antibiotic combinations • Interpret results using CLSI/EUCAST breakpoints • Classify S/I/R • Detect ESBL using double-disc synergy test and	Guide students to: • Perform Kirby-Bauer disc diffusion on 5 bacterial isolates • Measure inhibition zones • Determine MIC using broth dilution for 3 isolate-antibiotic combinations • Interpret results using CLSI/EUCAST breakpoints • Classify S/I/R • Detect ESBL using double-disc synergy test and MRSA using cefoxitin disc	Mueller-Hinton agar, antibiotic discs, MIC strips, CLSI guidelines, ESBL/MRSA confirmation kits

				MRSA using cefoxitin disc		
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



VETERINARY PHARMACOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: VETERINARY PHARMACOLOGY	COURSE CODE: VLT 314	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with a basic knowledge of different classes of drugs, route of administration, dosage and rational use of drugs in animals.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the scope and principles of pharmacology; 2.0 Know the various forms and classes of drugs in animals; 3.0 Understand the principles of rational use of drugs in animals; 4.0 Understand how to interpret prescription; 5.0 Know the route of administration of drugs in animals; 6.0 Know the dosage requirements of drugs in animals;		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: VETERINARY PHARMACOLOGY			COURSE CODE: VLT 314		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOURS/WEEKS	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with a basic knowledge of different classes of drugs, route of administration, dosage and rational use of drugs in animals.						
General Objective: 1.0: Know the scope and principles of pharmacology and fate of drugs						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Pharmacology and its branches 1.2 Explain the branches of pharmacology 1.3 Define common terms used in pharmacology. 1.4 Explain common sources of drugs	• Explain Pharmacology and its branches • Discuss the branches of pharmacology • Explain common terms used in pharmacology. • Discuss common sources of drugs	Books Journals Internet white board, marker, lecture notes, projector			
General Objective: 2.0: Know the forms and class of drugs and their uses in animals						
4-6	2.1 List the criteria for classification of drugs. 2.2 Explain the various	• Explain the criteria for classification of drugs. • Discuss the various	Text Books Journals White board, marker, videos,	• Identify various dosage forms • Identify Classes of drugs	Guide students to: • Identify various dosage forms • Identify Classes of	Different preparation of Drugs PPE,

	classes of drugs 2.3 Explain the various dosage forms of drugs	classes of drugs • Discuss the various dosage forms of drugs	Internet, Lecture notes		drugs	refrigerator,
General Objective: 3.0 Understand the principles of rational use of drugs in animals						
7-9	3.1 Explain drugs efficiency and safety. 3.2 Explain rational use of drugs in animals 3.3 List the benefits of rational drug use (RDU) 3.4 State the supportive role of the laboratory technologist in safe drug use	• Discuss drugs efficiency and safety. • Discuss rational use of drugs in animals • Explain the benefits of rational drug use (RDU) • Explain the supportive role of the laboratory technologist in safe drug use	Books Journals Internet Calculator Written Prescription			
General Objective: 4.0: Know how to interpret prescription						
10-12	4.1 Define drug prescription .and explain its features 4.2 Explain the difference between controlled drugs and over the counter drugs 4.3 Explain the importance of	• Explain drug prescription ,and explain its features • Discuss the difference between controlled drugs and over the counter drugs • Discuss the importance of	Books Journals Internet, Written Prescription	• Identify the difference between genuine and false prescriptions • Carry out prescription paper.	Guide students to: • Identify the difference between genuine and false prescriptions • Carry out prescription paper.	Prescription sheets

	prescription	prescription				
General Objective: 5.0: Know the route of administration of drugs in animals						
13-14	5.1 List the routes of drugs administration in animals 5.2 Explain parenteral route. 5.3 Explain oral route 5.4 Explain topical route	• Explain the routes of drugs administration in animals • Discuss parenteral route. • Discuss oral route • Discuss topical route	Books Journals Internet Written Prescription, white board, marker, videos, charts, projector	• Identify the various route of drug administration in animals	Guide students to: • Identify the various route of drug administration in animals	Different drug preparation, syringes, live animals, PPE
General Objective 6.0: Know the dosage requirements of drugs in animals						
15	6.1 Explain the concept of dose and dosage 6.2 Explain with examples how to calculate the dose and dosage of drugs in animals 6.3 Explain how to calculate the concentration of active drug ingredients	• Explain the concept of dose and dosage • Explain with examples how to calculate the dose and dosage of drugs in animals • Explain how to calculate the concentration of active drug ingredients	Calculator, white board, marker, projector, lecture notes, internet, charts,	• Calculate correct drug dosages for different animals • Determine body weight and prepare accurate drug doses • Administer drugs safely • Maintain dosage records	Guide students to: • Calculate correct drug dosages for different animals • Determine body weight and prepare accurate drug doses • Administer drugs safely • Maintain dosage records	Calculator, dosage charts, animal records Weighing scale, syringes, measuring devices, sample drugs Animal models/live animals, treatment record book, PPE

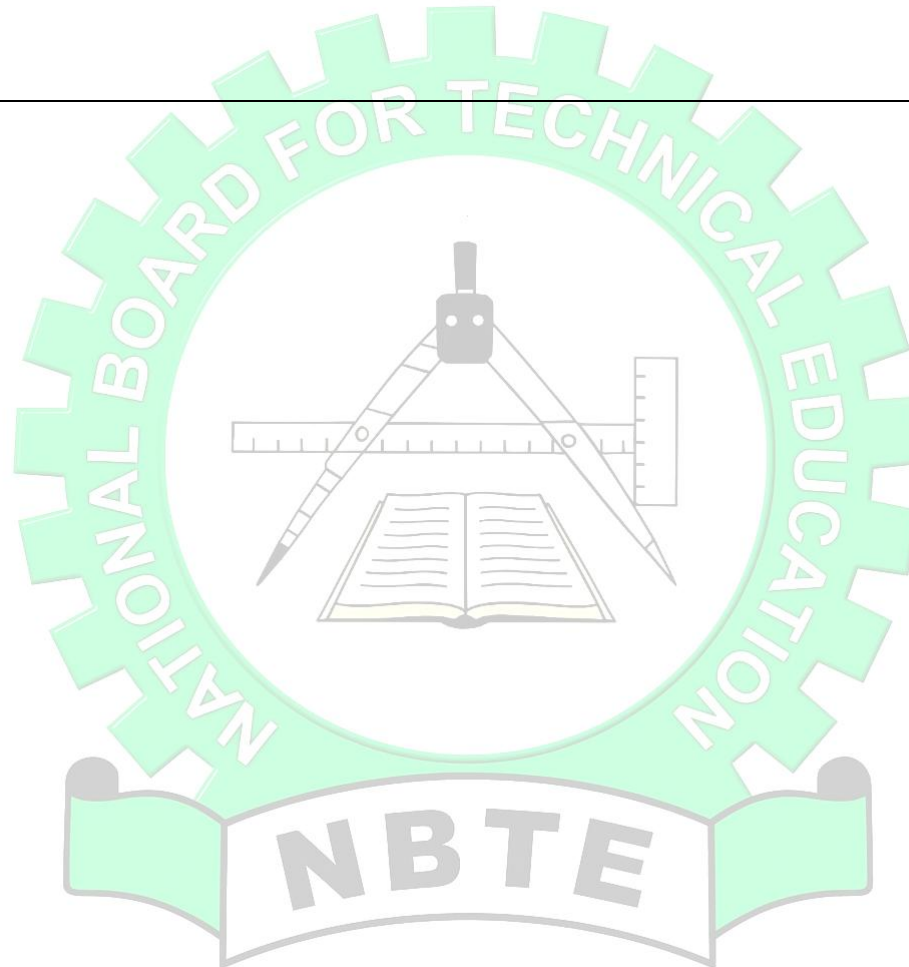
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

Practical 40%

Examination 40% = 100%



VETERINARY JURISPRUDENCE

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: VETERINARY JURISPRUDENCE	COURSE CODE: VLT 315	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 2 HOURS/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 0
GOAL: This course is designed to equip students with knowledge and skills of the law governing veterinary practice		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand some common terms used in veterinary jurisprudence; 2.0 Know the scope of official functions and responsibilities of veterinary technology; 3.0 Understand decrees, acts, laws and amendments as they affect animal resources; 4.0 Understand the Veterinary Decree No. 37 and amendment decree of 1984 and CAP V3 (2004); 5.0 Know veterinary practice in Nigeria;		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: VETERINARY JURISPRUDENCE			COURSE CODE: VLT 315		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 2 HOUR/WEEK	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 0 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of law governing veterinary practice						
General Objective: 1.0: Understand some common terms used in veterinary jurisprudence						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define the term Jurisprudence 1.2 Explain Veterinary Jurisprudence 1.3 Explain Law, Rule and Regulation 1.4 Explain Ordinance 1.5 Explain Decree, Edict and Act 1.6 Explain Code of Ethics 1.7 Explain Disease Regulations 1.8 Explain Disease Control	• Explain the term Jurisprudence • Discuss Veterinary Jurisprudence • Explain Law, Rule and Regulations • Discuss Ordinance • Explain Decree, Edict and Act • Code Ethics • Discuss Disease Regulations • Discuss Disease Control	Copies of previous acts, decrees, regulation, etc.			
General Objective: 2.0: Know the scope of official functions and responsibilities of veterinary technology						

4-6	2.1 List the duties of VLT in private and government establishment 2.2 Describe the scope of practice and professional ethics in veterinary technology. 2.3 Explain the roles and responsibilities of veterinary technologists in animal health services.	• List the duties of VLT in private and government establishment • Describe the scope of practice and professional ethics in veterinary technology. • Explain the roles and responsibilities of veterinary technologists in animal health services.	Ethics of Veterinary Health Team			
General Objective: 3.0 Understand decrees, acts, laws and amendments as they affect animal resources						
7-9	3.1 Outline measures to be taken during importation of animals 3.2 Explain international movement of animals 3.3 List the condition that constitute cruelty to animals 3.4 Explain: - Dog Law - Wild animals' preservation Act	• Discuss measures to be taken during importation of animals • Explain international movement of animals • Explain the condition that constitute cruelty to animals • Explain: - Dog Law - Wild animals' preservation Act - Pharmacy - Dangerous drug act	Copies of previous acts, decrees, regulation, etc.			

	iii. Pharmacy iv. Dangerous drug Act					
General Objective: 4.0: Understand the veterinary decree No. 37 and amendment decree of 1984 and CAP V3 (2004)						
10-12	4.1 List statutory requirements for the establishment and operating clinics/hospitals 4.2 Describe the purpose of ambulatory clinics 4.3 Explain the implications of practicing veterinary medicine without being a registered veterinary surgeon 4.4 List the role of veterinary lab technologist law suits involving that practice 4.5 Explain importation and port inspection of veterinary drugs, vaccines, diagnostic reagents and other veterinary biological	• Explain statutory requirements for the establishment and operating clinics/hospitals • Discuss the purpose of ambulatory clinics • Explain the implications of practicing veterinary medicine without being a registered veterinary surgeon • Explain the role of veterinary lab technologist law suits involving that practice • Explain importation and port inspection of veterinary drugs, vaccines, diagnostic reagents and other veterinary biological	Copies of previous acts, decrees, regulation, etc.			

General Objective: 5.0: Know veterinary practice in Nigeria

13-15	5.1 Explain the relationship of veterinary personnel with their clients 5.2 List the rules governing advertising in veterinary practice in Nigeria 5.3 Explain the relationship between the veterinarian and national health team. 5.4 Explain what constitute ethics and dignity in veterinary profession. 5.5 Explain the major problems affecting veterinary practice in Nigeria and the roles of veterinary laboratory technologists in contributing to the alleviation of the Problems.	• Explain the relationship of veterinary personnel with their clients • Explain the rules governing advertising in veterinary practice in Nigeria • Discuss the relationship between the veterinarian and national health team. • Discuss what constitute ethics and dignity in veterinary profession. • Explain the major problems affecting veterinary practice in Nigeria and the roles of veterinary laboratory technologists in contributing to the alleviation of the Problems.	Copies of previous acts, decrees, regulation, etc.			
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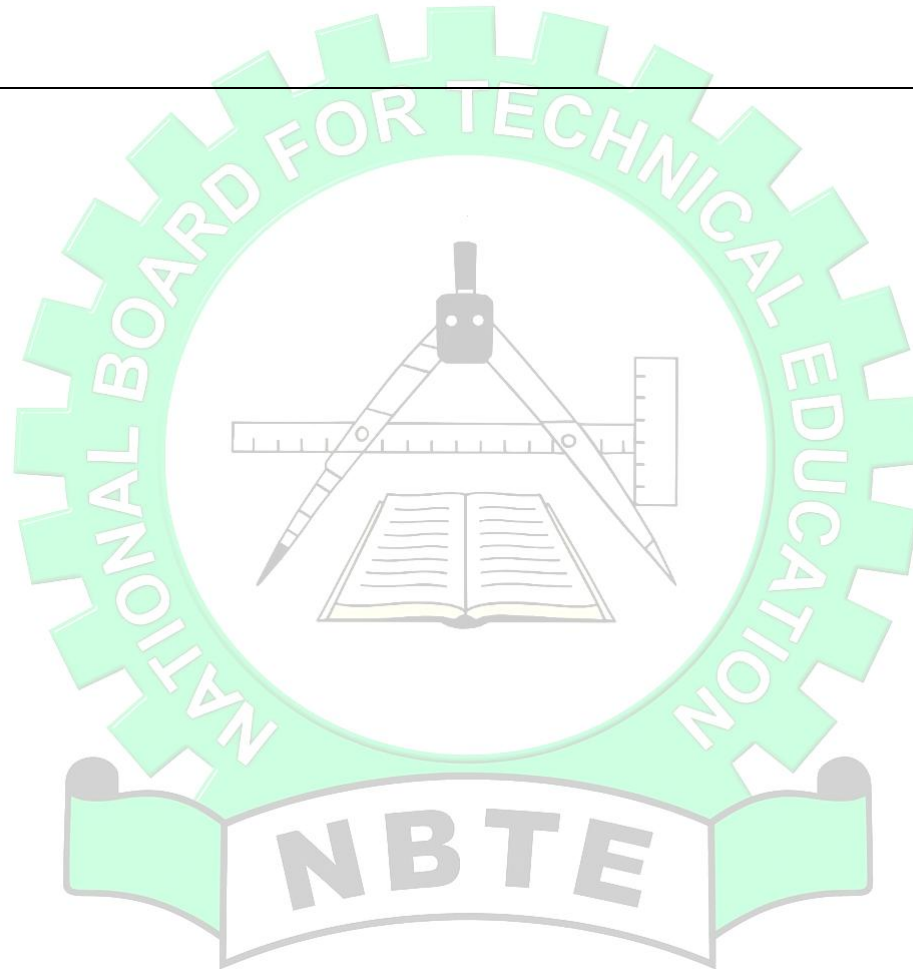
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

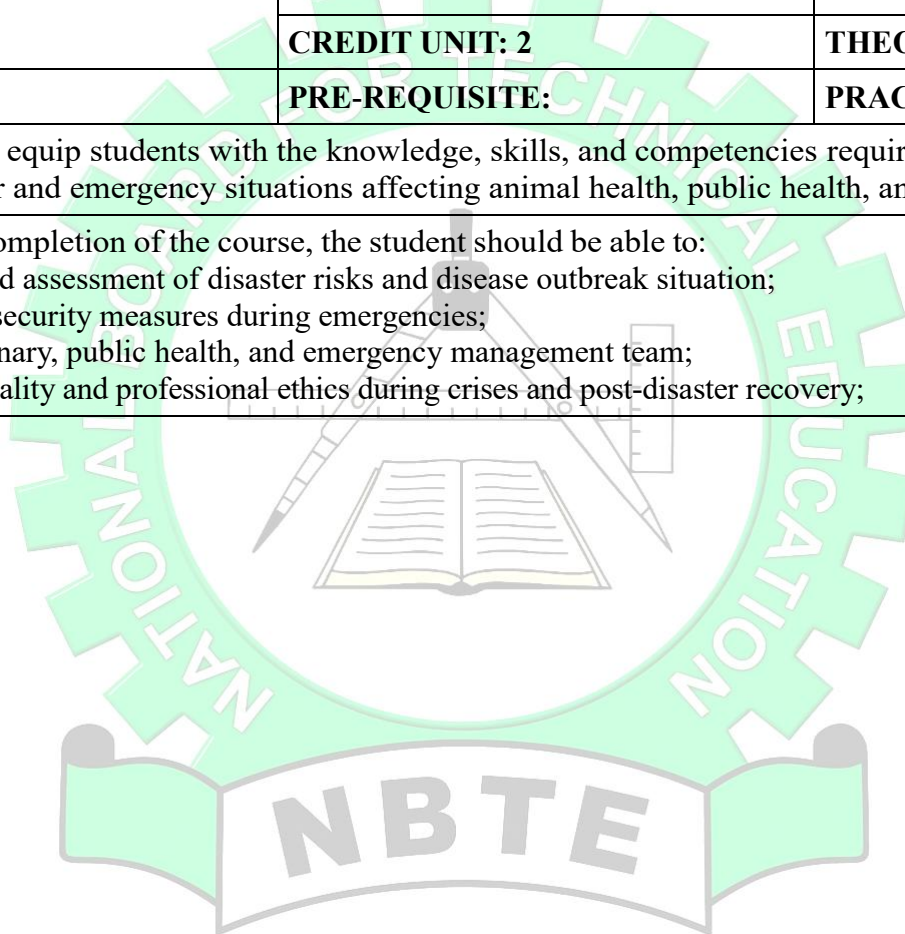
Practical 40%

Examination 40% = 100%



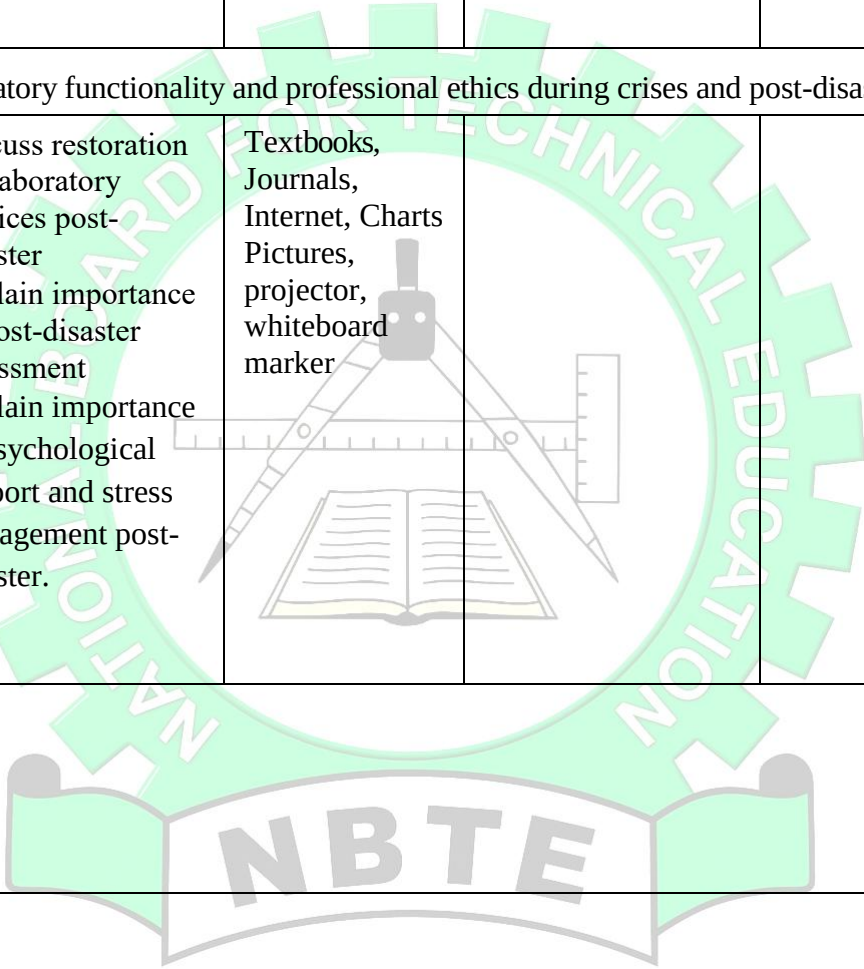
RESPONSE FOR DISASTER SITUATION

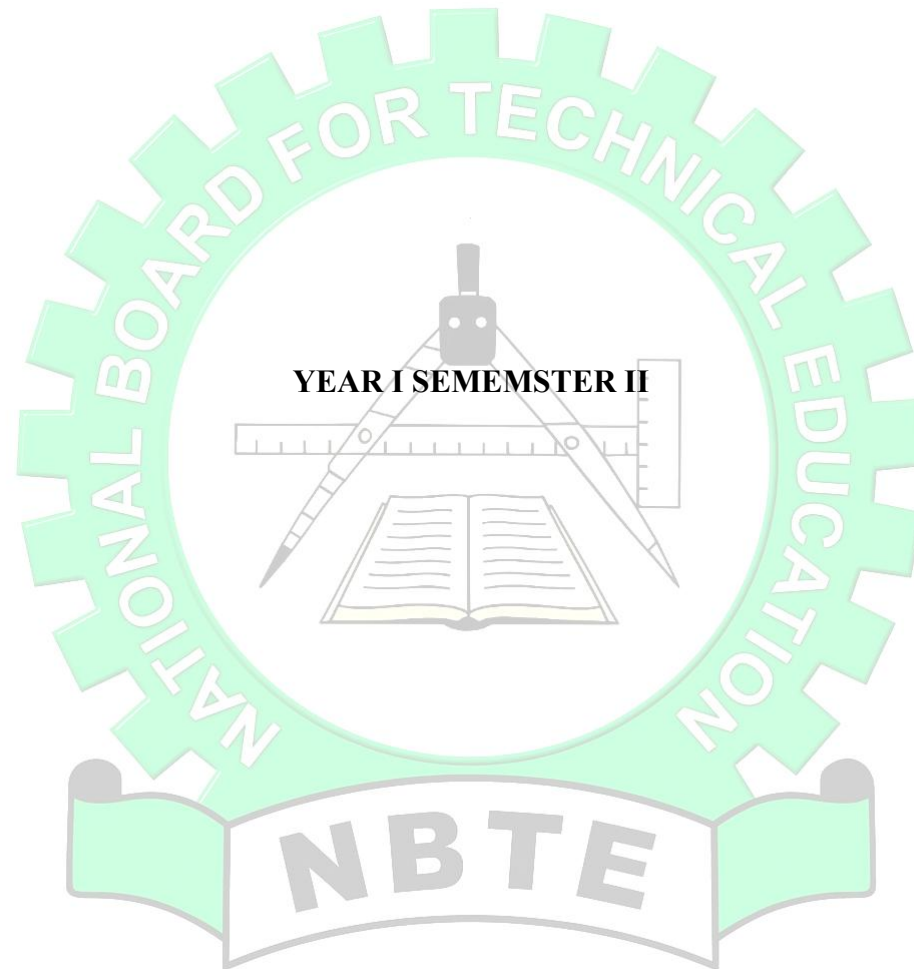
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: RESPONSE FOR DISASTER SITUATION	COURSE CODE: VLT 316	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with the knowledge, skills, and competencies required to prepare for, respond to, manage, and recover from disaster and emergency situations affecting animal health, public health, and laboratory operations.		
GENERAL OBJECTIVES: On completion of the course, the student should be able to: 1.0 Understand the cognition and assessment of disaster risks and disease outbreak situation; 2.0 Know the biosafety and biosecurity measures during emergencies; 3.0 Know the working of Veterinary, public health, and emergency management team; 4.0 Maintain laboratory functionality and professional ethics during crises and post-disaster recovery;		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: RESPONSE FOR DISASTER SITUATION			COURSE CODE: VLT 316		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with the knowledge, skills, and competencies required to prepare for, respond to, manage, and recover from disaster and emergency situations affecting animal health, public health, and laboratory operations.						
General Objective 1.0: Understand the cognition and assessment of disaster risks and disease outbreak situation;						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain common disasters and disease outbreaks affecting animal and public health. 1.2 Explain factors that contribute to disaster risks and disease outbreaks. 1.3 Describe methods used to assess disaster risks and outbreak situations.	• Explain common disasters and disease outbreaks affecting animal and public health. • Explain factors that contribute to disaster risks and disease outbreaks. • Describe methods used to assess disaster risks and outbreak situations.	Disaster and disease outbreak manuals/guidelines. Charts, maps, Case reports risk assessment templates.	• Conduct basic disaster risk and outbreak assessments. • Collect and interpret information related to disease outbreaks and emergencies. • Prepare simple risk assessment and outbreak investigation reports.	Guide students to: • Conduct basic disaster risk and outbreak assessments. • Collect and interpret information related to disease outbreaks and emergencies. • Prepare simple risk assessment and outbreak investigation reports.	Risk assessment forms Computers, GPS devices, and data collection tools PPE.
General Objective 2.0: Know the biosafety and biosecurity measures during emergencies						

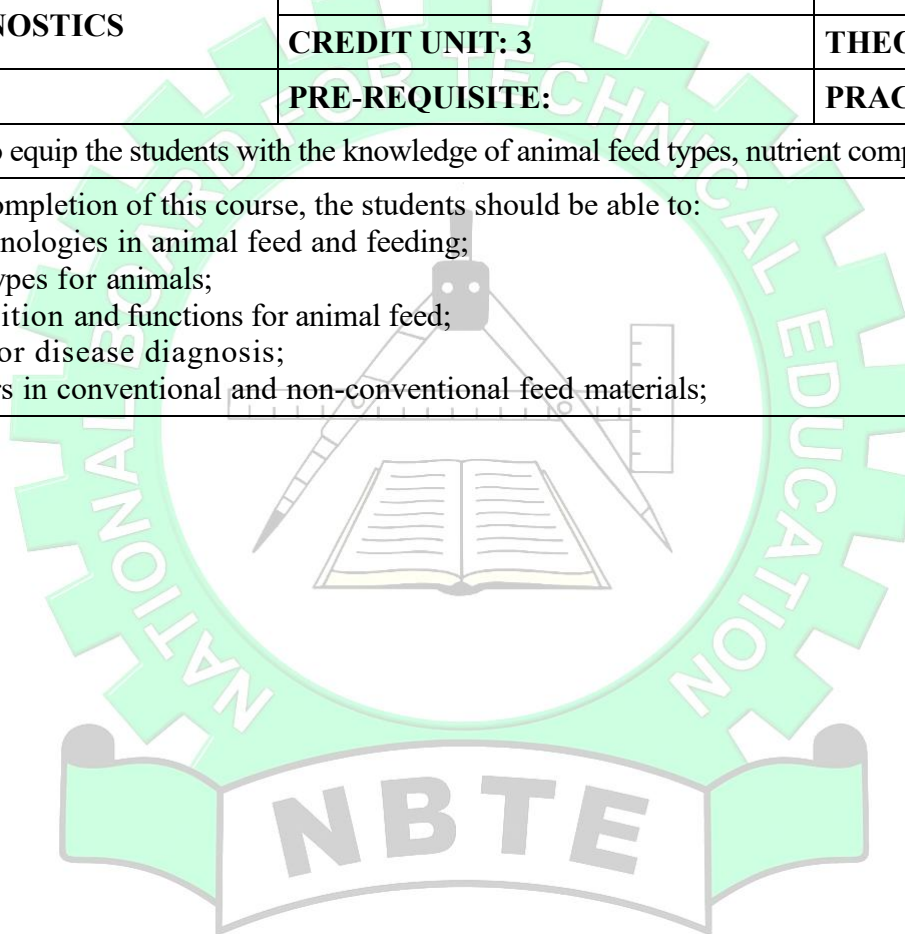
4-6	2.1 Explain outbreak prevention and control 2.2 Explain waste segregation, decontamination, and management during outbreaks 2.3 Describe proper use and importance of personal protective equipment (PPE)	• Discuss outbreak prevention and control • Explain waste segregation, decontamination, and management during outbreaks • Discuss proper use and importance of personal protective equipment (PPE)	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts, PPE, Colour coded waste disposal bin/container.			
General Objective 3.0: Know the working of Veterinary, public health, and emergency management team						
7-9	3.1 Explain the various roles of the component of the team 3.2 Explain the importance of teamwork and professional collaboration in disaster outbreaks 3.3 Explain methods	• Discuss the various roles of the component of the team • Explain the importance of teamwork and professional collaboration in disaster outbreaks • Explain methods of risk communication	Textbooks, Journals, Internet, Charts pictures, projector, whiteboard marker			

	of risk communication and public awareness	and public awareness				
General Objective 4.0: Know the laboratory functionality and professional ethics during crises and post-disaster recovery						
10-12	4.1 Describe restoration of Laboratory services post-disaster 4.2 Explain importance of post-disaster assessment 4.3 Explain importance of psychological support and stress management post-disaster.	• Discuss restoration of Laboratory services post-disaster • Explain importance of post-disaster assessment • Explain importance of psychological support and stress management post-disaster.	Textbooks, Journals, Internet, Charts Pictures, projector, whiteboard marker 			
COURSE ASSESSMENT:: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



FEED ANALYSIS AND CLINICAL NUTRITION DIAGNOSTICS

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: FEED ANALYSIS AND CLINICAL NUTRITION DIAGNOSTICS	COURSE CODE: VLT 321	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip the students with the knowledge of animal feed types, nutrient compositions, preparation and presentation		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Comprehend common terminologies in animal feed and feeding; 2.0 Know the classes of feed types for animals; 3.0 Know the nutrients composition and functions for animal feed; 4.0 Understand feed analysis for disease diagnosis; 5.0 Know anti-nutritional factors in conventional and non-conventional feed materials;		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: FEED ANALYSIS AND CLINICAL NUTRITION DIAGNOSTICS			COURSE CODE: VLT 321		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip the students with the knowledge of animal feed types, nutrient compositions, preparation and presentation						
General Objective 1.0: Comprehend common terminologies in animal feed and feeding						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define feed and feeding 1.2 List some terminologies in feed and feeding. 1.3 Explain the application of the terminologies	•Explain feed and feeding •Discuss some terminologies in feed and feeding. •Explain the application of the terminologies	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts			
General Objective: 2.0 Know the classes of feed types for animals						
4-6	2.1 Explain the types of animal feed. 2.2 Describe the classification of animal feeds, 2.3 Explain the classification of	• Explain the types of animal feed. • Discuss the classification of animal feeds, • Explain the classification of	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify various types and classes of feeds. • Identify raw materials of plant and animal origin. • Identify vitamin	Guide students to: • Identify various types and classes of feeds. • Identify raw materials of plant and animal origin. • Identify vitamin and	Feed raw materials

	feeds based on animal types.	feeds based on animal types.		and mineral premixes	mineral premixes	
General Objective:3.0 Knowledge of feed formulation Know the nutrients composition and compounding of functions for animal feed						
7-9	3.1 Explain nutrient composition in animal feed 3.2 Explain the function of nutrient in animal feed 3.3 Describe feeds formulation and compounding	- Explain nutrient composition in animal feed - Discuss the function of nutrient in animal feed - Describe feeds formulation and compounding	Teaching aids such as: Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	- Carry out proximate analysis of animal feed - Demonstrate analytical assays on animal feeds and samples such as HPLC, ELISA, and protein quantification	Guide students to: - Carry out proximate analysis of animal feed. - Demonstrate analytical assays on animal feeds and samples such as HPLC, ELISA, and protein quantification	Feed sample, mortal and piston, Laboratory and analyzer machine.
General Objective:4.0 Understand feed analysis for disease diagnosis.						
10-12	4.1 Explain nutritional and metabolic disorders 4.2 Enumerate the sources, function and deficiency symptoms of common nutritional and metabolic disorders in animals 4.3 Explain the types of diagnostic tests used for nutritional and metabolic	- Explain nutritional and metabolic disorders - Discuss the sources, function and deficiency symptoms of common nutritional and metabolic disorders in animals - Explain the types of diagnostic tests used for nutritional and metabolic disorders	Teaching aids such as books, journals, catalogues, manuals, Chalk board, Charts, internet	Perform the various diagnostic tests used in nutritional and metabolic disorders	Guide students to: Perform the various diagnostic tests used in nutritional and metabolic disorders	Assay equipment such ELISA, HPLC kit

	disorders					
General Objective:5.0 Know anti-nutritional factors in conventional and non-conventional feed materials						
13-15	5.1 Explain anti-nutritional factors 5.2 Explain conventional and non-conventional feed materials 5.3 Explain the relationship between anti-nutritional factors and nutritional/metabolic disorders	• Explain anti-nutritional factors • Discuss conventional and non-conventional feed materials • Explain the relationship between anti-nutritional factors and nutritional/metabolic disorders	Teaching aids such as books, journals, catalogues, manuals, Chalk board, Charts, internet	• Identify conventional and non-conventional feed raw materials that contain anti-nutritive elements	Guide students to: • Identify conventional and non-conventional feed raw materials that contain anti-nutritive elements	Feed raw materials
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

LABORATORY SKILLS, PROCEDURES AND SAFETY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: LABORATORY SKILLS, PROCEDURES AND SAFETY	COURSE CODE: VLT 322	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of laboratory procedures, Skills and Safety		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand the basic procedures, skills and safety in Radiology Laboratory; 2.0 Understand basic procedures and safety in Pathology Laboratory; 3.0 Understand basic procedures and safety in Biochemistry Laboratory; 4.0 Understand basic procedures and safety in Microbiology Laboratory; 5.0 Understand basic procedures and safety in Parasitology Laboratory; 6.0 Understand basic procedures and safety in Anatomy Laboratory; 7.0 Understand basic procedures and safety in Theatre Laboratory.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: LABORATORY SKILLS, PROCEDURES AND SAFETY			COURSE CODE: VLT 322		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of laboratory procedures, Skills and Safety						
GENERAL OBJECTIVE 1.0: Understand the basic procedures and safety in Radiology Laboratory						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Explain the procedures in Radiology Laboratory: e.g sorting out of equipment 1.2 Explain the skill required in Radiology Laboratory e.g technical know-how 1.3 List the safety measures required in Radiology Laboratory	•Discuss the procedures in Radiology Laboratory: e.g sorting out of equipment •Discuss the skill required in Radiology Laboratory e.g technical know-how •Explain the safety measures required in Radiology Laboratory	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory, • Identify the steps to be taken in case of accidents in the laboratory	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory. • Identify the steps to be taken in case of accidents in the laboratory	Computer, Report writing materials, X-ray machine (mobile and stationaries), Lead cover and other protective wears, Films and cassette, Darkroom, Restraint facilities
GeneralObjective:2.0 Understand the basic procedures and safety in Pathology Laboratory						

3-4	1.1 List the skill measures required in Pathology Laboratory 1.2 Explain the procedures in Pathology Laboratory (Gross pathology and Clinical Pathology). 1.3 Describe the safety and required in Pathology Laboratory	• Explain the skill measures required in Pathology Laboratory • Explain the procedures in Pathology Laboratory (Gross pathology and Clinical Pathology). • Discuss the safety and required in Pathology Laboratory	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory	Laboratory request forms, PPE, computer, Freezers, Microtome, Staining reagents, Fixatives, Slides, Microscopic camera, Haem-analyzer, Magnetic stirrer
General Objective:3.0 Understand basic procedures and safety in Biochemistry Laboratory						
5-6	3.1 Explain the skills required in Biochemistry Laboratory: e.g workability of the reagents, servicing and calibration of instruments. 3.2 List the procedures in Biochemistry Laboratory 3.3 List the safety measures required in Biochemistry Laboratory	• Discuss the skills required in Biochemistry Laboratory: e.g workability of the reagents, servicing and calibration of instruments. • Explain the procedures in Biochemistry Laboratory • Explain the safety measures required in Biochemistry	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory	Laboratory request forms, Log Book, PPE, computer, writing materials, cold chain facility, First Aid Kit, Fire extinguisher

		Laboratory				
GENERAL OBJECTIVE 4.0: Understand basic procedures and safety in Microbiology Laboratory						
7-8	4.1 Explain the skill required in Microbiology Laboratory 4.2 List the procedures in Microbiology Laboratory (Virology, Bacteriology and Mycology) 4.3 List the safety measures required in Microbiology Laboratory	• Discuss the skill required in Microbiology Laboratory • Explain the procedures in Microbiology Laboratory (Virology, Bacteriology and Mycology) • Explain the safety measures required in Microbiology Laboratory	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory.	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory.	Laboratory request forms, Log Book, PPE, computer, writing materials, cold chain facility, Fume Chamber, UV light, Water bath, Autoclave, Colony counter
GENERAL OBJECTIVE 5.0: Understand basic procedures and safety in Parasitology Laboratory						
9-10	5.1 Explain the skills required in Parasitology Laboratory 5.2 Explain the procedures in Parasitology Laboratory. 5.3 Describe the safety measures required in Parasitology Laboratory to avoid mouth pipetting	• Discuss the skills required in Parasitology Laboratory • Discuss the procedures in Parasitology Laboratory. • Explain the safety measures required in Parasitology Laboratory to avoid	Lecture, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory.	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory.	Laboratory request forms, PPE, Centrifuge, Test tubes, Microscope, Incubator, computer, Refrigerator, Glass slides, Cover slips, Reagents,

		mouth pipetting				
General Objective 6.0: Understand basic procedures and safety in Anatomy Laboratory						
11-12	6.1 Describe the skill required in Anatomy Laboratory 6.2 Explain the procedures in Anatomy Laboratory (Embalmment, Histo-techniques) 6.3 Explain the safety measures required in Anatomy Laboratory	• Discuss the skill required in Anatomy Laboratory • Explain the procedures in Anatomy Laboratory (Embalmment, Histo-techniques) • Explain the safety measures required in Anatomy Laboratory	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in each laboratory.	Guide students to: • Identify different specimens, reagents, apparatus in each laboratory.	Laboratory request forms, Log Book, PPE, computer, writing materials, cold chain facility, Freezers,
General Objective 7.0: Understand basic procedures and safety in Surgery Theatre						
13-15	7.1 Explain the skill required in surgical theatre 7.2 Explain the operation procedures in the theatre 7.3 Explain the safety measures required in Surgical theatre	• Explain the skill required in surgical theatre • Explain the operation procedures in the theatre • Explain the safety measures required in Surgical theatre	Lecture spaces, text books, journals	• Identify different specimens, reagents, apparatus in the surgical theatre.	Guide students to: • Identify different specimens, reagents, apparatus in the surgical theatre.	Laboratory request forms, Log Book, PPE, computer, , cold chain facility, Anesthetic machine, surgical kit and lamps

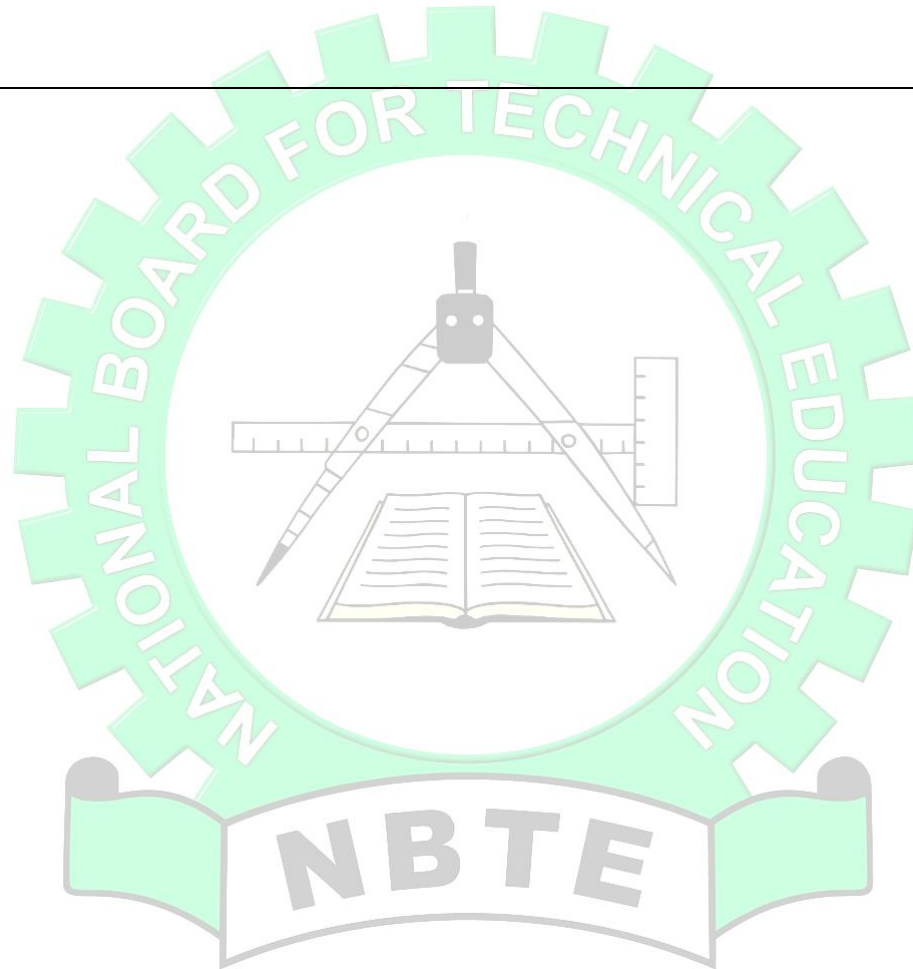
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

Practical 40%

Examination 40% = 100%



ANIMAL DISEASES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANIMAL DISEASES	COURSE CODE: VLT 323	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: : This course is designed to equip students with Knowledge and skills of animal diseases		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know major viral diseases of domestic animals; 2.0 Know the major bacterial diseases of Domestic animals; 3.0 Know animal diseases associated with Mycoplasma infection; 4.0 Know the endemic fungal diseases of domestic animals; 5.0 Know major diseases of poultry; 6.0 Know major diseases of fish; 7.0 Know diseases of animals associated with protozoan and rickettsia; 8.0 Know animal helminthic diseases of economic importance in Nigeria; 9.0 Know disease control procedures in domestic animals; 10.0 Know metabolic diseases of animals; 11.0 Know causes of poisoning and injuries in animals;		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANIMAL DISEASES			COURSE CODE: VLT 323		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: : This course is designed to equip students with Knowledge and skills of animal diseases						
GENERAL OBJECTIVE 1.0: Know major viral diseases of Livestock						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 List viral diseases of animals 1.2 Explain animal disease under the following: i. Aetiology ii. Clinical signs, iii. Diagnosis iv. Treatment 1.3 Describe diseases of economic importance: i. FMD ii. PPR iii. ASF iv. AHS etc.	• Explain viral diseases of animals • Explain animal disease under the following: - Aetiology - Clinical signs, - Diagnosis - Treatment • Discuss diseases of economic importance: - FMD - PPR - ASF - AHS etc.	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis • Identify clinical signs	• Guide students to: • Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis • Identify clinical signs	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex with LSD

GENERAL OBJECTIVE 2.0: Know the major bacterial diseases of Livestock						
3	2.1 List bacterial diseases of animals 2.2 Describe the aetiology, Clinical signs, diagnosis and treatment of bacterial diseases of animals. 2.3 Explain diseases of economic importance. Brucellosis, Tuberculosis, Pasteurellosis, Anthrax, Listeriosis, Mastitis, Colibacillosis,	• Explain bacterial diseases of animals • Explain the aetiology, Clinical signs, diagnosis and treatment of bacterial diseases of animals. • Discuss diseases of economic importance. Brucellosis, Tuberculosis, Pasteurellosis, Anthrax, Listeriosis, Mastitis, Colibacillosis,	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis • Identify Clinical signs	Guide students to: • Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis • Identify Clinical signs	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex
GENERAL OBJECTIVE 3.0: Know Livestock diseases associated with Mycoplasma infection						
4	3.1 List Mycoplasma diseases of livestock 3.2 Describe the aetiology, Clinical signs, diagnosis and treatment of Mycoplasma diseases of Livestock.	• Explain Mycoplasma diseases of livestock • Discuss the aetiology, Clinical signs, diagnosis and treatment of Mycoplasma diseases of Livestock. • Explain diseases of economic importance	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis	Guide students to: • Identify Portals of disease entry into the body of animals • Identify lesions on animals • Collect blood samples for laboratory diagnosis • clinical signs	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex

	3.3 Describe diseases of economic importance. CBPP and CCPP	CBPP and CCPP		• clinical signs		
GENERAL OBJECTIVE 4.0: Know the endemic fungal diseases of Livestock						
5	4.1 List Fungi diseases of animals 4.2 Describe the aetiology, Clinical signs, diagnosis and treatment of Fungi diseases of animals. 4.3 Describe diseases of economic importance: Aspergillosis, Ringworm, Dermatomycosis, Dermatophytosis, Candidiasis,	• Explain Fungi diseases of animals • Explain the aetiology, Clinical signs, diagnosis and treatment of Fungi diseases of animals. • Discuss diseases of economic importance: Aspergillosis, Ringworm, Dermatomycosis, Dermatophytosis, Candidiasis,	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Lesions on animals • Collect blood samples for laboratory diagnosis • Identify clinical signs	Guide students to: • Identify Portals of disease entry into the body of animals • Lesions on animals • Collect blood samples for laboratory diagnosis • Identify clinical signs	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex
GENERAL OBJECTIVE 5.0: Know the diseases of Livestock associated with protozoan and Rickettsia						
6	5.1 List Protozoa diseases of animals 5.2 Describe the aetiology, Clinical signs, diagnosis and treatment of Protozoa diseases of animals.	• Explain Protozoa diseases of animals • Discuss the aetiology, Clinical signs, diagnosis and treatment of Protozoa diseases of animals.	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for	Guide students to: • Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for laboratory diagnosis	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital

	5.3 Describe diseases of economic importance. Babesiosis, Trypanosomiasis, Hepatozoonosis	• Explain diseases of economic importance. Babesiosis, Trypanosomiasis, Hepatozoonosis		laboratory diagnosis • Identify Clinical signs	• Identify Clinical signs	complex
General Objective: 6.0: Know major diseases of poultry						
7	6.1 Explain the diseases of chicks e.g. Yolk sac infection Chilling 6.2 Explain the Viral diseases of poultry 6.3 Explain some bacterial diseases of poultry	• Explain the diseases of chicks e.g. Yolk sac infection Chilling • Explain the Viral diseases of poultry • Explain some bacterial diseases of poultry	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for laboratory diagnosis • Identify Clinical signs	Guide students to: • Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for laboratory diagnosis • Identify Clinical signs	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex
General Objective: 7.0: Know Major Diseases of Fish						
8	7.1 List the diseases of Fish e.g. Abdominal dropsy, Anorexia, Fin and tail rurt, Dermatomycosis, Viral Hemorrhagic Septicemia	• Explain the diseases of Fish e.g. Abdominal dropsy, Anorexia, Fin and tail rurt, Dermatomycosis, Viral Hemorrhagic Septicemia	Lecture note, text books, journals	• Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for	Guide students to: • Identify Portals of disease entry into the body of animals • Identify Lesions on animals • Collect blood samples for laboratory diagnosis	Clinic cases, Pictures of sick animals, restraint facilities. Veterinary Teaching Hospital complex

	7.2 Explain some bacterial diseases of Fish their etiology, clinical signs, diagnosis, treatment and control e.g. 7.3 Define the economic importance of Fish diseases	• Discuss some bacterial diseases of Fish their etiology, clinical signs, diagnosis, treatment and control e.g. • Explain the economic importance of Fish diseases		laboratory diagnosis • Identify Clinical signs		
General Objective:8.0 Know Livestock helminthic diseases of economic importance in Nigeria						
9	8.1 Explain the major helminthic diseases of domestic animals 8.2 Describe the aetiology, clinical science, diagnosis and Treatment 8.3 Describe the economic importance of helminth diseases	• Discuss the major helminthic diseases of domestic animals • Explain the aetiology, clinical science, diagnosis and Treatment • Discuss the economic importance of helminth diseases	Lecture note, text books, journals			
General objective 9.0: Know disease control procedures in domestic animals						
10-11	9.1 Explain the concept and importance of disease control in	• Explain the concept and importance of disease control in domestic animals.	Lecture note, text books, journals	• Carry out biosecurity measures in animal housing. • Demonstrate	Guide students to: • Carry out biosecurity measures in animal housing. • Demonstrate proper	PPE. Disinfectants, sprayers, and sanitation tools. Animal housing

	domestic animals. 9.2 Describe common disease control methods used in animal production. 9.3 Describe biosecurity measures for preventing disease spread.	• Discuss common disease control methods used in animal production. • Discuss biosecurity measures for preventing disease spread.		proper disinfection and sanitation procedures. • Carry out basic disease-control practices under supervision.	disinfection and sanitation procedures. • Carry out basic disease-control practices under supervision.	unit and vaccination/disinfection kits.
General objective 10.0: Know metabolic diseases of animals						
12-13	10.1 Define metabolic diseases 10.2 Explain the metabolic diseases causes in animals. 10.3 Explain common metabolic diseases of domestic animals. 10.4 Describe the prevention and control of metabolic diseases.	• Discuss metabolic diseases • Explain the metabolic diseases causes in animals. • Explain common metabolic diseases of domestic animals. • Discuss the prevention and control of metabolic diseases.	Lecture note, text books, journals	• Identify clinical signs of common metabolic diseases in animals. • Perform basic procedures for diagnosing metabolic diseases. • Carry out preventive measures against metabolic diseases.	Guide students to: • Identify clinical signs of common metabolic diseases in animals. • Perform basic procedures for diagnosing metabolic diseases. Carry out preventive measures against metabolic diseases.	Animals, photographs, Case reports. Diagnostic kits, record sheets, Feed samples, mineral supplements, and farm facilities.
General Objective 11.0: Know causes of poisoning and injuries in animals						
14-15	11.1 Explain the causes of poisoning and	• Explain the causes of poisoning and	Lecture note, text books,	• Identify common sources of	Guide students to: • Identify common	Toxic plant samples,

	injuries in animals. 11.2 Identify signs and symptoms of poisoning and injuries in animals. 11.3 Describe preventive measures against poisoning and injuries.	injuries in animals. • Discuss signs and symptoms of poisoning and injuries in animals. • Explain preventive measures against poisoning and injuries.	journals	poisoning and injuries in animals. • Assess animals for signs of poisoning and injuries. • Apply basic first-aid measures for poisoning and injuries under supervision.	sources of poisoning and injuries in animals. • Assess animals for signs of poisoning and injuries. • Apply basic first-aid measures for poisoning and injuries.	chemicals Farm facilities. Live animals, photographs, PPE, animal restraint equipment, and treatment records.
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

VETERINARY TOXICOLOGY, AFLATOXIN AND RESIDUE SCREENING

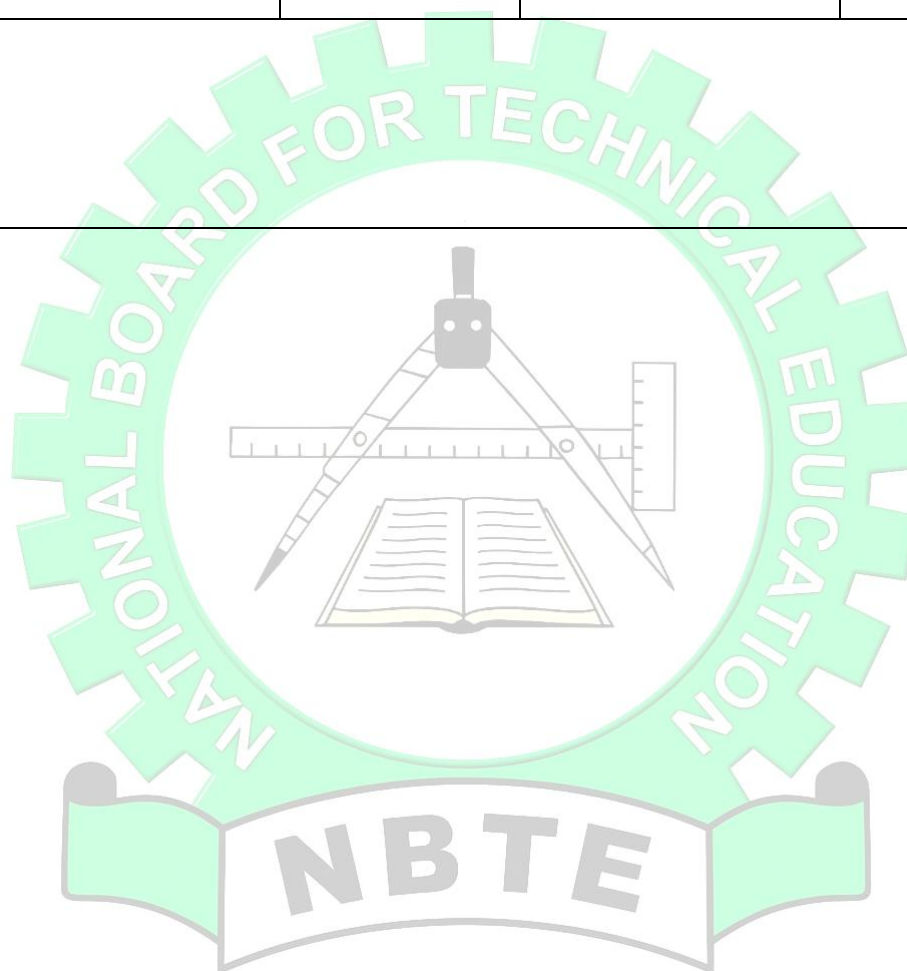
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: VETERINARY TOXICOLOGY, AFLATOXIN AND RESIDUE SCREENING	COURSE CODE: VLT 324	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of veterinary toxicology to aid clinical diagnosis		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the basic concept of veterinary toxicology; 2.0 Know common forms of poisons of veterinary importance; 3.0 Know how to identify poisoned animals; 4.0 Know how to collect, preserve and transport toxicological specimen; 5.0 Know how to detect toxic principles in toxicological samples;		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: VETERINARY TOXICOLOGY, AFLATOXIN AND RESIDUE SCREENING			COURSE CODE: VLT 324		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of veterinary toxicology to aid clinical diagnosis						
GENERAL OBJECTIVE 1.0: Know the basic concept of veterinary toxicology						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define toxicology and its related terms 1.2 Explain common sources and types of poisons in animals 1.3 Explain acute, sub-acute and chronic toxicity 1.4 Explain drug toxicity 1.5 List the factors affecting it 1.6 Explain the mechanism of toxicity	• Explain toxicology and its related terms • Explain common sources and types of poisons in animals • Explain acute, sub-acute and chronic toxicity • Explain drug toxicity and list the factors affecting it • Explain the mechanism of toxicity	Text books, Journals, Internet, Charts, pictures, white board, marker e.t.c.	• Identify toxic plants and state their toxic principles • Identify toxin/poison on laboratory animal	Guide students to: • Identify toxic plants and state their toxic principles • Identify toxin/poison on laboratory animal	Laboratory animal, PPE, poison specimens, syringe and needles, restraint materials

GENERAL OBJECTIVE 2.0: Know common forms of poisons of veterinary importance						
4-6	2.1 Explain the forms of toxins 2.2 List the forms of toxins and heavy metal 2.3 Differentiate synthetic toxins and natural toxins	• Explain the forms of toxins • List the forms of toxins and heavy metal • Differentiate synthetic toxins and natural toxins	White board, marker, projector, internet, charts, videos, textbooks	• Identify different forms of poisonous plants and toxins • Identify animal that can produce toxins/poisons • Identify heavy metal and their sources	Guide students to: • Identify different forms of poisonous plants and toxins • Identify animal that can produce toxins/poisons • Identify heavy metal and their sources	Plant, animal, microscope, slides, PPE' test kits, reagent,
General Objective 3.0: Know how to identify poisoned animals						
7-9	3.1 List basic clinical signs of poisoning in Animals 3.2 Explain general measures to be taken in poisoned animals 3.3 Explain the role of veterinary laboratory technician in the control of poisoning in animals	• Explain basic clinical signs of poisoning in Animals • Explain general measures to be taken in poisoned animals • Explain the role of veterinary laboratory technician in the control of poisoning in animals	White board, marker, projector, internet, charts, pictures, textbooks, lecture	• Identify general first aid for poisoned animals • Carry out rapid diagnostics in cases of poisoning	Guide students to: • Identify general first aid for poisoned animals • Carry out rapid diagnostics in cases of poisoning	Animal, test kits, sample
General Objective 4.0: Know how to collect, preserve and transport toxicological specimen						

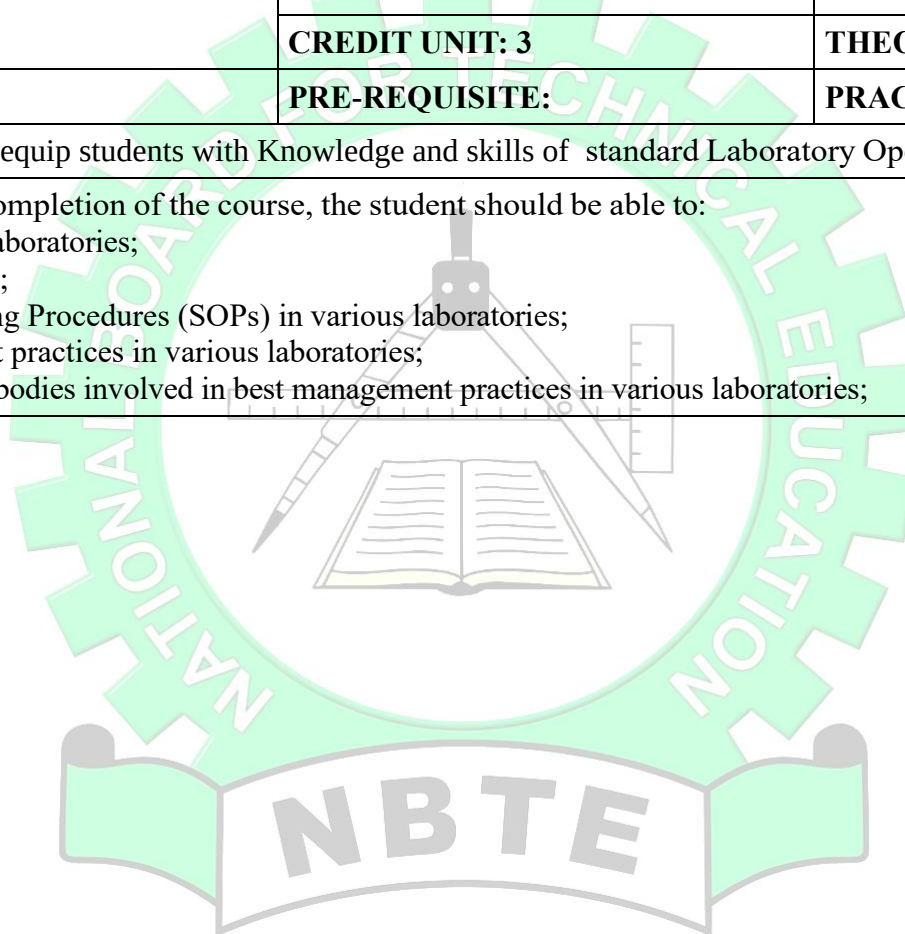
10 - 12	4.1 Explain the importance of toxicological specimens in disease and poisoning diagnosis. 4.2 Explain different toxicological specimens and methods of preservation. 4.3 Describe procedures for collection, storage, packaging, and transportation of specimens.	• Explain the importance of toxicological specimens in disease and poisoning diagnosis. • Explain different toxicological specimens and methods of preservation. • Describe procedures for collection, storage, packaging, and transportation of specimens.	Charts/posters of toxicological specimens and preservation methods. Projector, slides, and videos.	• Collect toxicological specimens using standard procedures. • Preserve specimens appropriately to prevent deterioration and contamination. • Assist to package, label, and transport specimens safely for laboratory analysis.	Guide students to: • Collect toxicological specimens using standard procedures. • Preserve specimens appropriately to prevent deterioration and contamination. • Assist to package, label, and transport specimens safely for laboratory analysis.	Specimen collection kits (syringes, swabs, forceps, sample bottles, containers). Preservatives, PPE, labels, and biohazard bags. Cool boxes, Submission forms.
General Objective 5.0: Know how to detect toxic principles in toxicological samples						
13-15	5.1 Mention the equipment used for toxicological analysis and their uses 5.2 Explain toxicological analysis for poisons and drug residue 5.3 Explain the mechanism of	• Explain the equipment used for toxicological analysis and their uses • Discuss toxicological analysis for poisons and drug residue • Discuss the mechanism of equipment used in toxicological analysis	White board, maker, projector, internet, charts	• Conduct some toxicological and drug residues analysis • Identify equipment used for toxicological and drug residues analysis • Use the equipment in toxicological and drug residues	Guide students to: • Conduct some toxicological and drug residues analysis • Identify equipment used for toxicological and drug residues analysis • Use the equipment in toxicological and	Reagents Toxicological and drug residues detection equipment, PPE

	equipment used in toxicological analysis			analysis	drug residues analysis	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



LABORATORY OPERATIONS AND MANAGEMENT

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: LABORATORY OPERATIONS AND MANAGEMENT	COURSE CODE: VLT 325	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of standard Laboratory Operations and management practices.		
GENERAL OBJECTIVES: On completion of the course, the student should be able to: 1.0 Know the various types of laboratories; 2.0 Know Laboratory operations; 3.0 Know the Standard Operating Procedures (SOPs) in various laboratories; 4.0 Understand the management practices in various laboratories; 5.0 Know the relevant statutory bodies involved in best management practices in various laboratories;		

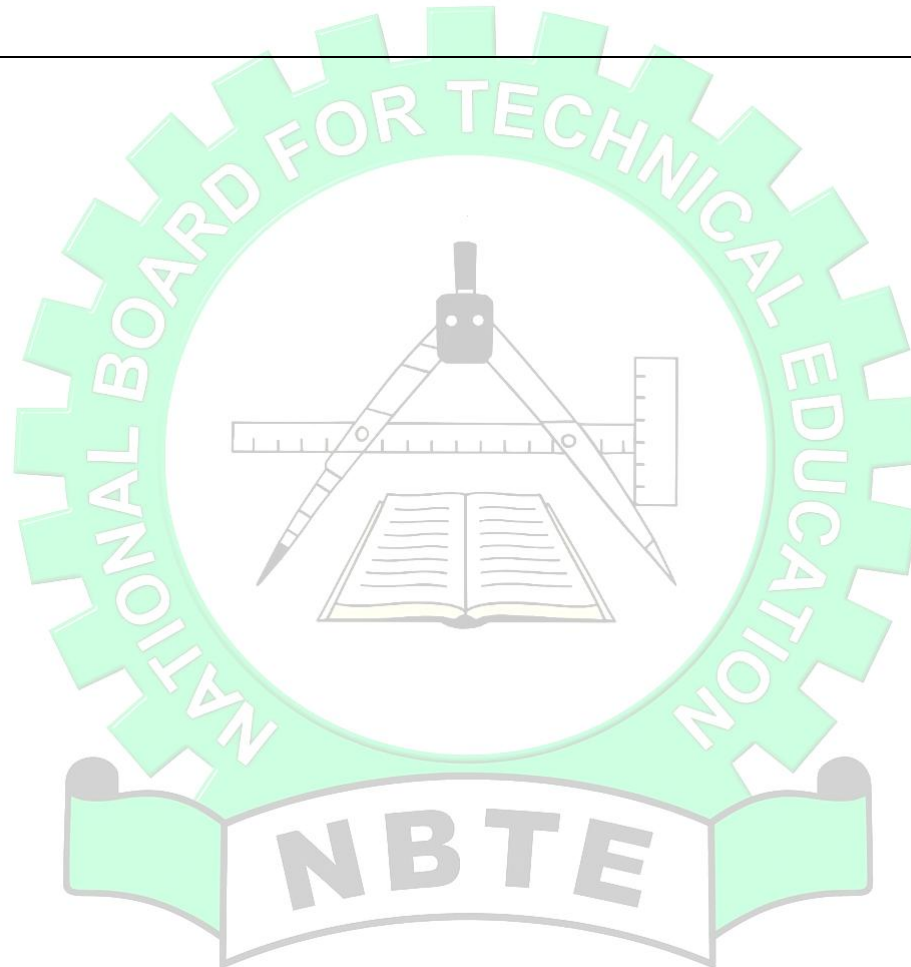


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: LABORATORY OPERATIONS AND MANAGEMENT			COURSE CODE: VLT 325		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of standard Laboratory Operations and management practices.						
GENERAL OBJECTIVE 1.0: Know the various types of laboratories						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define the term laboratory: medical, Veterinary and Science laboratories 1.2 List the various types of scientific laboratories 1.3 Highlight the importance of Laboratories as a tool for diagnosis	• Explain the term laboratory, medical, Veterinary and Science laboratories • Discuss the various types of scientific laboratories • Explain the importance of Laboratories as a tool for diagnosis	Lecture note, text books, journals	• Identify various types of Laboratories	Guide students to: • Identify various types of Laboratories	Functional medical, veterinary and science Laboratories
GENERAL OBJECTIVE 2.0: Know Laboratory operations						
4-6	2.1 List inventory management processes and maintenance	• Explain inventory management processes and maintenance	Lecture note, text books, journals	• Identify various inventory list and sample tracking in the Laboratory.	Guide students to: • Identify various inventory list and sample tracking in the	Laboratory equipment e.g 30 microscope, 10 incubators,

	2.2 Explain the importance of equipment maintenance 2.3 Describe the role of sample tracking in Laboratory operations	• Explain the importance of equipment maintenance • Discuss the role of sample tracking in Laboratory operations		• Learn about equipment management and maintenance	Laboratory. • Learn about equipment management and maintenance	PPE
GENERAL OBJECTIVE 3.0 Know the standard operating procedures (SOPs) in various laboratories						
7-9	3.1 Explain standard operating procedures (SOPs) 3.2 Explain the importance and relevance of SOPs to Laboratory analysis 3.3 Explain the standard operating procedures (SOPs) of various laboratories e.g. anatomy, microbiology, biochemistry, etc	• Explain standard operating procedures (SOPs) • Explain the importance and relevance of SOPs to Laboratory analysis • Explain the standard operating procedures (SOPs) of various laboratories e.g. anatomy, microbiology, biochemistry, etc	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Follow SOPs during laboratory operations. • Apply SOPs for specimen handling, equipment use, and safety practices. • Maintain laboratory records according to SOP requirements.	Guide students to: • Follow SOPs during laboratory operations. • Apply SOPs for specimen handling, equipment use, and safety practices. • Maintain laboratory records according to SOP requirements.	PPE Reference SOPs
GENERAL OBJECTIVE 4.0: Know the management practices in various laboratories						
10-12	4.1 Define the term Management practices in the Laboratory	• Explain the term Management practices in the	Textbooks, Journals, Internet, Charts, pictures,	• Understand proper lab management and maintenance	Guide students to: • Understand proper lab management and	PPE, Maintenance tools e.g spanner, plier etc

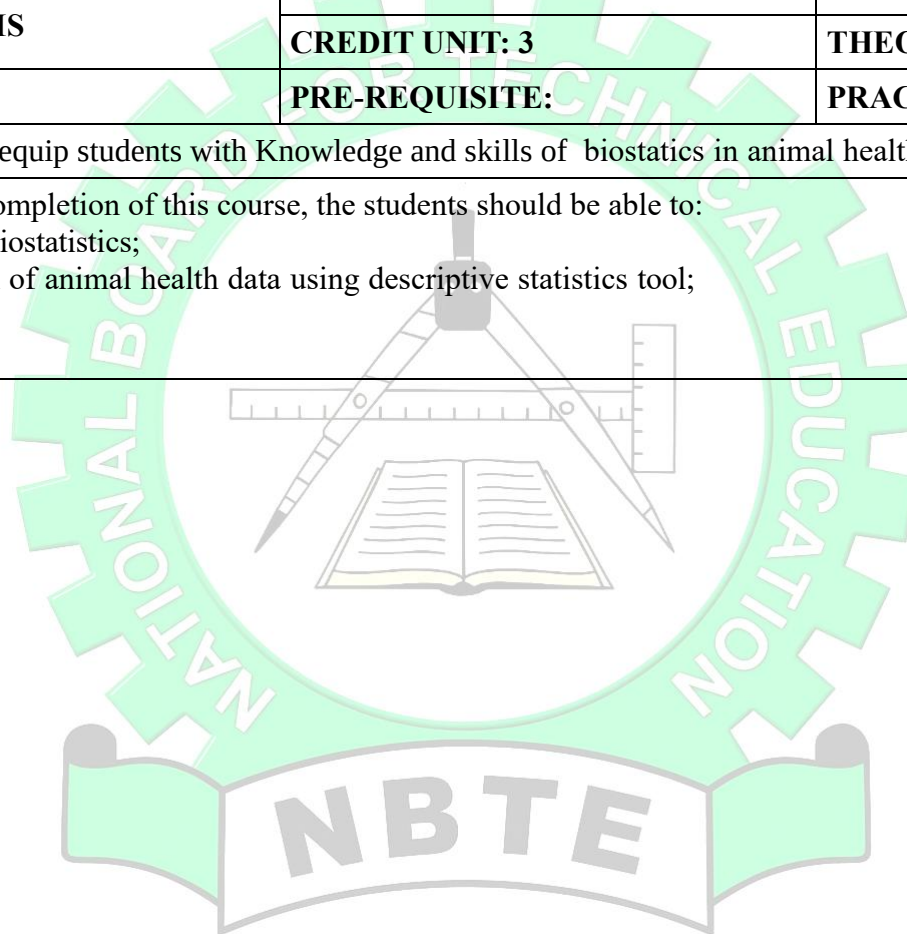
	4.2 List the personnel and their relevant qualification 4.3 Explain the types of management practices in the laboratory 4.4 Explain the importance of good management practices in the Laboratory	Laboratory • Discuss the personnel and their relevant qualification • Explain the types of management practices in the laboratory • Explain the importance of good management practices in the Laboratory	projector, whiteboard marker		maintenance	
GENERAL OBJECTIVE 5.0: Know the relevant statutory bodies involved in best management practices in various laboratories						
13-15	5.1 Explain Quality assurance 5.2 List various statutory bodies involved in best management practices in various Laboratories e,g ISO, MLSCN 5.3 Explain the roles of statutory bodies in best management practices in various Laboratories	• Explain Quality assurance • Discuss various statutory bodies involved in best management practices in various Laboratories e,g ISO, MLSCN • Discuss the roles of statutory bodies in best management practices in various Laboratories	Journals, Internet, Charts, Manual, projector, whiteboard marker			
COURSE ASSESSMENT:						

Course work 10%
Test/Assignments 10%
Practical 40%
Examination 40% = 100%



BIostatISTICS AND LABORATORY DATA ANALYSIS

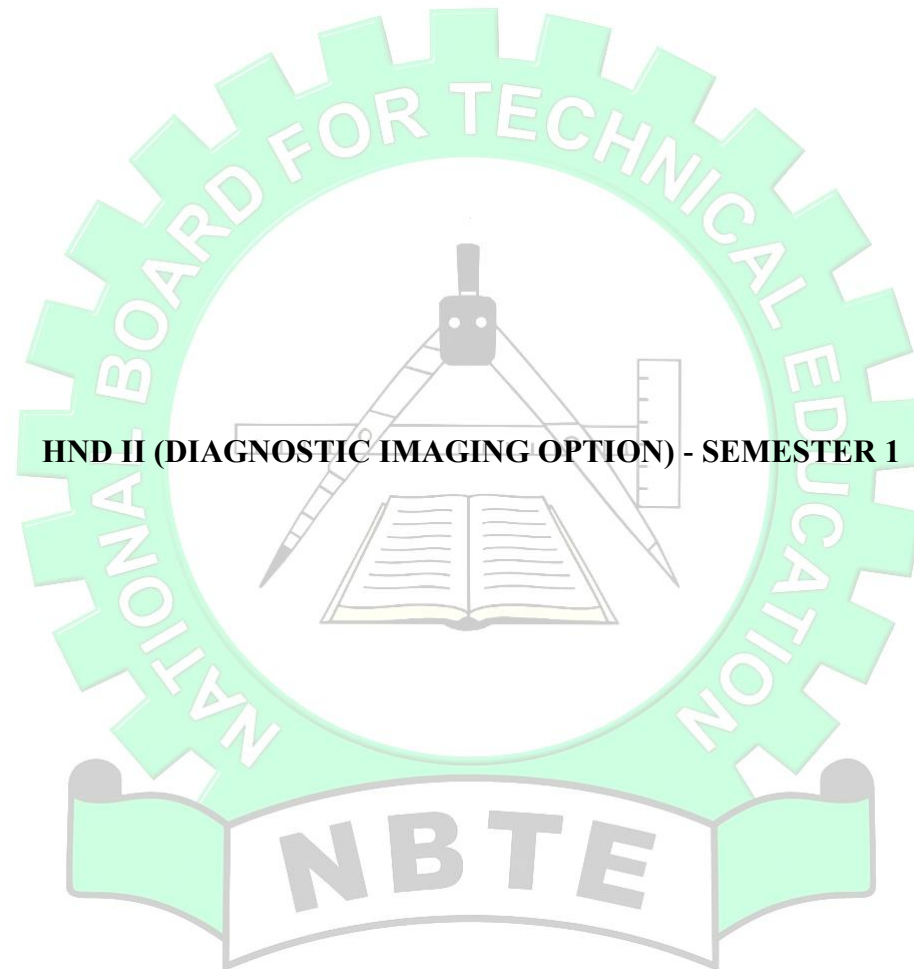
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: BIostatISTICS AND LABORATORY DATA ANALYSIS	COURSE CODE: VLT 326	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: I SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: The course is designed to equip students with Knowledge and skills of biostatistics in animal health programme.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the fundamental of Biostatistics; 2.0 Understand the presentation of animal health data using descriptive statistics tool; 3.0 Compute statistical test; 4.0 Understand vital statistics;		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: BIOSTATISTICS AND LABORATORY DATA ANALYSIS			COURSE CODE: VLT 326		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: I SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: The course is designed to equip students with Knowledge and skills of biostatistics in animal health programme.						
GENERAL OBJECTIVE: 1.0 The student should be able to know the fundamental of Biostatistics.						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Biostatistics. 1.2 Explain the sources of Biostatistics. 1.3 Explain the uses of Biostatistics.	• Explain Biostatistics. • Discuss the sources of Biostatistics. • Explain the uses of Biostatistics.	Books Journal Charts Pictures			
GENERAL OBJECTIVE: 2.0 Understand the presentation of animal health data using descriptive statistics tool.						
4-7	2.1 Explain the concept and importance of descriptive statistics in animal health data analysis. 2.2 Explain descriptive statistical tools such as frequency tables, percentages, mean,	• Explain the concept and importance of descriptive statistics in animal health data analysis. • Discuss descriptive statistical tools such as frequency tables, percentages, mean,	Charts Pictures Journals Projector	• Organize animal health data into tables and frequency distributions. • Calculate mean, median, mode, percentages, and rates from animal	• Guide students to: • Organize animal health data into tables and frequency distributions. • Calculate mean, median, mode, percentages, and rates from animal health	Computers with Excel/SPSS or similar software Record sheets, and calculators. Graph papers, chart templates, and data analysis worksheets.

	median, mode, and charts. 2.3 Explain animal health data using descriptive statistical measures.	median, mode, and charts. • Explain animal health data using descriptive statistical measures.		health datasets. • Present and interpret animal health data using graphs and charts.	datasets. • Present and interpret animal health data using graphs and charts.	
GENERAL OBJECTIVE: 3.0 Compute statistical test relating to health services.						
8-11	3.1 Explain statistics of inference test on animal health data 3.2 Explain the Measure association using linear correlation graph. 3.3 Describe Spearman Rank Order Correlation. 3.4 Explain Pearson Correlation. 3.5 Explain Chi-Square test.	• Discuss statistics of inference test on animal health data • Discuss the Measure association using linear correlation graph. • Explain Spearman Rank Order Correlation. • Discuss Pearson Correlation. • 3.5 Explain Chi-Square test.	Books, journals, charts, Pictures, Projector.			
GENERAL OBJECTIVE: 4.0 Understand vital statistics						
12-15	4.1 Explain the following: i. Vital events ii. Vital registration iii. Vital statistics iv. Rate Ratio v. Proportional rate	• Explain the following: - Vital events - Vital registration - Vital statistics - Rate Ratio - Proportional rate	Pictures Charts Books Projector			

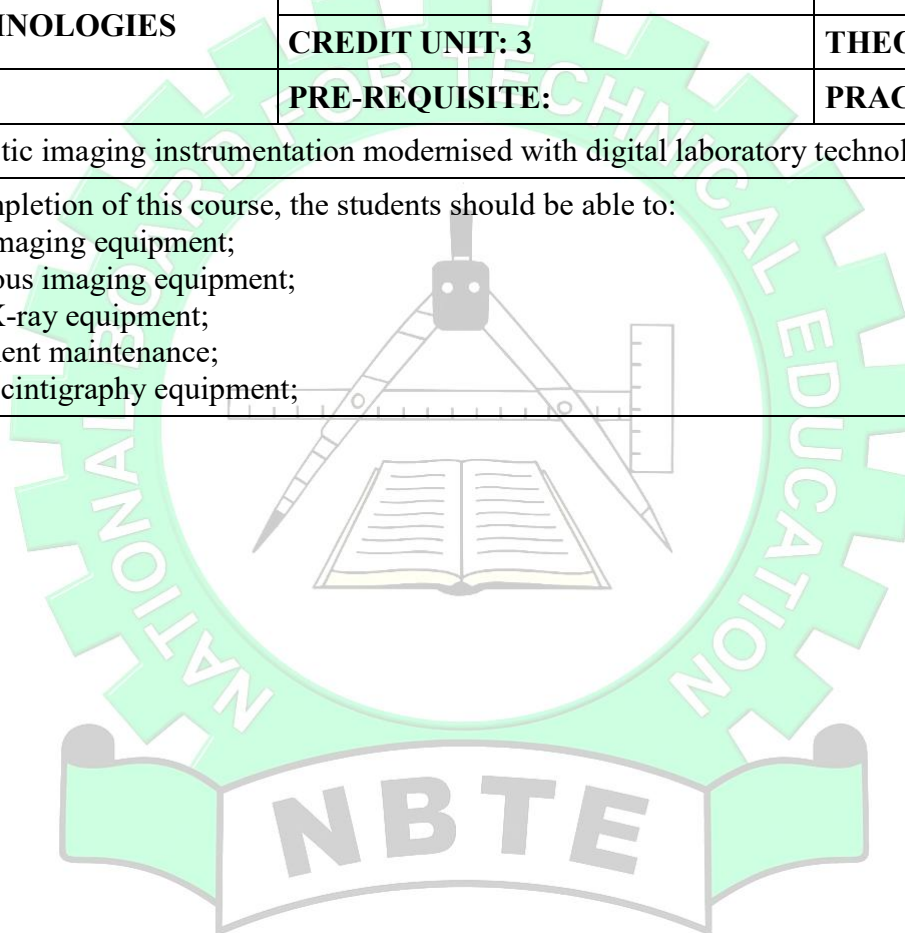
	4.2 Describe types of vital statistics 4.3 Explain morbidity statistics 4.4 Explain morbidity statistics 4.5 Calculate Nuptiality statistics 4.6 Compute Natality statistics. 4.7 Compute migration statistics 4.8 Compute sanitation	• Describe types of vital statistics • Explain morbidity statistics • Explain morbidity statistics • statistics • Calculate Nuptiality statistics • Compute Natality statistics. • Compute migration statistics • Compute sanitation				
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (DIAGNOSTIC IMAGING OPTION) - SEMESTER 1

INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES	COURSE CODE: VLD 411	CONTACT HOURS: 3HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course covers diagnostic imaging instrumentation modernised with digital laboratory technologies and equipment maintenance		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the various types of imaging equipment; 2.0 Demonstrate the use of various imaging equipment; 3.0 Know the various types of X-ray equipment; 4.0 Understand imaging equipment maintenance; 5.0 Know the various types of Scintigraphy equipment;		

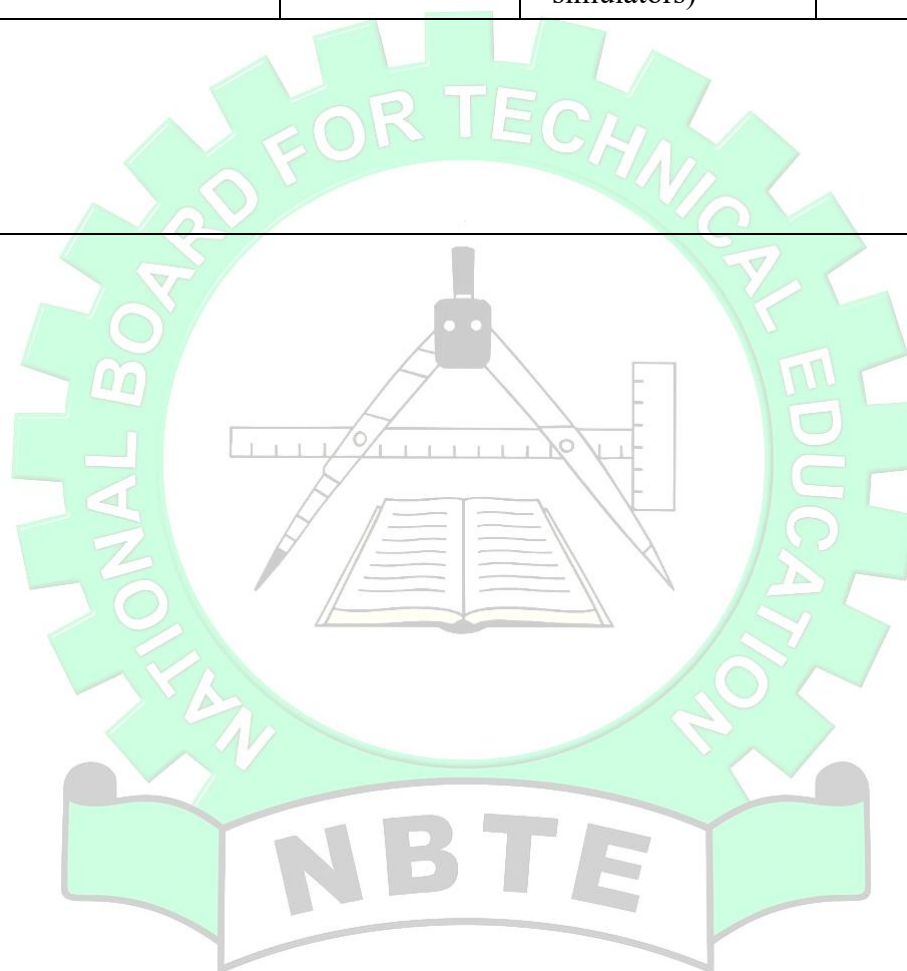


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES			COURSE CODE: VLD 411		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course covers diagnostic imaging instrumentation modernised with digital laboratory technologies and equipment maintenance						
GENERAL OBJECTIVE 1.0: Know the various types of imaging equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain the various types of imaging equipment used in veterinary medicine. 1.2 Explain the principles and functions of different imaging equipment. 1.3 Differentiate between imaging modalities based on their applications and limitations.	• Discuss the various types of imaging equipment used in veterinary medicine. • Explain the principles and functions of different imaging equipment. • Differentiate between imaging modalities based on their applications and limitations.	Pictures of equipment Projector White board marker Internet	• Identify and operate basic imaging equipment safely. • Demonstrate proper handling and maintenance of imaging equipment. • Produce basic diagnostic images. • Interpret basic diagnostic images under supervision. • Internal basic diagnostic image	Guide students to: • Identify and operate basic imaging equipment safely. • Demonstrate proper handling and maintenance of imaging equipment. • Produce and interpret basic diagnostic images under supervision.	X-ray machine, ultrasound scanner, and accessories. PPE Radiation monitoring devices. Animal models/patients, Maintenance manuals.

GENERAL OBJECTIVE 2.0: Demonstrate the use of various imaging equipment						
4-6	2.2 Explain the application of imaging equipment. 2.2 Explain the indications for their Uses. 2.3 Describe how to use the machine on animals.	- Explain the application of imaging equipment. - Explain the indications for their Uses. - Discuss how to use the machine on animals.	Reference Textbooks Pictures of equipment Projector White board marker Internet	- Carry out preparation of animal for imaging. - Identify Imaging machine used to evaluate the patient	Guide students to: - Carry out preparation of animal for imaging. - Identify Imaging machine used to evaluate the patient	Imaging machine, computer
GENERAL OBJECTIVE 3.0: Understand automated imaging equipment						
7-9	3.1 Explain major components of X-ray machine 3.2 Describe the functions of parts of the X-ray machine 3.3 Explain pre-operative safety checks (warm up protocol) for X-ray machine	- Explain major components of X-ray machine - Explain the functions of parts of the X-ray machine - Discuss pre-operative safety checks (warm up protocol) for X-ray machine	Reference Textbooks Pictures of equipment Projector White board marker Internet	- Identify major components of X-ray machine and state the functions its parts. - Demonstrate pre-operative safety checks	Guide students to: - Identify major components of X-ray machine and state the functions its parts. - Demonstrate pre-operative safety checks	X-ray machine Manuals PPE
GENERAL OBJECTIVE 4.0: Understand imaging equipment maintenance						
10-12	4.1 Explain preventive (PM) maintenance for imaging equipment 4.2 Describe calibration	- Discuss preventive maintenance for imaging equipment - Explain calibration and quality control	Equipment maintenance manuals, LCD projector	- Develop PM schedule for 8 imaging equipment items - Conduct	Guide students to: - Develop PM schedule for 8 imaging equipment items - Conduct calibration	Equipment, calibration tools, fault scenarios, logbooks

	and quality control 4.3 Describe first-line fault-finding 4.4 Explain equipment logbook and asset management	• Explain first-line fault-finding • Discuss equipment logbook and asset management		calibration on X-ray output, ultrasound transducer, monitor display Diagnose and remedy 4 simulated equipment faults • Maintain equipment logbook and asset register	on X-ray output, ultrasound transducer, monitor display Diagnose and remedy 4 simulated equipment faults. • Maintain equipment logbook and asset register	
GENERAL OBJECTIVE 5.0: Understand digital reporting and integration						
13-15	5.1 Explain digital report generation 5.2 Explain structured imaging reports 5.3 Explain integration with EMR systems 5.4 Describe AI tools in imaging	• Explain digital report generation • Explain structured imaging reports • Explain integration with EMR systems • Discuss AI tools in imaging	Digital reporting manuals, LCD projector	• Generate digital imaging reports for 8 cases following standard templates • Build structured imaging report with measurements, findings, conclusions • Integrate imaging system with EMR • Verify bi-directional data flow • Demonstrate AI-	Guide students to: • Generate digital imaging reports for 8 cases following standard templates • Build structured imaging report with measurements, findings, conclusions • Integrate imaging system with EMR • Verify bi-directional data flow • Demonstrate AI-assisted imaging diagnosis tools (or	Reporting software, templates, EMR system, AI imaging demos

				assisted imaging diagnosis tools (or simulators)	simulators)	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

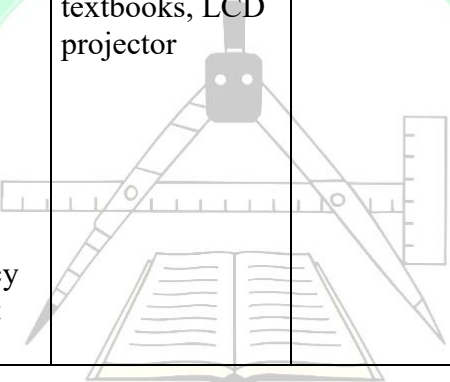


RADIATION BIOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: RADIATION BIOLOGY	COURSE CODE: VLD 412	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 2 HOURS/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 0
GOAL: This course is designed to equip students with knowledge and skills of radiation biology, radiation effects on tissues, and basis for radiation safety in veterinary imaging.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand radiation physics and biological effects; 2.0 Understand cellular and tissue effects of radiation; 3.0 Understand deterministic and stochastic effects; 4.0 Understand radiation protection principles; 5.0 Understand veterinary radiation biology applications.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: RADIATION BIOLOGY			COURSE CODE: VLD 412		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 2 HOURS/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 0 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of radiation biology, radiation effects on tissues, and basis for radiation safety in veterinary imaging.						
GENERAL OBJECTIVE 1.0: Understand radiation physics and biological effects						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain types of ionising radiation (X-rays, gamma, alpha, beta) 1.2 Describe units of radiation measurement (Sv, Gy, R, rad) 1.3 Explain mechanisms of radiation interaction with matter. 1.4 Describe direct vs indirect radiation effects on cells	- Explain types of ionising radiation (X-rays, gamma, alpha, beta) - Discuss units of radiation measurement (Sv, Gy, R, rad) - Explain mechanisms of radiation interaction with matter. - Discuss direct vs indirect radiation effects on cells	Lecture note, text books, journals			
GENERAL OBJECTIVE 2.0: Understand cellular and tissue effects of radiation						

4-6	2.1 Describe DNA damage and repair 2.2 Explain chromosomal aberrations 2.3 Describe cell death (mitotic, apoptotic) 2.4 Explain tissue radio sensitivity (Bergonie-Tribondeau law)	• Explain DNA damage • Discuss aberrations • Discuss cell death • Discuss radio sensitivity	Lecture note, text books, journals			
GENERAL OBJECTIVE 3.0: Understand deterministic and stochastic effects						
7-9	3.1 Explain acute radiation syndrome 3.2 Describe cataract, sterility, skin damage as deterministic effects 3.3 Explain carcinogenesis as stochastic effect 3.4 Describe heritable effects	• Explain acute radiation syndrome • Describe cataract, sterility, skin damage as deterministic effects • Explain carcinogenesis as stochastic effect • Describe heritable effects	Lecture note, text books, journals			
GENERAL OBJECTIVE 4.0: Understand radiation protection principles						
10-12	4.1 Explain ALARA principle 4.2 Describe justification and optimization	• Explain ALARA principle • Discuss justification and optimization	Lecture note, text books, journals			

	4.3 Explain dose limits for workers and public 4.4 Describe ICRP recommendations	• Explain dose limits for workers and public • Discuss ICRP recommendations				
GENERAL OBJECTIVE 5.0: Understand veterinary radiation biology applications						
13-15	5.1 Explain radiation dose to companion animals 5.2 Describe radiation dose to large animals 5.3 Explain pregnant patient considerations 5.4 Describe emergency dose management	• Explain radiation dose to companion animals • Discuss radiation dose to large animals • Explain pregnant patient considerations • Discuss emergency dose management	Veterinary radiation textbooks, LCD projector 			
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

ULTRASONOGRAPHY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ULTRASONOGRAPHY	COURSE CODE: VLD 413	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills to covers diagnostic ultrasonography in veterinary practice with focus on reproductive imaging supporting dairy reproduction diagnostics.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand ultrasound physics and equipment; 2.0 Understand abdominal ultrasonography; 3.0 Understand reproductive ultrasonography; 4.0 Understand cardiac and thoracic ultrasound; 5.0 Understand image interpretation and reporting.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ULTRASONOGRAPHY			COURSE CODE: VLD 413		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills to covers diagnostic ultrasonography in veterinary practice with focus on reproductive imaging supporting dairy reproduction diagnostics.						
GENERAL OBJECTIVE 1.0: Understand ultrasound physics and equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain ultrasound physics (frequency, wavelength, attenuation) 1.2 Describe ultrasound modes (B-mode, M-mode, Doppler) 1.3 Describe transducer types and selection 1.4 Explain image optimization (gain, depth, focus)	• Explain ultrasound physics (frequency, wavelength, attenuation) • Discuss ultrasound modes (B-mode, M-mode, Doppler) • Discuss transducer types and selection • Explain image optimization (gain, depth, focus)	Ultrasound textbooks, LCD projector	• Operate ultrasound machine. • Explore physics-based settings • Carry out B-mode, M-mode, Doppler imaging on phantom • Use linear, curvilinear, sector transducers appropriately • Optimize image quality through gain, depth, focus,	Guide students to: • Operate ultrasound machine. • Explore physics-based settings • Carry out B-mode, M-mode, Doppler imaging on phantom • Use linear, curvilinear, sector transducers appropriately • Optimize image quality through gain, depth, focus, frequency settings	Ultrasound machines, multiple transducers, phantoms, ultrasound gel

				frequency settings		
GENERAL OBJECTIVE 2.0: Understand abdominal ultrasonography						
4-6	2.1 Describe liver, gallbladder, spleen scanning 2.2 Explain kidney, adrenal scanning 2.3 Describe GI tract, urinary bladder scanning 2.4 Explain pancreas, lymph node scanning	• Discuss liver, gallbladder, spleen scanning • Explain kidney, adrenal scanning • Discuss GI tract, urinary bladder scanning • Explain pancreas, lymph node scanning	Abdominal ultrasound atlases, LCD projector	• Perform liver, gallbladder, spleen ultrasound on canine patient • Perform kidney and adrenal ultrasound on canine patient • Perform GI tract and urinary bladder ultrasound • Perform pancreas and lymph node ultrasound; identify abnormalities	Guide students to: • Perform liver, gallbladder, spleen ultrasound on canine patient • Perform kidney and adrenal ultrasound on canine patient • Perform GI tract and urinary bladder ultrasound. • Perform pancreas and lymph node ultrasound; identify abnormalities	Ultrasound machines, canine patients, sample images, atlases
GENERAL OBJECTIVE 3.0: Understand reproductive ultrasonography						
7-9	3.1 Explain bovine pregnancy diagnosis (early to late gestation) 3.2 Describe ovarian and uterine scanning in cattle 3.3 Explain small-ruminant reproductive ultrasound	• Explain bovine pregnancy diagnosis (early to late gestation) • Discuss ovarian and uterine scanning in cattle • Discuss small-ruminant reproductive	Reproductive ultrasound atlases, LCD projector	• Perform bovine pregnancy ultrasound on 10 dairy cows at various gestation stages • Scan ovaries and uterus • Identify follicles, corpora lutea,	Guide students to: • Perform bovine pregnancy ultrasound on 10 dairy cows at various gestation stages • Scan ovaries and uterus • Identify follicles, corpora lutea, uterine	Ultrasound machines, dairy cows, sheep, goats, dogs, cats, restraint equipment

	3.4 Explain small-animal reproductive scanning	ultrasound • Discuss small-animal reproductive scanning		uterine pathology • Perform reproductive ultrasound on small ruminants (sheep, goats) • Perform reproductive scanning on canine/feline patients for pregnancy/pyometra	pathology • Perform reproductive ultrasound on small ruminants (sheep, goats) • Perform reproductive scanning on canine/feline patients for pregnancy/pyometra	
GENERAL OBJECTIVE 4.0: Understand cardiac and thoracic ultrasound						
10-12	4.1 Explain cardiac chamber identification 4.2 Describe M-mode echocardiography 4.3 Describe Doppler cardiac assessment 4.4 Explain thoracic ultrasound (pleural, pulmonary)	• Explain cardiac chamber identification • Discuss M-mode echocardiography • Discuss Doppler cardiac assessment • Explain thoracic ultrasound (pleural, pulmonary)	Cardiac ultrasound textbooks, LCD projector	• Perform cardiac ultrasound • Identify all 4 chambers and valves • Conduct M-mode echocardiography; measure cardiac dimensions • Carry out Doppler to assess cardiac function and valve flow • Perform thoracic ultrasound for pleural effusion	Guide students to: • Perform cardiac ultrasound • Identify all 4 chambers and valves • Conduct M-mode echocardiography; measure cardiac dimensions • Carry out Doppler to assess cardiac function and valve flow. • Perform thoracic ultrasound for pleural effusion and lung	Ultrasound machines, patients, cardiac measurement tools

				and lung pathology	pathology	
GENERAL OBJECTIVE 5.0: Understand image interpretation and reporting						
13-15	5.1 Describe systematic image interpretation 5.2 Explain measurements and calculations 5.3 Explain normal vs abnormal recognition 5.4 Describe ultrasound report writing	• Discuss systematic image interpretation • Explain measurements and calculations • Explain normal vs abnormal recognition • Discuss ultrasound report writing	Image interpretation manuals, LCD projector	• Interpret 15 ultrasound studies systematically • Take standardized measurements on cardiac and abdominal images • Document 10 identified abnormal ultrasound findings • Produce complete ultrasound reports for 8 sample cases	Guide students to: • Interpret 15 ultrasound studies systematically • Take standardized measurements on cardiac and abdominal images • Document 10 identified abnormal ultrasound findings. • Produce complete ultrasound reports for 8 sample cases	Sample image sets, measurement tools, abnormal cases, report templates
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

MAMMOGRAPHY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: MAMMOGRAPHY	COURSE CODE: VLD 414	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills to covers veterinary mammographic, imaging principles and practice for mammary gland evaluation in companion animals and dairy ruminants.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand mammary anatomy and imaging indications. 2.0 Understand mammographic techniques; 3.0 Understand mammary tumor imaging; 4.0 Understand dairy mammary imaging; 5.0 Understand mammographic reporting.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: MAMMOGRAPHY			COURSE CODE: VLD 414		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills to covers veterinary mammographic, imaging principles and practice for mammary gland evaluation in companion animals and dairy ruminants.						
GENERAL OBJECTIVE 1.0: Understand mammary anatomy and imaging indications						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe mammary anatomy across species 1.2 Explain indications for mammographic imaging 1.3 Describe imaging modalities for mammary tissue 1.4 Explain patient preparation and positioning	• Discuss mammary anatomy across species • Explain indications for mammographic imaging • Discuss imaging modalities for mammary tissue • Explain patient preparation and positioning	Mammary imaging textbooks, LCD projector	• Identify mammary anatomy in cattle, dogs, cats by palpation and imaging • Map clinical indications to imaging selection for 5 case scenarios • Compare ultrasound, mammography, and CT for mammary imaging • Position canine and bovine patients for	Guide students to: • Identify mammary anatomy in cattle, dogs, cats by palpation and imaging • Map clinical indications to imaging selection for 5 case scenarios • Compare ultrasound, mammography, and CT for mammary imaging • Position canine and bovine patients for mammary imaging	Patient animals, anatomy atlases, imaging modalities, positioning aids

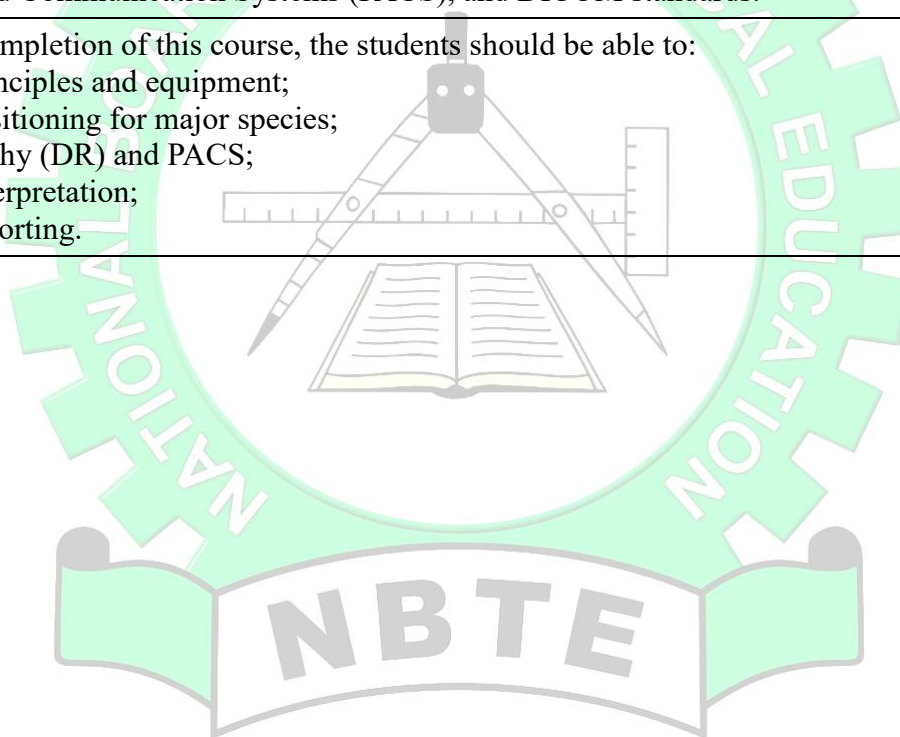
				mammary imaging		
GENERAL OBJECTIVE 2.0: Understand mammographic techniques						
4-6	2.1 Describe X-ray mammography techniques 2.2 Explain ultrasonographic mammography 2.3 Explain contrast-enhanced mammography 2.4 Describe biopsy-guided imaging	• Discuss X-ray mammography techniques • Explain ultrasonographic mammography • Explain contrast-enhanced mammography • Discuss biopsy-guided imaging	Mammographic technique manuals, LCD projector	• Perform X-ray mammography on canine patient with mammary mass • Perform ultrasonographic mammography to characterize masses • Carry out contrast-enhanced imaging to mammary masses • Conduct biopsy-guided imaging for mammary mass sampling	Guide students to: • Perform X-ray mammography on canine patient with mammary mass • Perform ultrasonographic mammography to characterize masses • Carry out contrast-enhanced imaging to mammary masses • Conduct biopsy-guided imaging for mammary mass sampling	Mammography equipment, ultrasound, contrast agents, biopsy needles, patients
GENERAL OBJECTIVE 3.0: Understand mammary tumour imaging						
7-9	3.1 Explain benign and malignant imaging features 3.2 Describe staging and metastatic assessment 3.3 Describe lymph node imaging in mammary disease 3.4 Explain post-treatment	• Explain benign vs malignant imaging features • Discuss staging and metastatic assessment • Discuss lymph node imaging in mammary disease • Explain post-	Mammary oncology imaging textbooks, LCD projector	• Identify imaging features distinguishing benign and malignant mammary masses • Stage mammary tumours using imaging across multiple modalities	Guide students to: • Identify imaging features distinguishing benign and malignant mammary masses • Stage mammary tumours using imaging across multiple modalities • Image regional lymph	Sample image sets, staging templates, monitoring protocols

	monitoring	treatment monitoring		• Image regional lymph nodes for metastatic involvement • Conduct post-treatment imaging monitoring for 3 cases	nodes for metastatic involvement. • Conduct post-treatment imaging monitoring for 3 cases	
GENERAL OBJECTIVE 4.0: Understand dairy mammary imaging						
10-12	4.1 Describe mastitis imaging in dairy cattle 4.2 Explain mammary fibrosis imaging 4.3 Describe teat injury and abscess imaging 4.4 Explain imaging-guided treatment planning	• Discuss mastitis imaging in dairy cattle • Explain mammary fibrosis imaging • Discuss teat injury and abscess imaging • Explain imaging-guided treatment planning	Dairy mammary imaging textbooks, LCD projector	• Conduct Image dairy cow udders with mastitis; correlate with CMT and culture • Carry out Image mammary fibrosis and chronic changes • Carry out Image teat injuries and abscesses • Recommend management • Plan treatment based on imaging findings in dairy cases	Guide students to: • Conduct Image dairy cow udders with mastitis; correlate with CMT and culture • Carry out Image mammary fibrosis and chronic changes • Carry out Image teat injuries and abscesses • Recommend management • Plan treatment based on imaging findings in dairy cases	Dairy cows, ultrasound, CMT kits, microscopes, treatment protocols
GENERAL OBJECTIVE 5.0: Understand mammographic reporting						
13-15	5.1 Describe mammary	• Describe mammary	Reporting	• Conduct BI-	Guide students to:	Sample cases,

	BI-RADS-like reporting 5.2 Describe standardized measurements 5.3 Explain report templates and structured reports 5.4 Explain multidisciplinary case discussion	BI-RADS-like reporting • Describe standardized measurements • Explain report templates and structured reports • Explain multidisciplinary case discussion	manuals, LCD projector	RADS-like categories to 10 mammographic findings • Take standardized measurements on mammographic images • Use structured report templates for 8 cases • Participate in multidisciplinary case discussions	• Conduct BI-RADS-like categories to 10 mammographic findings • Take standardized measurements on mammographic images • Use structured report templates for 8 cases. • Participate in multidisciplinary case discussions	report templates, MDT meeting format
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

RADIOLOGY (DIGITAL IMAGING AND PACS)

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: RADIOLOGY (DIGITAL IMAGING AND PACS)	COURSE CODE: VLD 415	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary radiology with modernised emphasis on digital imaging (DR), Picture Archiving and Communication Systems (PACS), and DICOM standards.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand radiographic principles and equipment; 2.0 Understand radiographic positioning for major species; 3.0 Understand digital radiography (DR) and PACS; 4.0 Understand radiographic interpretation; 5.0 Understand radiographic reporting.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: RADIOLOGY (DIGITAL IMAGING AND PACS)			COURSE CODE: VLD 415		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary radiology with modernised emphasis on digital imaging (DR), Picture Archiving and Communication Systems (PACS), and DICOM standards.						
GENERAL OBJECTIVE 1.0: Understand radiographic principles and equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain X-ray production and image formation 1.2 Describe exposure factors (kVp, mAs, distance, time) 1.3 Explain image quality factors (contrast, density, sharpness, distortion) 1.4 Describe radiation safety in radiography	- Explain X-ray production and image formation - Discuss exposure factors (kVp, mAs, distance, time) - Explain image quality factors (contrast, density, sharpness, distortion) - Discuss radiation safety in radiography	Radiology textbooks, LCD projector	- Operate radiographic equipment safely on phantom - Adjust kVp, mAs and distance - Compare resulting images - Optimize image quality through exposure adjustment - Identify radiation safety (lead apron, shield, dosimetry);	Guide students to: - Operate radiographic equipment safely on phantom - Adjust kVp, mAs and distance; compare resulting images - Optimize image quality through exposure adjustment - Identify radiation safety (lead apron, shield, dosimetry); verify compliance	X-ray equipment, phantoms, PPE, dosimeters

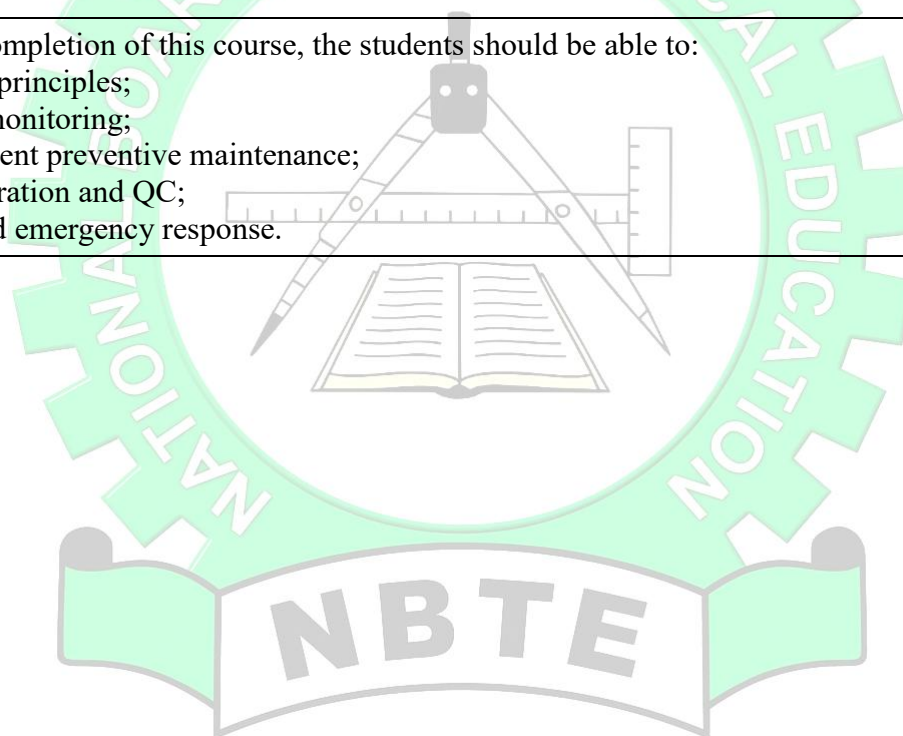
				verify compliance		
GENERAL OBJECTIVE 2.0: Understand radiographic positioning for major species						
4-6	2.1 Explain small-animal positioning (DV, VD, lateral) Apply large-animal positioning (bovine, equine) 2.2 Describe specialty views (skull, spine, joints) 2.3 Explain contrast radiography	- Explain small-animal positioning (DV, VD, lateral) Apply large-animal positioning (bovine, equine) - Discuss specialty views (skull, spine, joints) - Explain contrast radiography	Positioning atlases, LCD projector	- Position canine and feline patients for 8 standard views - Position equine/bovine limbs for radiography - Carry out specialty positioning for skull, spine, joints - Perform contrast radiography (barium swallow, urography)	Guide students to: - Position canine and feline patients for 8 standard views - Position equine/bovine limbs for radiography - Carry out specialty positioning for skull, spine, joints - Perform contrast radiography (barium swallow, urography)	Patients, positioning aids, contrast agents, lead aprons
GENERAL OBJECTIVE 3.0: Understand digital radiography (DR) and PACS						
7-9	3.1 Describe digital detector technology 3.2 Explain DR workflow vs film-screen 3.3 Describe PACS architecture and operation 3.4 Explain DICOM	- Describe digital detector technology - Explain DR workflow vs film-screen - Describe PACS architecture and operation	DR/PACS manuals, LCD projector	- Operate DR detector system; capture digital radiographs - Compare DR with film-screen workflow; document	Guide students to: - Operate DR detector system; capture digital radiographs - Compare DR with film-screen workflow; document advantages - Use PACS	DR system, PACS workstation, DICOM network, sample studies

	standard and image management	• Explain DICOM standard and image management		advantages • Use PACS workstation to retrieve, view, and manipulate images • Carry out DICOM tags • Transfer images via DICOM network	workstation to retrieve, view, and manipulate images • Carry out DICOM tags Transfer images via DICOM network	
GENERAL OBJECTIVE 4.0: Understand radiographic interpretation						
10-12	4.1 Describe systematic interpretation approach 4.2 Explain skeletal radiography findings 4.3 Explain thoracic radiography findings 4.4 Describe abdominal radiography findings	• Discuss systematic interpretation approach • Explain skeletal radiography findings • Explain thoracic radiography findings • Discuss abdominal radiography findings	Interpretation textbooks, LCD projector	• Interpret 15 radiographs using systematic ABCs approach • Identify skeletal abnormalities on 10 radiographs • Identify thoracic abnormalities on 10 radiographs • Identify abdominal abnormalities on 10 radiographs	Guide students to: • Interpret 15 radiographs using systematic ABCs approach • Identify skeletal abnormalities on 10 radiographs • Identify thoracic abnormalities on 10 radiographs • Identify abdominal abnormalities on 10 radiographs	Sample radiograph sets, interpretation guides
GENERAL OBJECTIVE 5.0: Understand radiographic reporting						
13-15	5.1 Explain structured radiology report format	• Explain structured radiology report format	Reporting manuals, LCD projector	• Perform structured radiology reports	Guide students to: • Write structured radiology reports for	Sample cases, terminology guides, PACS,

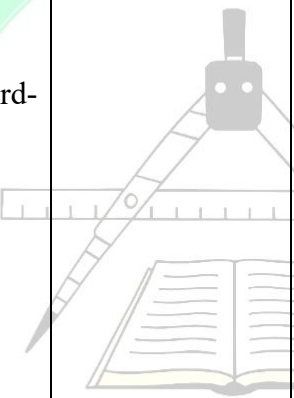
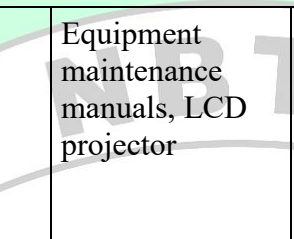
	5.2 Describe standardized terminology 5.3 Explain digital reporting in PACS 5.4 Describe teleradiology consultation	• Discuss standardized terminology • Explain digital reporting in PACS • Discuss teleradiology consultation		for 10 cases • Identify standardized radiology terminology • Generate digital reports linked to PACS images • Submit cases for teleradiology consultation • Integrate feedback	10 cases • Identify standardized radiology terminology • Generate digital reports linked to PACS images • Submit cases for teleradiology consultation • Integrate feedback	teleradiology platforms
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

RADIATION SAFETY AND EQUIPMENT MAINTENANCE

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: RADIATION SAFETY AND EQUIPMENT MAINTENANCE	COURSE CODE: VLD 416	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of radiation safety in veterinary imaging and equipment maintenance.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand radiation safety principles; 2.0 Understand dosimetry and monitoring; 3.0 Understand imaging equipment preventive maintenance; 4.0 Understand equipment calibration and QC; 5.0 Understand fault-finding and emergency response.		

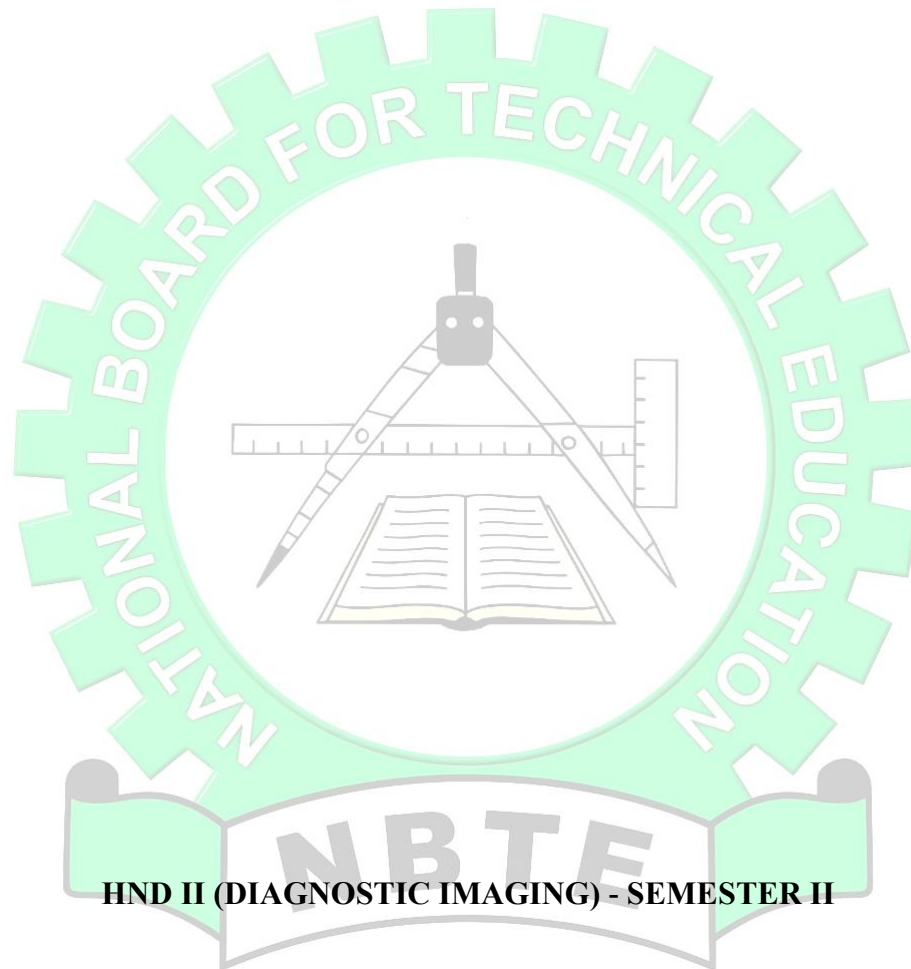


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: RADIATION SAFETY AND EQUIPMENT MAINTENANCE			COURSE CODE: VLD 416		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of radiation safety in veterinary imaging and equipment maintenance.						
GENERAL OBJECTIVE 1.0: Understand radiation safety principles						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe ALARA principle and dose limits 1.2 Describe time, distance, shielding strategies 1.3 Explain personal protective equipment (PPE) 1.4 Explain NNRA and Nigerian radiation regulations	• Discuss ALARA principle and dose limits • Discuss time, distance, shielding strategies • Explain personal protective equipment (PPE) • Explain NNRA and Nigerian radiation regulations	Radiation safety textbooks, NNRA documents, LCD projector	• Calculate radiation doses using ALARA principle for sample procedures • Carry out time, distance, shielding in mock radiographic procedure • Use all radiation PPE correctly (lead apron, thyroid shield, gloves, goggles) • Profile NNRA	Guide students to: • Calculate radiation doses using ALARA principle for sample procedures • Carry out time, distance, shielding in mock radiographic procedure • Use all radiation PPE correctly (lead apron, thyroid shield, gloves, goggles) • Profile NNRA regulations and • Identify compliance	Calculation worksheets, PPE sets, NNRA documents

				regulations and • Identify compliance requirements	requirements	
GENERAL OBJECTIVE 2.0: Understand dosimetry and monitoring						
4-6	2.1 Explain personal dosimetry (film badges, TLD, OSL) 2.2 Describe area dosimetry 2.3 Describe dose record-keeping and reporting 2.4 Explain pregnant worker considerations	• Explain personal dosimetry (film badges, TLD, OSL) • Discuss area dosimetry • Discuss dose record-keeping and reporting • Explain pregnant worker considerations	Dosimetry textbooks, LCD projector 	• Use personal dosimeters • Submit for processing • Conduct area dosimetry survey using survey meters • Maintain dose records following regulatory requirements • Apply pregnant-worker dose protocols in mock scenarios	Guide students to: • Use personal dosimeters • Submit for processing • Conduct area dosimetry survey using survey meters • Maintain dose records following regulatory requirements • Apply pregnant-worker dose protocols in mock scenarios	Personal dosimeters, survey meters, record-keeping forms
GENERAL OBJECTIVE 3.0: Understand imaging equipment preventive maintenance						
7-9	3.1 Explain X-ray equipment maintenance schedule 3.2 Explain CR/DR maintenance 3.3 Explain ultrasound	• Explain X-ray equipment maintenance schedule • Explain CR/DR maintenance • Explain ultrasound	Equipment maintenance manuals, LCD projector 	• Execute X-ray equipment PM schedule • Maintain CR plates • Maintain DR detectors	Guide students to: • Execute X-ray equipment PM schedule • Maintain CR plates • Maintain DR detectors • Clean and calibrate	Equipment, calibration tools, cleaning materials

	equipment maintenance 3.4 Explain monitor and workstation maintenance	equipment maintenance • Explain monitor and workstation maintenance		• Calibrate X-ray equipment • Maintain ultrasound transducers and machines • Replace gel applicators • Calibrate monitors (gamma, brightness) • Verify display quality	• Maintain ultrasound transducers, machines; • Replace gel applicators • Calibrate monitors (gamma, brightness) • Verify display quality	
GENERAL OBJECTIVE 4.0: Understand equipment calibration and QC						
10-12	4.1 Describe X-ray tube output verification 4.2 Explain image quality QC 4.3 Describe daily, weekly, monthly QC programs 4.4 Explain regulatory compliance audits	• Discuss X-ray tube output verification • Explain image quality QC • Discuss daily, weekly, monthly QC programs • Explain regulatory compliance audits	QC manuals, LCD projector	• Verify X-ray tube output using ion chamber • Conduct image quality QC using test phantoms • Perform daily, weekly, monthly QC program • Conduct mock regulatory compliance audit	Guide students to: • Verify X-ray tube output using ion chamber • Conduct image quality QC using test phantoms • Perform daily, weekly, monthly QC program • Conduct mock regulatory compliance audit	Ion chambers, test phantoms, QC checklists, audit forms
GENERAL OBJECTIVE 5.0: Understand fault-finding and emergency response						
13-15	5.1 Explain first-line	• Explain first-line	Fault-finding	• Diagnose	Guide students to:	Fault scenarios,

	equipment fault-finding 5.2 Describe emergency response (equipment failure, exposure incident) 5.3 Explain equipment logbook and asset register 5.4 Explain manufacturer support and service contracts	equipment fault-finding • Describe emergency response (equipment failure, exposure incident) • Explain equipment logbook and asset register • Explain manufacturer support and service contracts	manuals, LCD projector	equipment fault • Remedy simulated equipment faults • Respond to simulated radiation exposure incident • Maintain comprehensive equipment logbook for 4 weeks • Engage manufacturer support • Manage service contract	• Diagnose equipment fault • Remedy simulated equipment faults • Respond to simulated radiation exposure incident • Maintain comprehensive equipment logbook for 4 weeks • Engage manufacturer support • Manage service contract	emergency protocols, logbooks, service contracts
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (DIAGNOSTIC IMAGING) - SEMESTER II

MAGNETIC RESONANCE IMAGING (MRI)

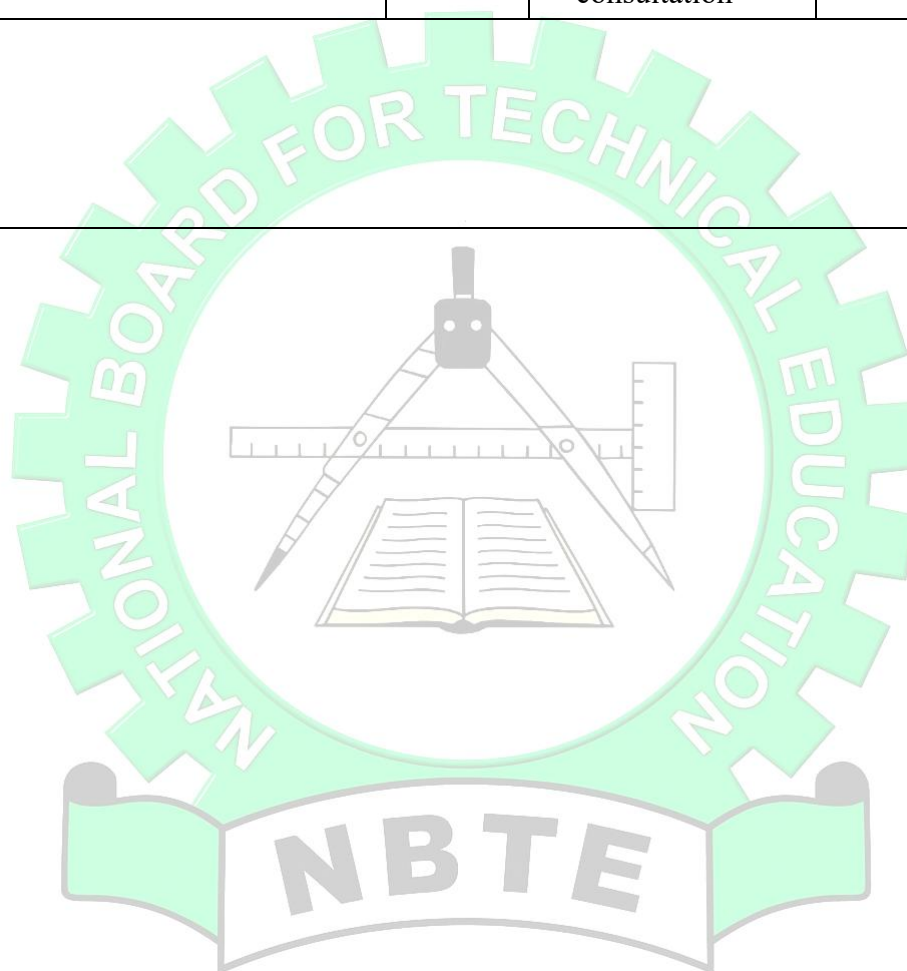
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: MAGNETIC RESONANCE IMAGING (MRI)	COURSE CODE: VLD 421	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of Magnetic Resonance Imaging		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand Magnetic Resonance Imaging (MRI); 2.0 Know the indications for use of Magnetic Resonance Imaging (MRI); 3.0 Know the various parts of the MRI machine; 4.0 Understand musculoskeletal and abdominal MRI; 5.0 Understand MRI workflow and reporting.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: MAGNETIC RESONANCE IMAGING (MRI)				COURSE CODE: VLD 421		CONTACT HOURS: 4 HOURS/WEEKS
				CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II				PRE-REQUISITE:		PRACTICAL: 3 HOUR/WEEK
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of Magnetic Resonance Imaging						
GENERAL OBJECTIVE 1.0: Understand MRI physics and equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define the magnetic resonance imaging (MRI) 1.2 Explain MRI hardware (magnet, coils, gradients) 1.3 Describe pulse sequences (SE, GRE, FLAIR, STIR) 1.4 State MRI safety zones and contraindications	- Define the magnetic resonance imaging (MRI) - Explain MRI hardware (magnet, coils, gradients) - Describe pulse sequences (SE, GRE, FLAIR, STIR) - Explain MRI safety zones and contraindications	Textbooks Journals Charts MRI images Projector Internet	- Demonstrate MRI physics using phantom or simulator - Identify hardware components on MRI scanner (or simulator) - Run T1, T2, FLAIR, STIR sequences on phantom or sample data - Conduct MRI safety screening for patient and personnel	Guide students to: - Demonstrate MRI physics using phantom or simulator - Identify hardware components on MRI scanner (or simulator) - Run T1, T2, FLAIR, STIR sequences on phantom or sample data - Conduct MRI safety screening for patient and personnel	MRI scanner or simulator, phantoms, safety checklists

GENERAL OBJECTIVE 2.0: Know the indications for use of Magnetic Resonance Imaging (MRI)						
4-6	2.1 list the indications for the use of magnetic resonance imaging (MRI) 2.2 Describe anaesthesia for MRI (MR-safe equipment) 2.3 Describe positioning and coil selection 2.4 Explain contrast administration (gadolinium)	• Explain the indications for the use of magnetic resonance imaging (MRI) • Discuss anaesthesia for MRI (MR-safe equipment) • Discuss positioning and coil selection • Explain contrast administration (gadolinium)	MRI preparation on manuals, LCD projector	• Conduct patient screening on 5 sample cases • Set up MR-safe anaesthesia configuration • Position patients with appropriate coils • Administer gadolinium contrast safely	Guide students to: • Conduct patient screening on 5 sample cases • Set up MR-safe anaesthesia configuration • Position patients with appropriate coils • Administer gadolinium contrast safely	Screening forms, MR-safe anaesthesia, coils, gadolinium
GENERAL OBJECTIVE 3.0: Know the various parts of the equipment						
7-9	3.1 Describe brain MRI protocols 3.2 Explain spinal cord MRI 3.3 Explain MRI interpretation of CNS pathology 3.4 Explain integration with clinical findings	• Discuss brain MRI protocols • Explain spinal cord MRI • Explain MRI interpretation of CNS pathology • Explain integration with clinical findings	Neuro-MRI atlases, LCD projector	• Carry out review of brain MRI for 5 sample cases • Carry out review of spinal MRI for 3 sample cases • Identify CNS pathology (tumour, IVDD, infarct) on MRI • Integrate MRI with clinical findings in 4 cases	Guide students to: • Carry out review of brain MRI for 5 sample cases • Carry out review of spinal MRI for 3 sample cases • Identify CNS pathology (tumour, IVDD, infarct) on MRI • Integrate MRI with clinical findings in 4 cases	Sample MRI studies, atlases, clinical records

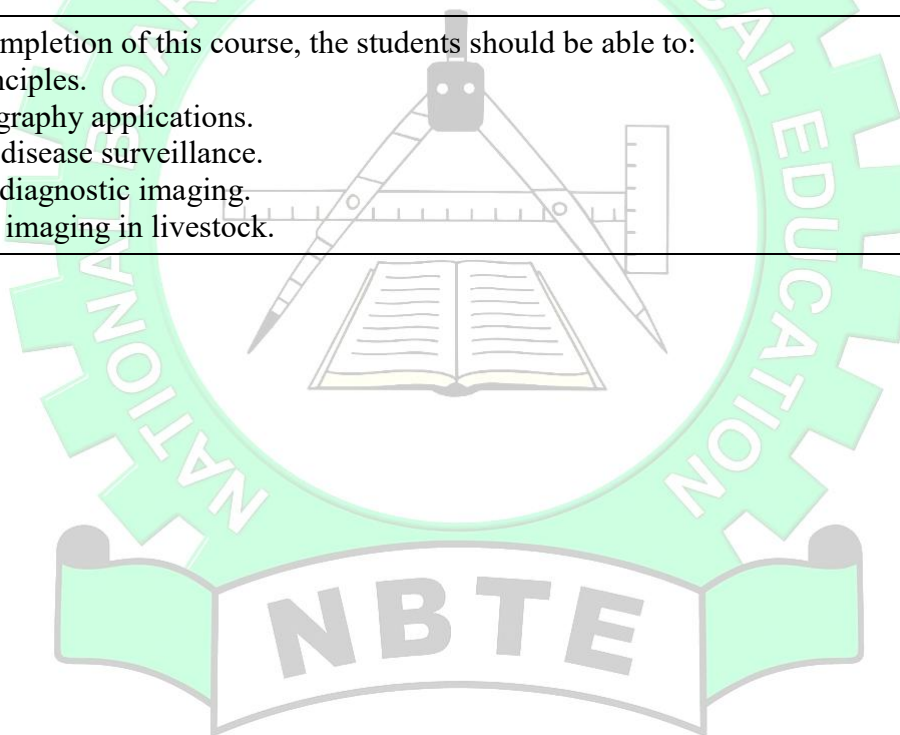
GENERAL OBJECTIVE 4.0: Understand musculoskeletal and abdominal MRI						
10-12	4.1 Explain MSK MRI protocols 4.2 Define abdominal MRI 4.3 Define oncologic MRI staging 4.4 Define specialty MRI (cardiac, vascular)	• Explain MSK MRI protocols • Discuss abdominal MRI • Discuss oncologic MRI staging • Explain specialty MRI (cardiac, vascular)	MSK and body MRI atlases, LCD projector	• Carry out review of MSK MRI for orthopaedic cases • Carry out review of abdominal MRI for sample cases • Carry out oncologic MRI staging for 3 tumour cases • Carry out specialty MRI (cardiac, vascular)	Guide students to: • Carry out review of MSK MRI for orthopaedic cases • Carry out review of abdominal MRI for sample cases • Carry out oncologic MRI staging for 3 tumour cases • Carry out specialty MRI (cardiac, vascular)	Sample studies, atlases, staging templates
GENERAL OBJECTIVE 5.0: Understand MRI workflow and reporting						
13-15	5.1 Explain MRI workflow and patient throughput 5.2 Explain DICOM and PACS for MRI 5.3 Apply structured MRI reporting 5.4 Describe teleradiology consultations for MRI	• Explain MRI workflow and patient throughput • Explain DICOM and PACS for MRI • Apply structured MRI reporting • Describe teleradiology consultations for MRI	MRI workflow manuals, LCD projector	• Map MRI workflow from referral to report delivery • Carry out and retrieved MRI studies via DICOM/PACS • Produce structured MRI reports for 6 cases • Demonstrate the	Guide students to: • Map MRI workflow from referral to report delivery • Carry out and retrieved MRI studies via DICOM/PACS • Produce structured MRI reports for 6 cases • Demonstrate the procedure to MRI for teleradiology	Workflow templates, DICOM/PACS, report templates, teleradiology platforms

				procedure to MRI for teleradiology consultation	consultation	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



SCINTIGRAPHY AND DIGITAL LIVESTOCK SURVEILLANCE IMAGING

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: SCINTIGRAPHY AND DIGITAL LIVESTOCK SURVEILLANCE IMAGING	COURSE CODE: VLD 422	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOUR/WEEK
GOAL: This course is designed to equip students with skills and knowledge of veterinary scintigraphy integrated with digital livestock disease surveillance imaging.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand scintigraphy principles. 2.0 Understand veterinary scintigraphy applications. 3.0 Understand digital livestock disease surveillance. 4.0 Understand integration with diagnostic imaging. 5.0 Understand emerging digital imaging in livestock.		

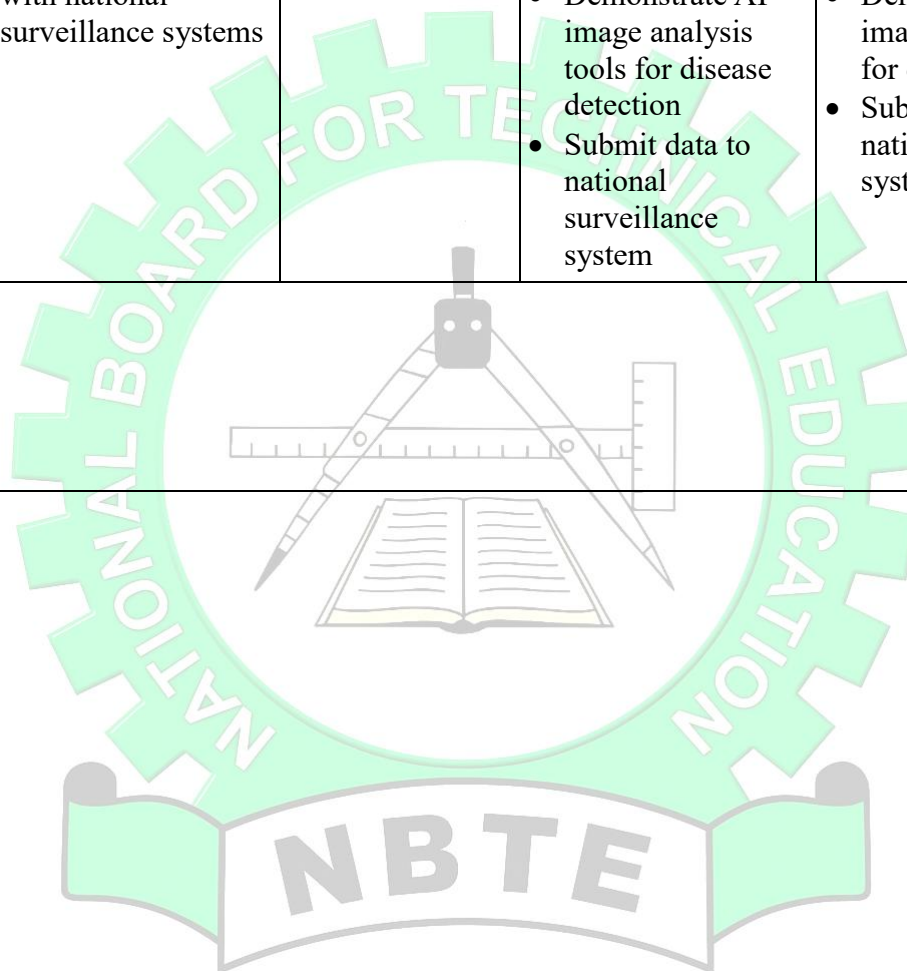


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: SCINTIGRAPHY & DIGITAL LIVESTOCK SURVEILLANCE IMAGING			COURSE CODE: VLD 422		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with skills and knowledge of veterinary scintigraphy integrated with digital livestock disease surveillance imaging.						
GENERAL OBJECTIVE 1.0: Understand scintigraphy principles						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain radiopharmaceuticals principles 1.2 Describe gamma camera operation 1.3 Describe radiation safety in nuclear medicine 1.4 Explain image acquisition and processing	• Explain radiopharmaceuticals principles • Explain gamma camera operation • Explain radiation safety in nuclear medicine • Explain image acquisition and processing	Nuclear medicine textbooks, LCD projector	• Identify radiopharmaceuticals and their uses • Operate gamma camera (or simulator) on phantom • Carry out radiation safety in nuclear medicine setting • Process acquired scintigraphic images	Guide students to: • Identify radiopharmaceuticals and their uses • Operate gamma camera (or simulator) on phantom • Carry out radiation safety in nuclear medicine setting • Process acquired scintigraphic images	Nuclear medicine partner, gamma camera or simulator, phantoms, PPE
GENERAL OBJECTIVE 2.0: Understand veterinary scintigraphy applications						

4-6	2.1 Describe bone scintigraphy in equine lameness 2.2 Describe thyroid scintigraphy in feline hyperthyroidism 2.3 Explain renal scintigraphy (GFR assessment) 2.4 Explain tumour scintigraphy	• Explain bone scintigraphy in equine lameness • Explain thyroid scintigraphy in feline hyperthyroidism • Explain renal scintigraphy (GFR assessment) • Explain tumour scintigraphy	Veterinary scintigraphy textbooks, LCD projector	• Perform bone scintigraphy on equine lameness case • Perform thyroid scintigraphy on feline case • Perform renal scintigraphy with GFR calculation • Perform tumour scintigraphy for staging	Guide students to: • Perform bone scintigraphy on equine lameness case • Perform thyroid scintigraphy on feline case • Perform renal scintigraphy with GFR calculation • Perform tumour scintigraphy for staging	Nuclear medicine access, sample studies, GFR calculation tools
GENERAL OBJECTIVE 3.0: Understand digital livestock disease surveillance						
7-9	3.1 Explain IoT sensors in livestock disease surveillance 3.2 Describe accelerometer-based sickness detection 3.3 Explain satellite imagery for outbreak monitoring 3.4 Explain mobile-app disease reporting integrated with imaging	• Explain IoT sensors in livestock disease surveillance • Discuss accelerometer-based sickness detection • Explain satellite imagery for outbreak monitoring • Explain mobile-app disease reporting integrated with imaging	Digital surveillance manuals, LCD projector	• Install IoT sensors (rumen bolus, collar) on demonstration cattle • Analyse accelerometer data from collared cattle for sickness • Interpret Sentinel-2 imagery for outbreak monitoring downloaded • Use EpiCollect or KoBo for disease	Guide students to: • Install IoT sensors (rumen bolus, collar) on demonstration cattle • Analyse accelerometer data from collared cattle for sickness • Interpret Sentinel-2 imagery for outbreak monitoring downloaded • Use EpiCollect or KoBo for disease reporting integrated with imaging	IoT sensors, cattle, computers, GIS software, mobile apps

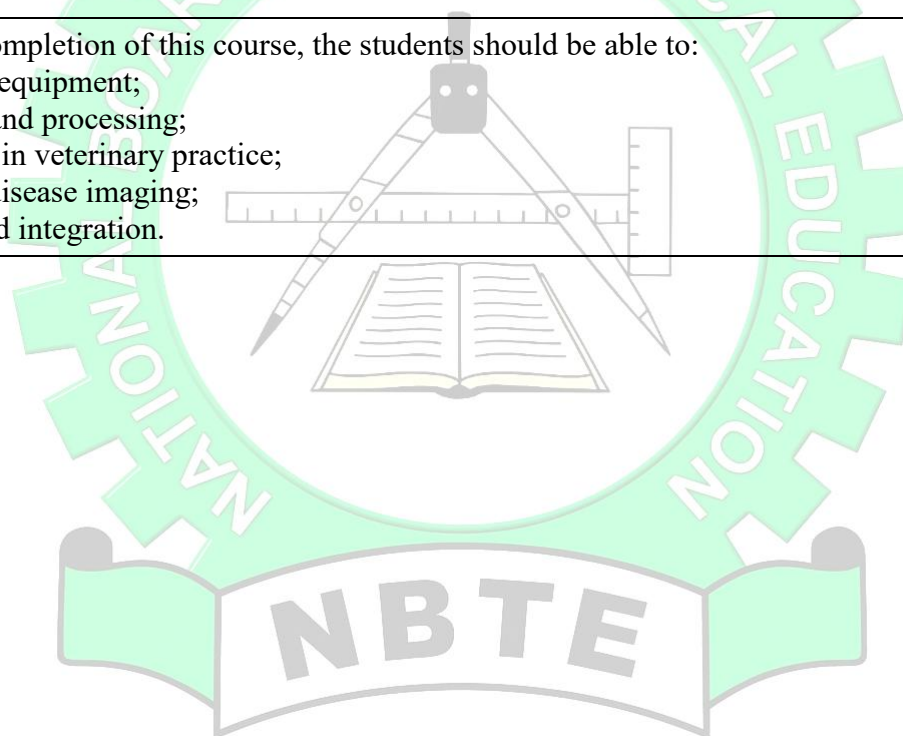
				reporting integrated with imaging		
GENERAL OBJECTIVE 4.0: Understand integration with diagnostic imaging						
10-12	4.1 Explain SPECT/CT fusion imaging 4.2 Describe imaging hot-spot to clinical correlation 4.3 Explain quantitative analysis 4.4 Describe multimodal reporting	• Explain SPECT/CT fusion imaging • Discuss imaging hot-spot to clinical correlation • Explain quantitative analysis • Discuss multimodal reporting	Multimodal imaging textbooks, LCD projector	• Review SPECT/CT fusion studies for sample cases • Correlate scintigraphy findings with X-ray and clinical signs • Carry out quantitative analysis to scintigraphic images • Write multimodal imaging reports integrating scintigraphy with other studies	Guide students to: • Review SPECT/CT fusion studies for sample cases • Correlate scintigraphy findings with X-ray and clinical signs • Carry out quantitative analysis to scintigraphic images • Write multimodal imaging reports integrating scintigraphy with other studies	Sample multimodal studies, correlation tools, report templates
GENERAL OBJECTIVE 5.0: Understand emerging digital imaging in livestock						
13-15	5.1 Describe drone-based livestock imaging 5.2 Explain thermal imaging for disease detection 5.3 Describe AI-	• Discuss drone-based livestock imaging • Explain thermal imaging for disease detection • Explain AI-assisted	Digital imaging textbooks, LCD projector	• Operate drone-based livestock imaging on a farm • Carry out thermal imaging to detect fever or	Guide students to: • Operate drone-based livestock imaging on a farm • Carry out thermal imaging to detect	Drones or simulator, thermal cameras, AI tools, national reporting platforms

	assisted image analysis 5.4 Explain integration with national surveillance systems	image analysis • Discuss integration with national surveillance systems		inflammation in cattle • Demonstrate AI image analysis tools for disease detection • Submit data to national surveillance system	fever or inflammation in cattle • Demonstrate AI image analysis tools for disease detection • Submit data to national surveillance system	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



COMPUTED TOMOGRAPHY (CT) AND CLIMATE-DRIVEN IMAGING

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: COMPUTED TOMOGRAPHY (CT) AND CLIMATE-DRIVEN IMAGING	COURSE CODE: VLD 423	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course covers is designed to equip students with knowledge and skills of veterinary CT imaging with integrated climate-driven disease.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand CT physics and equipment; 2.0 Understand CT acquisition and processing; 3.0 Understand CT applications in veterinary practice; 4.0 Understand climate-driven disease imaging; 5.0 Understand CT reporting and integration.		

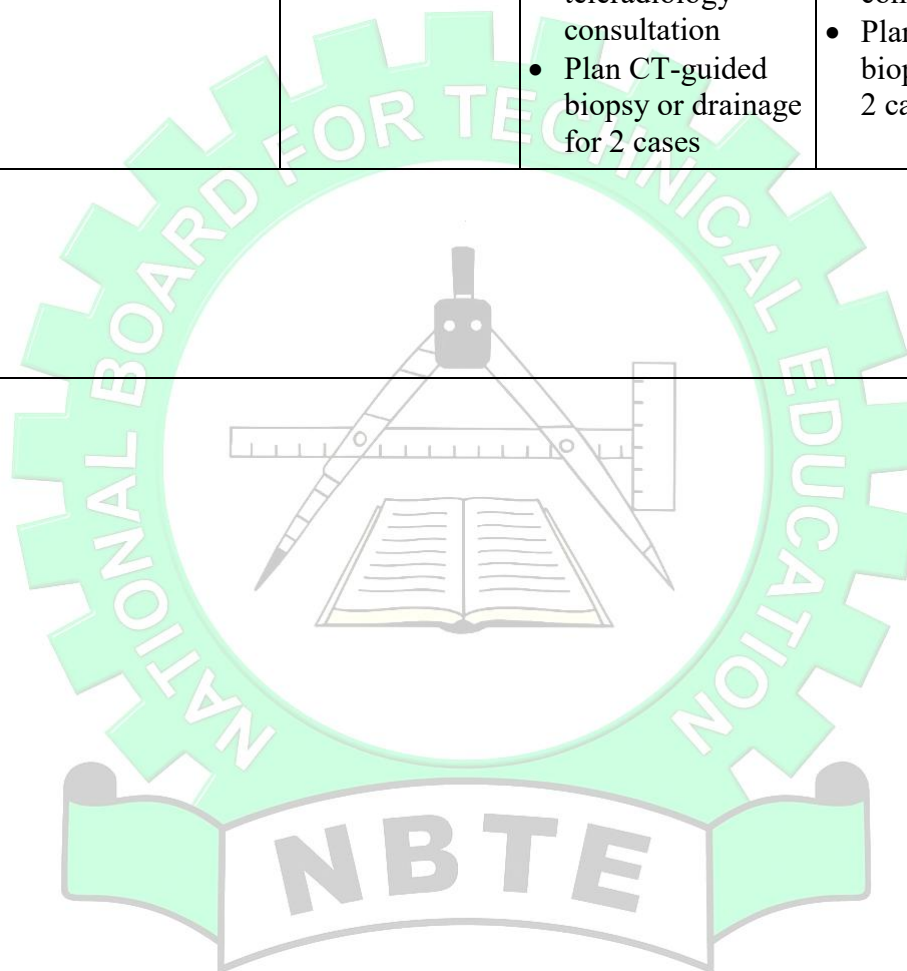


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: COMPUTED TOMOGRAPHY (CT) AND CLIMATE-DRIVEN IMAGING			COURSE CODE: VLD 423		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course covers is designed to equip students with knowledge and skills of veterinary CT imaging with integrated climate-driven disease.						
GENERAL OBJECTIVE 1.0: Understand CT physics and equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe CT physics (X-ray attenuation, reconstruction) 1.2 Explain CT hardware (gantry, detectors, table) 1.3 Describe multi-detector CT advantages 1.4 Explain CT contrast administration	• Discuss CT physics (X-ray attenuation, reconstruction) • Explain CT hardware (gantry, detectors, table) • Discuss multi-detector CT advantages • Explain CT contrast administration	CT textbooks, LCD projector	• Demonstrate CT physics on simulator or working CT • Identify CT hardware components • Compare single vs multi-detector CT image quality • Administer CT contrast (iohexol) following safety protocols	Guide students to: • Demonstrate CT physics on simulator or working CT • Identify CT hardware components • Compare single vs multi-detector CT image quality • Administer CT contrast (iohexol) following safety protocols	CT scanner or simulator, sample studies, contrast agents
GENERAL OBJECTIVE 2.0: Understand CT acquisition and processing						

4-6	2.1 Explain CT acquisition parameters (kVp, mAs, slice, pitch) 2.2 Describe 2D and 3D reconstruction 2.3 Explain multi-planar reformatting (MPR) 2.4 Describe CT angiography	• Explain CT acquisition parameters (kVp, mAs, slice, pitch) • Discuss 2D and 3D reconstruction • Explain multi-planar reformatting (MPR) • Describe CT angiography	CT processing manuals, LCD projector	• Optimize CT acquisition parameters for different body regions • Perform 2D and 3D reconstructions on sample studies • Carry out multi-planar reformatting (axial, sagittal, coronal) • Perform CT angiography on vascular cases	• Optimize CT acquisition parameters for different body regions • Perform 2D and 3D reconstructions on sample studies • Apply multi-planar reformatting (axial, sagittal, coronal) • Perform CT angiography on vascular cases	CT workstation, sample studies, reconstruction software
GENERAL OBJECTIVE 3.0: Understand CT applications in veterinary practice						
7-9	3.1 Explain neurological CT 3.2 Describe thoracic CT 3.3 Describe abdominal CT 3.4 Explain MSK CT	• Explain neurological CT • Discuss thoracic CT • Discuss abdominal CT • Explain MSK CT	CT applications atlases, LCD projector	• Perform neurological CT for sample cases • Perform thoracic CT for sample cases • Perform abdominal CT for sample cases • Perform MSK CT for orthopaedic cases	Guide students to: • Perform neurological CT for sample cases • Perform thoracic CT for sample cases • Perform abdominal CT for sample cases • Perform MSK CT for orthopaedic cases • Review CT images	Sample CT studies, atlases

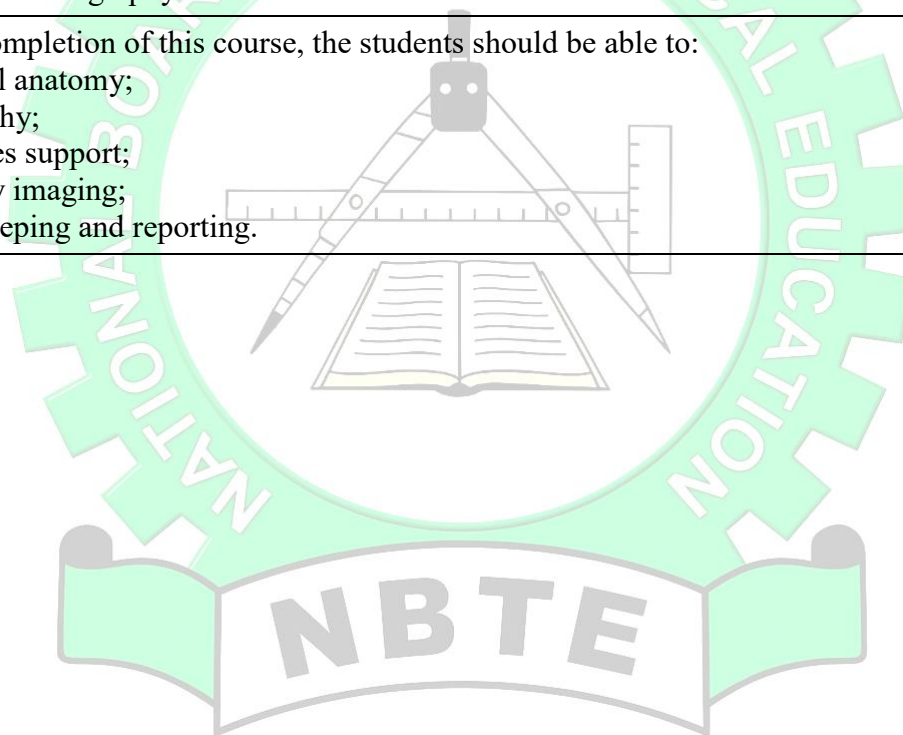
				Review CT images		
GENERAL OBJECTIVE 4.0: Understand climate-driven disease imaging						
10-12	4.1 Describe imaging in heat-stress pathologies 4.2 Describe imaging in vector-borne disease 4.3 Explain imaging in Rift Valley Fever and anthrax 4.4 Describe imaging in drought-driven nutritional disease	- Explain imaging in heat-stress pathologies - Discuss imaging in vector-borne disease - Explain imaging in Rift Valley Fever and anthrax - Explain imaging in drought-driven nutritional disease	Climate-disease imaging textbooks, LCD projector	- Image heat-stress pathologies in livestock - Document findings - Image vector-borne disease cases (trypanosomiasis, theileriosis) - Image RVF and anthrax cases; document characteristic findings - Image drought-driven nutritional disease (deficiency syndromes)	Guide students to: - Image heat-stress pathologies in livestock - Document findings - Image vector-borne disease cases (trypanosomiasis, theileriosis) - Image RVF and anthrax cases; document characteristic findings - Image drought-driven nutritional disease (deficiency syndromes)	Imaging equipment, sample cases, atlases
GENERAL OBJECTIVE 5.0: Understand CT reporting and integration						
13-15	5.1 Explain structured CT reporting 5.2 Describe CT PACS integration 5.3 Describe CT teleradiology 5.4 Explain CT-guided procedures planning	- Explain structured CT reporting - Discuss CT PACS integration - Explain CT teleradiology - Explain CT-guided procedures planning	CT reporting manuals, LCD projector	- Write structured CT reports for 8 cases - Archive CT studies in PACS with appropriate DICOM tags - Demonstrate a	Guide students to: - Write structured CT reports for 8 cases - Archive CT studies in PACS with appropriate DICOM tags - Demonstrate a	Report templates, PACS, teleradiology platforms, biopsy planning tools

				procedure to submit CT for teleradiology consultation Plan CT-guided biopsy or drainage for 2 cases	procedure to submit CT for teleradiology consultation Plan CT-guided biopsy or drainage for 2 cases	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



DENTAL PROCEDURES AND IMAGING

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: DENTAL PROCEDURES AND IMAGING	COURSE CODE: VLD 424	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary dental imaging and laboratory support for dental procedures including digital intraoral radiography.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand veterinary dental anatomy; 2.0 Understand dental radiography; 3.0 Understand dental procedures support; 4.0 Understand dental pathology imaging; 5.0 Understand dental record-keeping and reporting.		

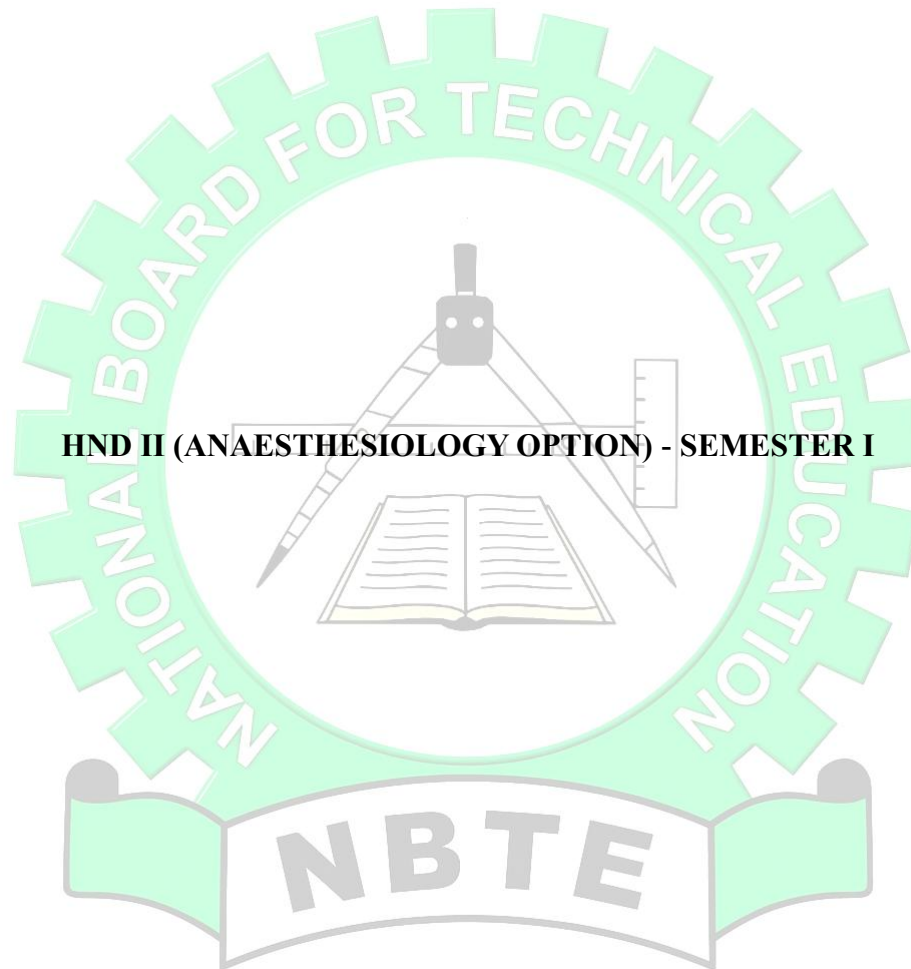


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: DENTAL PROCEDURES AND IMAGING			COURSE CODE: VLD 424		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary dental imaging and laboratory support for dental procedures including digital intraoral radiography.						
GENERAL OBJECTIVE 1.0: Understand veterinary dental anatomy						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain dental anatomy across species (dog, cat, horse, cattle) 1.2 Describe dental formulae and eruption times 1.3 Explain tooth structure and periodontium 1.4 Explain species-specific dental considerations	• Explain dental anatomy across species (dog, cat, horse, cattle) • Discuss dental formulae and eruption times • Explain tooth structure and periodontium • Explain species-specific dental considerations	Dental anatomy textbooks, LCD projector	• Identify teeth and dental anatomy in 4 species using skulls and live animals • Document dental formulae and aging by teeth for cattle, horse, dog, cat • Identify tooth structure and periodontium on dissection • Compare species-specific dental	Guide students to: • Identify teeth and dental anatomy in 4 species using skulls and live animals • Document dental formulae and aging by teeth for cattle, horse, dog, cat • Identify tooth structure and periodontium on dissection • Compare species-specific dental adaptations and	Skulls, live animals, dissection specimens, atlases

				adaptations and pathologies	pathologies	
GENERAL OBJECTIVE 2.0: Understand dental radiography						
4-6	2.1 Describe intraoral radiographic techniques 2.2 Explain parallel and bisecting angle techniques 2.3 Explain digital dental radiography 2.4 Describe dental radiograph interpretation	• Discuss intraoral radiographic techniques • Explain parallel and bisecting angle techniques • Explain digital dental radiography • Discuss dental radiograph interpretation	Dental radiography manuals, LCD projector	• Perform intraoral radiography on canine patient • Carry out parallel and bisecting angle techniques • Operate digital dental radiography system • Interpret 10 dental radiographs; identify abnormalities	Guide students to: • Perform intraoral radiography on canine patient • Carry out parallel and bisecting angle techniques • Operate digital dental radiography system • Interpret 10 dental radiographs; identify abnormalities	Dental X-ray, digital sensors, patients, atlases
GENERAL OBJECTIVE 3.0: Understand dental procedures support						
7-9	3.1 Describe dental prophylaxis support 3.2 Explain extraction support 3.3 Explain periodontal therapy support 3.4 Explain endodontic support	• Discuss dental prophylaxis support • Explain extraction support • Explain periodontal therapy support • Explain endodontic support	Dental procedure manuals, LCD projector	• Support dental prophylaxis on canine patient • Prepare equipment • Support tooth extraction • Manage instruments and bleeding • Support periodontal therapy	Guide students to: • Support dental prophylaxis on canine patient • Prepare equipment • Support tooth extraction • Manage instruments and bleeding • Support periodontal therapy • Record probing	Dental equipment, patients, instruments, recording forms

				- Record probing depths - Support endodontic procedure - Manage instruments	depths Support endodontic procedure Manage instruments	
GENERAL OBJECTIVE 4.0: Understand dental pathology imaging						
10-12	4.1 Describe caries and tooth resorption imaging 4.2 Explain periodontal disease imaging 4.3 Describe trauma and fracture imaging 4.4 Explain oral tumour imaging	- Discuss caries and tooth resorption imaging - Explain periodontal disease imaging - Discuss trauma and fracture imaging - Explain oral tumour imaging	Dental pathology textbooks, LCD projector	- Identify caries and tooth resorption on dental radiographs - Identify periodontal disease patterns radiographically - Image dental trauma and fractures - Document dental trauma and fractures - Image oral tumours - Map extent and metastatic potential	Guide students to: - Identify caries and tooth resorption on dental radiographs - Identify periodontal disease patterns radiographically - Image dental trauma and fractures - Document dental trauma and fractures - Image oral tumours - Map extent and metastatic potential	Sample radiographs, atlases, case studies
GENERAL OBJECTIVE 5.0: Understand dental record-keeping and reporting						
13-15	5.1 Explain dental	Explain dental charts and	Dental	Maintain dental	Guide students to:	Chart templates,

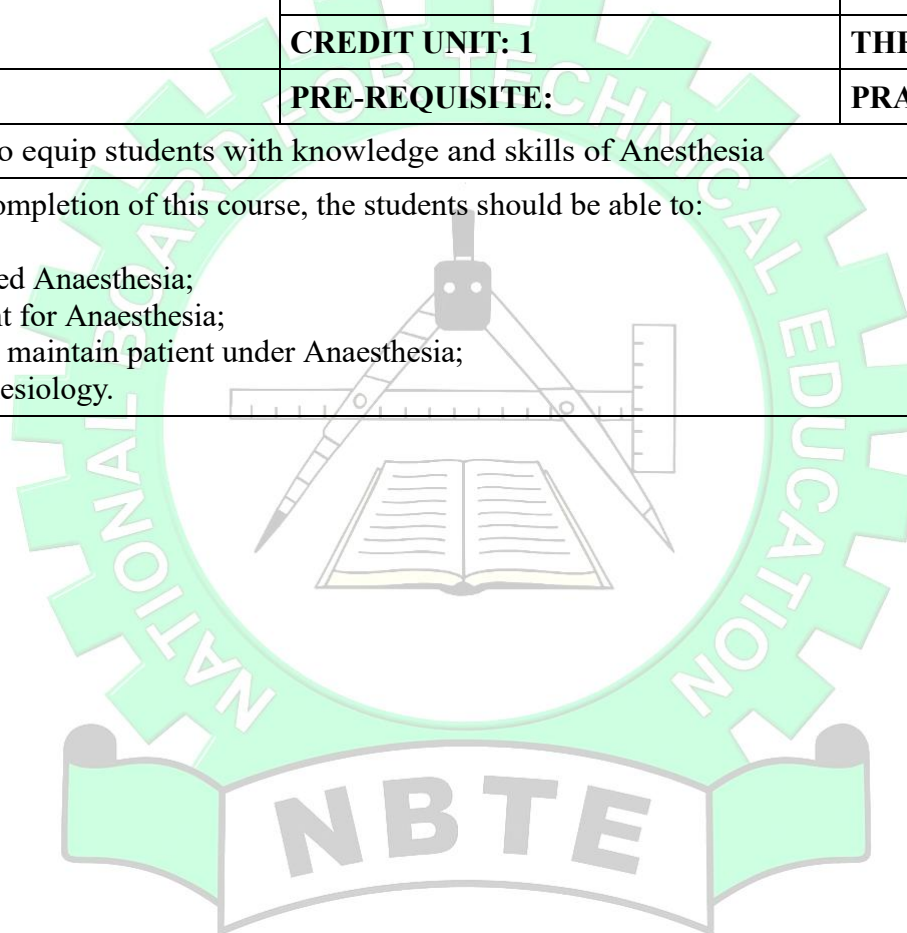
	charts and records 5.2 Explain dental imaging archiving 5.3 Describe dental treatment planning 5.4 Describe client communication and consent	records • Explain dental imaging archiving • Describe dental treatment planning • Explain client communication and consent	records manuals, LCD projector	charts for 10 patients • Archive dental imaging in PACS • Develop dental treatment plans for 5 cases • Communicate findings to end users • Obtain informed consent	• Maintain dental charts for 10 patients • Archive dental imaging in PACS • Develop dental treatment plans for 5 cases • Communicate findings to end users • Obtain informed consent	PACS, treatment plan templates, consent forms
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (ANAESTHESIOLOGY OPTION) - SEMESTER I

INTRODUCTION TO ANAESTHESIOLOGY AND DIGITAL MONITORING

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: INTRODUCTION TO ANAESTHESIOLOGY	COURSE CODE: VLA 411	CONTACT HOURS: 1 HOUR/WEEK
	CREDIT UNIT: 1	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 0 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of Anesthesia		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know Anaesthesia; 2.0 Understand why patients need Anaesthesia; 3.0 Know how to prepare patient for Anaesthesia; 4.0 Know how to recognize and maintain patient under Anaesthesia; 5.0 Understand clinical Anaesthesiology.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: INTRODUCTION TO ANAESTHESIOLOGY				COURSE CODE: VLA 411		CONTACT HOURS: 1 HOUR/WEEK
				CREDIT UNIT: 1		THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I				PRE-REQUISITE:		PRACTICAL: 0 HOUR/WEEK
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of Anesthesia						
General Objective: 1.0: Know Anaesthesia						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define anaesthesia 1.2 Explain how anaesthesia is achieved 1.3 Describe types of anaesthesia	• Explain anaesthesia • Explain how anaesthesia is achieved • Discuss types of anaesthesia	Textbooks Journals Sketches Internet			
General Objective: 2.0: Know why patients need anaesthesia						
4-6	2.1 Explain why a patient will need anaesthesia 2.2 State examples of indication for anaesthesia in animals 2.3 Describe various types and form of	• Explain why a patient need anaesthesia • Discuss examples of indication for anaesthesia in animals • Explain various types and form of anaesthesia	Textbooks Journals Sketches Internet			

	anaesthesia					
General Objective: 3.0 Know how to prepare patient for anaesthesia						
7-9	3.1 Describe why patient shall be prepared for anaesthesia 3.2 Explain how patient shall be prepared 3.3 List the requirement for patient preparation	• Explain why patient shall be prepared for anaesthesia • Explain how patient shall be prepared • Discuss the requirement for patient preparation	Textbooks Journals Sketches Internet			
General Objective: 4.0 Know how to recognize and maintain patient under anaesthesia						
10-12	4.1 Describe the stages and manifestations of anaesthesia 4.2 Explain how to confirm patient under anaesthesia. 4.3 Explain how to recognize patient recovering from anaesthesia. 4.4 Describe how to confirm recovery from anaesthesia	• Discuss the stages and manifestations of anaesthesia • Explain how to confirm patient under anaesthesia. • Explain how to recognize patient recovering from anaesthesia. • Explain how to confirm recovery from anaesthesia	Textbooks Journals Sketches Internet			
General Objective: 5.0 Understand clinical anaesthesiology						
13-15	5.1 Define clinical anaesthesiology	• Explain clinical anaesthesiology	Textbooks Journals			

	5.2 Explain the clinical use of anaesthesia in therapy 5.3 List conditions where clinical anaesthesia is indicated	• Discuss the clinical use of anaesthesia in therapy • Explain conditions where clinical anaesthesia is indicated	Sketches Internet			
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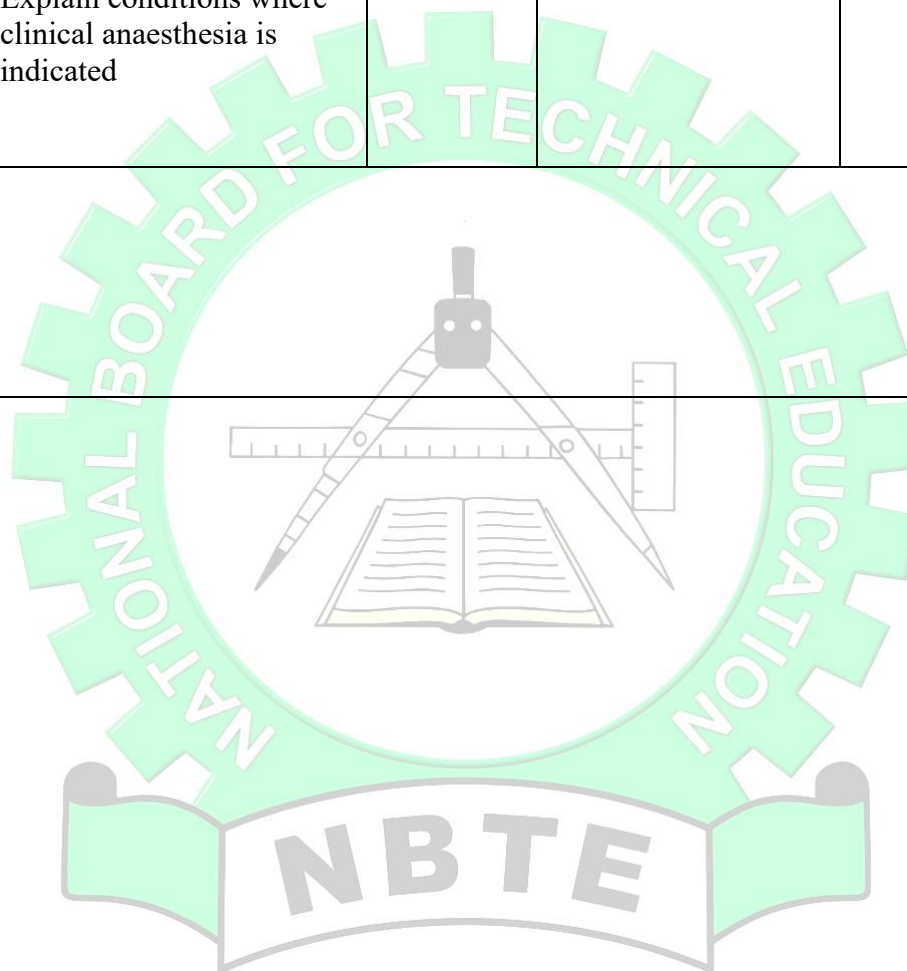
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

Practical 40%

Examination 40% = 100%



ANESTHETIC INSTRUMENTATION AND EQUIPMENT MAINTAINANCE

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANESTHETIC INSTRUMENTATION	COURSE CODE: VLA 412	CONTACT HOURS: 4 HOUR/WEEK
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of anesthetic equipment		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know types of inhalation anesthetic equipment; 2.0 Know ancillary equipment to inhalation anesthetic equipment; 3.0 Know parts and functions of inhalation anesthetic equipment; 4.0 Understand how inhalation anesthetic machine works; 5.0 Understand maintenance and management of anaesthesia unit		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANESTHETIC INSTRUMENTATION			COURSE CODE: VLA 412		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of anesthetic equipment						
General Objective: 1.0 Know the types of anesthetic equipment						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain types of anesthetic machines 1.2 know the different categories of the anesthetic equipment 1.3 Explain the function and functionality of the anesthesia workstation	• Explain types of anesthetic machines • Discuss the different categories of the anesthetic equipment • Explain the function and functionality of the anesthesia workstation	Textbooks Journals PowerPoint's Charts	• Identify features of various types of anesthetic machine • Carry out the operationally of an anesthetic unit	Guide students to: • Identify features of various types of anesthetic machine • Carry out the operationally of an anesthetic unit	Anesthetic Unit
General Objective: 2.0. Know ancillary equipment's in inhalation anesthetic machine						
4-6	2.1 List the ancillary equipment's in an anesthetic machine: i. Airway management tools,	• Explain the ancillary equipment's in an anesthetic machine: - Airway management	Textbooks PowerPoint Pictures Charts	• Identify the ancillary equipment in anesthetic	Guide studetns to: • Identify the ancillary equipment in anesthetic machines.	Ancillary equipment e.g. oxymeter ECG Esophageal

	ii. Patient monitors iii. Regional anesthesia kits 2.2 Describe the importance of all ancillary components for an anaesthetic unit 2.3 Explain the function and functionality of the ancillary components	tools, - Patient monitors - Regional anesthesia kits • Discuss the importance of all ancillary components for an anaesthetic unit • Explain the function and functionality of the ancillary components		machines. • Demonstrate the operability of the ancillary equipment	• Demonstrate the operability of the ancillary equipment	
General Objective: 3.0 Know parts and functions of anesthetic machines						
7-9	3.1 Describe parts of anesthetic units 3.2 Describe the functions of the parts of anesthetic workstation 3.3 Explain the operability of an anaesthetic workstation or machine	• Discuss parts of anesthetic units • Explain the functions of the parts of anesthetic workstation • Explain the operability of an anaesthetic workstation or machine	Textbooks PowerPoint	• Identify parts of anesthetic machine • Demonstrate functionality of the various parts of anaesthetic workstation	Guide students to: • Identify parts of anesthetic machine • Demonstrate functionality of the various parts of anaesthetic workstation	Anesthetic workstation Anaesthetic agents
General Objective: 4.0 understand how anesthetic machine works						
10-12	4.1 Explain how gas anesthesia machine works	• Explain how gas anesthesia machine	Journals Prepared slides Textbooks	• Operate an anesthetic machine	Guide students to: • Demonstrate how the	Gas anesthetic machine/workstation

	4.2 Describe how the anaesthesia unit works: the workstation and ancillary equipment 4.3 Explain common anaesthesia unit operational problems and how to resolve them	works • Discuss how the anaesthesia unit works: the workstation and ancillary equipment • Explain common anaesthesia unit operational problems and how to resolve them	Charts	works • Troubleshoot common problems of operating anaesthesia units	anesthetic machine works • Troubleshoot common problems of operating anaesthesia units	Equipment manual and guide Handy tools
General Objective: 5.0 Understand maintenance and management of anaesthesia unit						
13-15	5.1 Explain maintenance and care for anaesthesia equipment 5.2 Explain how to management an anaesthesia unit (workstation and ancillary equipment) 5.3 Describe safety measures and risks associated with operating anaesthesia unit	• Explain maintenance and care for anaesthesia equipment • Explain how to management an anaesthesia unit (workstation and ancillary equipment) • Describe safety measures and risks associated with operating anaesthesia unit	Journals, Prepared slides Textbooks Chart	• Carry out basic care and Maintenance checks on anaesthesia units	• Guide studentns to: • Demonstrate basic care and maintenance checks on anaesthesia units	Anaesthesia workstation and ancillary equipment Cleaning tools and agents Handy tools

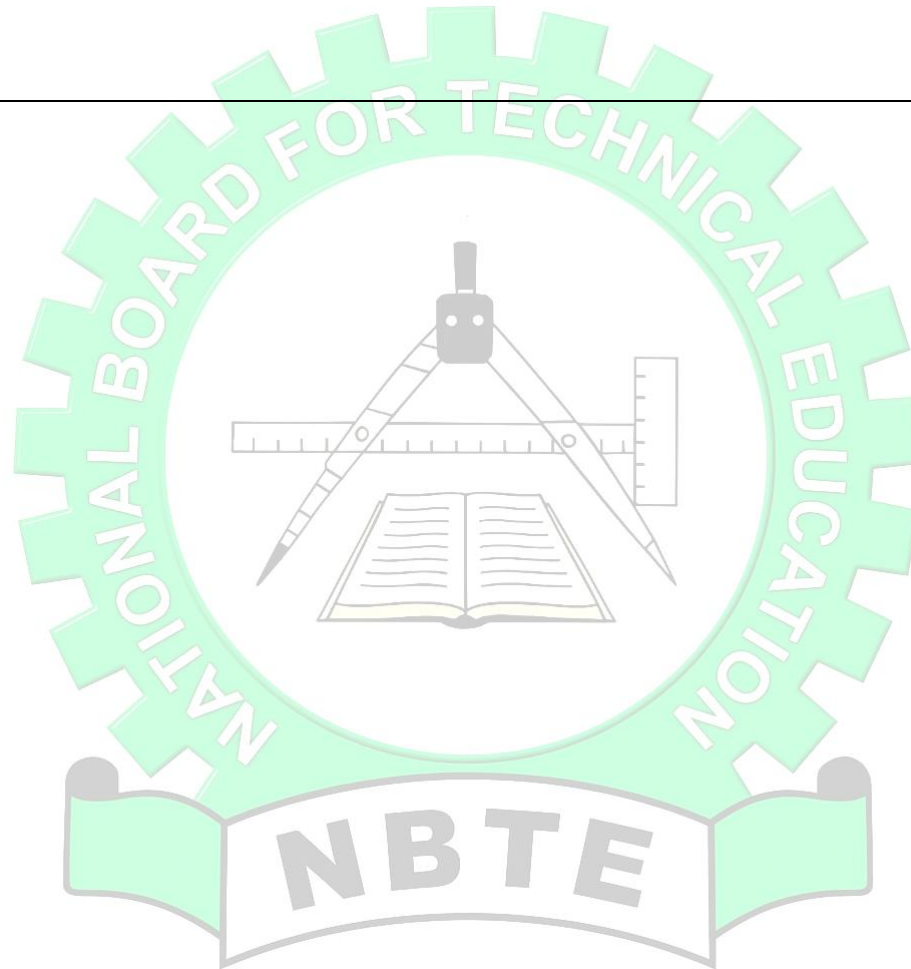
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

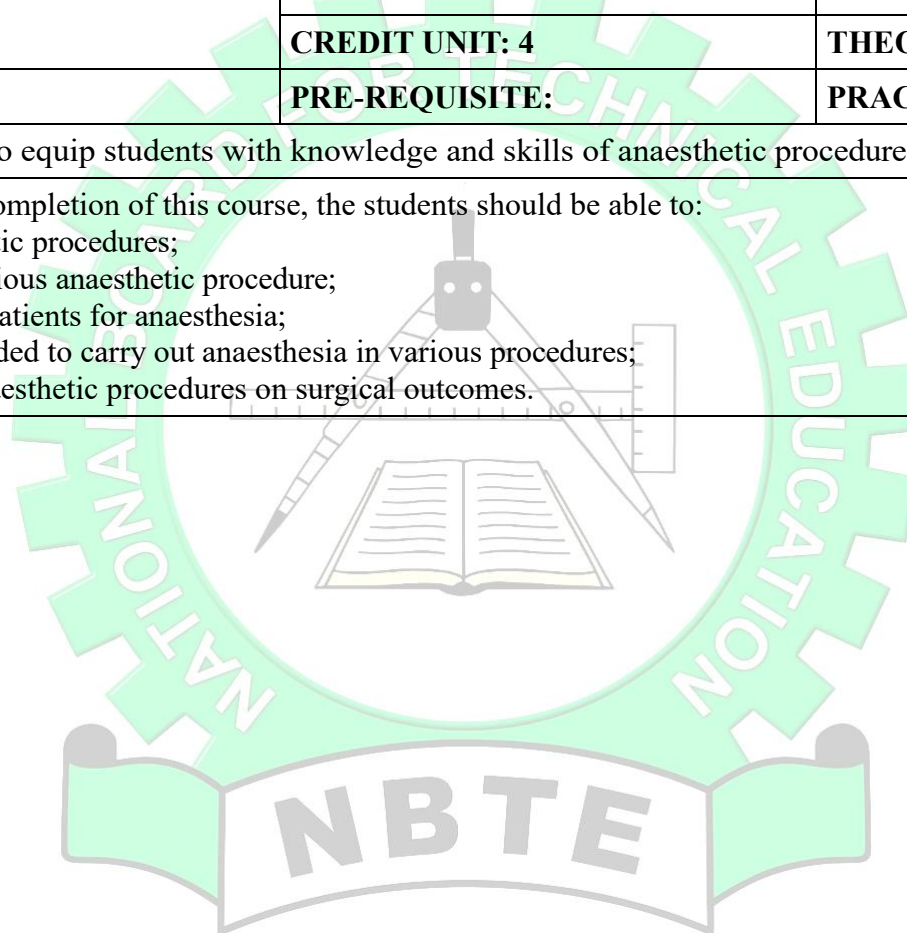
Practical 40%

Examination 40% = 100%



ANESTHETIC PROCEDURES AND LABORATORY SUPPORT

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANESTHETIC PROCEDURES AND LABORATORY SUPPORT	COURSE CODE: VLT 413	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOURS/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of anaesthetic procedures		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the types of anaesthetic procedures; 2.0 Know the indication for various anaesthetic procedure; 3.0 Understand preparation of patients for anaesthesia; 4.0 Know the type of drugs needed to carry out anaesthesia in various procedures; 5.0 Understand the effect of anaesthetic procedures on surgical outcomes.		



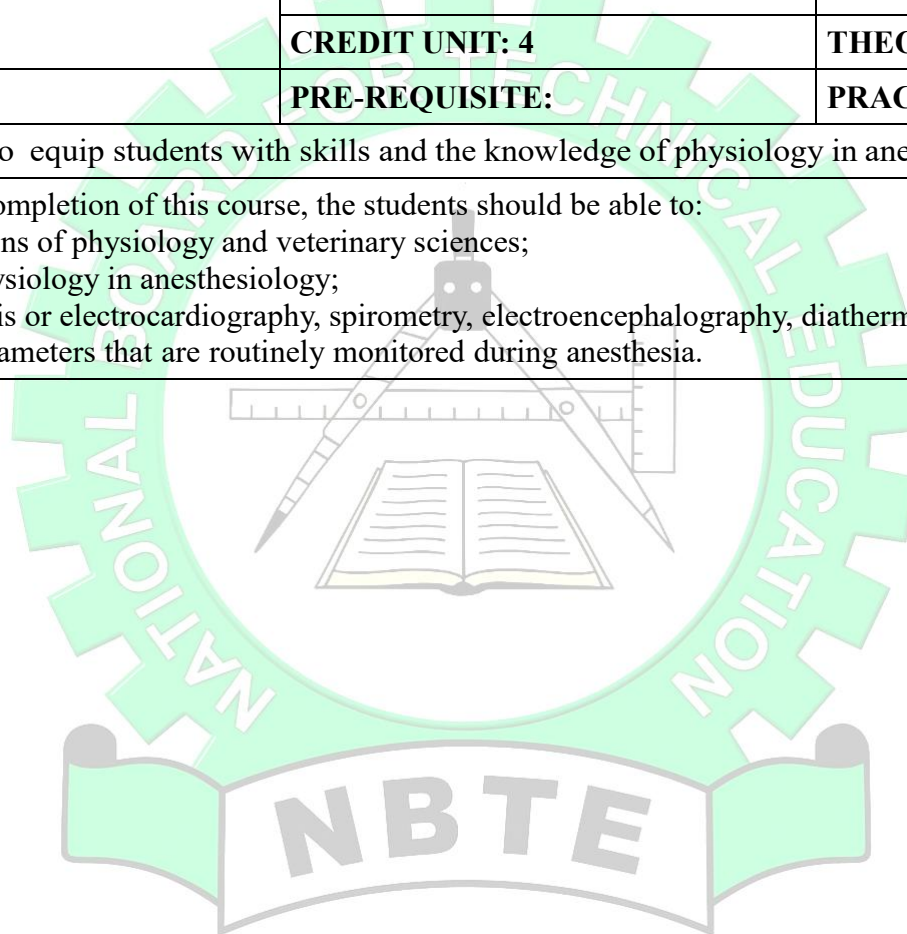
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANESTHETIC PROCEDURES AND LABORATORY SUPPORT			COURSE CODE: VLT 413		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOURS/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of anaesthetic procedures						
General Objective: 1.0: Know types of Anaesthetic Procedures						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Mention the various types of Anaesthetic procedures 1.2 Explain reasons for each anaesthetic procedure 1.3 Describe the requirements and steps for each type of anaesthetic procedure	• Explain the various types of Anaesthetic procedures • Explain reasons for each anaesthetic procedure • Discuss the requirements and steps for each type of anaesthetic procedure	Textbooks PowerPoint, charts, Journals,	• Carry out specific anaesthetic procedures • Identify the conditions for specific anaesthetic procedures	Guide students to: • Carry out specific anaesthetic procedures • Identify the conditions for specific anaesthetic procedures	Anaesthetic units, anaesthetic agents, animal, restraint materials, PPE,
General Objective:2.0: Know indications for various anaesthetic procedures						
4-6	2.1 Mention factors/rationale for choice of various anaesthetic	• Discuss factors/rationale for choice of various anaesthetic	Textbooks PowerPoint, charts, Journals,			

	procedure 2.2 List indications that influence the choice of anaesthesia 2.3 Explain special conditions that warrant anaesthetic procedure modification	procedure • Explain indications that influence the choice of anaesthesia • Explain special conditions that warrant anaesthetic procedure modification				
General Objective:3.0: Understand preparations of patient for anaesthesia						
7-9	3.1 Explain anaesthetic patient preparation (pre-anaesthesia) 3.2 Describe anaesthetic initiation and maintenance 3.3 Describe post-anaesthetic recovery and patient resuscitation	• Explain anaesthetic patient preparation (pre-anaesthesia) • Discuss anaesthetic initiation and maintenance • Explain post-anaesthetic recovery and patient resuscitation	Textbooks, PowerPoint, charts, white board, internet, journals			
General Objective:4.0: Know the types of drugs needed to carry out anaesthesia						
10-12	4.1 Mention the classes of drugs used for anaesthesia: sedatives, tranquilizers hypnotics 4.2 List injectable agents	• Discuss the classes of drugs used for anaesthesia: sedatives, tranquilizers hypnotics • Explain injectable agents	Textbook Power point Journals	• Identify all types of classes of drugs • Identify volatile agents • Identify gaseous agents	Guide students to: • Identify all types of classes of drugs • Identify volatile agents • Identify gaseous agents	Anaesthetic drugs

	4.3 List volatile agents 4.4 List gaseous agents	• Discuss volatile agents • Explain gaseous agents				
General Objective:5.0: Understand the effect of anaesthetic procedures on surgical outcomes						
13-15	5.1 Explain how anaesthetic procedures influence the surgical status of the patient 5.2 Define the surgical team 5.3 Explain the roles and relationship of the members of the surgical team 5.4 State the role or influence of anaesthesia pre-, peri-, and post-surgical	• Explain how anaesthetic procedures influence the surgical status of the patient • Discuss the surgical team and explain the roles and relationship of the members of the surgical team • Explain the role or influence of anaesthesia pre-, peri-, and post-surgical	Teaching aids such as; Textbooks Power Point, charts, white board, internet, journals			
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

APPLIED PHYSIOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: APPLIED PHYSIOLOGY	COURSE CODE: VLT 414	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with skills and the knowledge of physiology in anesthetic management		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the various applications of physiology and veterinary sciences; 2.0 Know the application of physiology in anesthesiology; 3.0 Know the physiological basis or electrocardiography, spirometry, electroencephalography, diathermy etc; 4.0 Know the physiological parameters that are routinely monitored during anesthesia.		

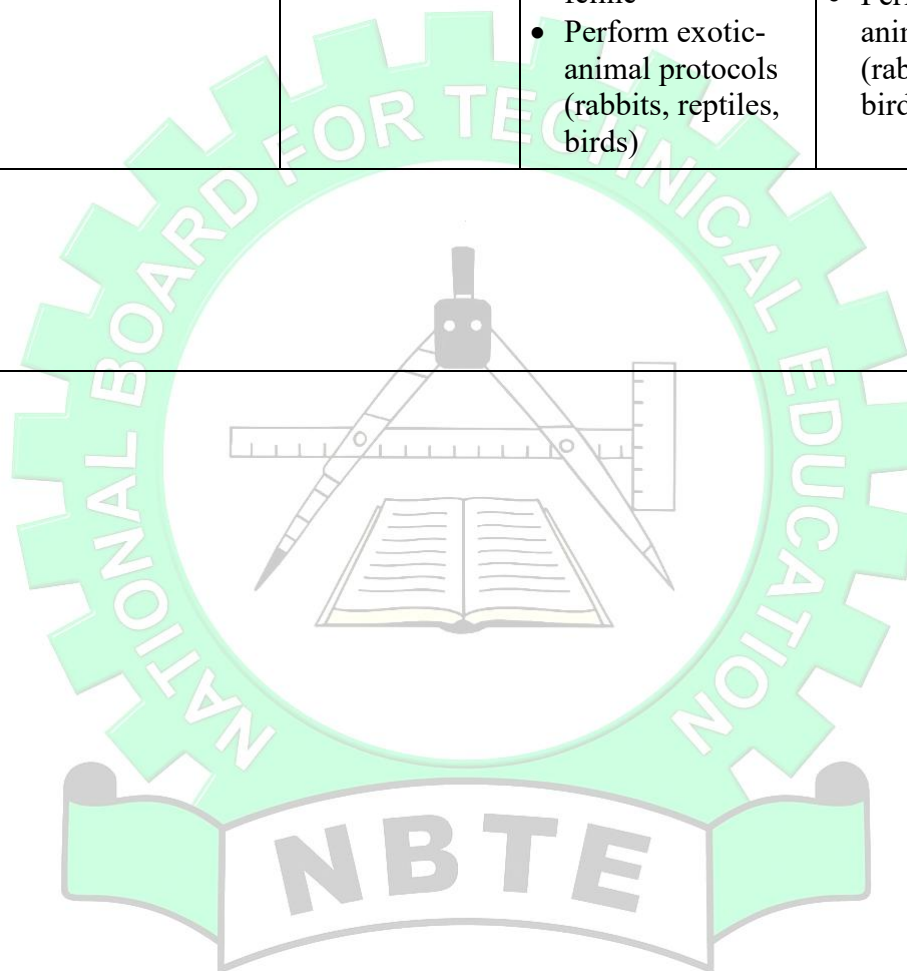


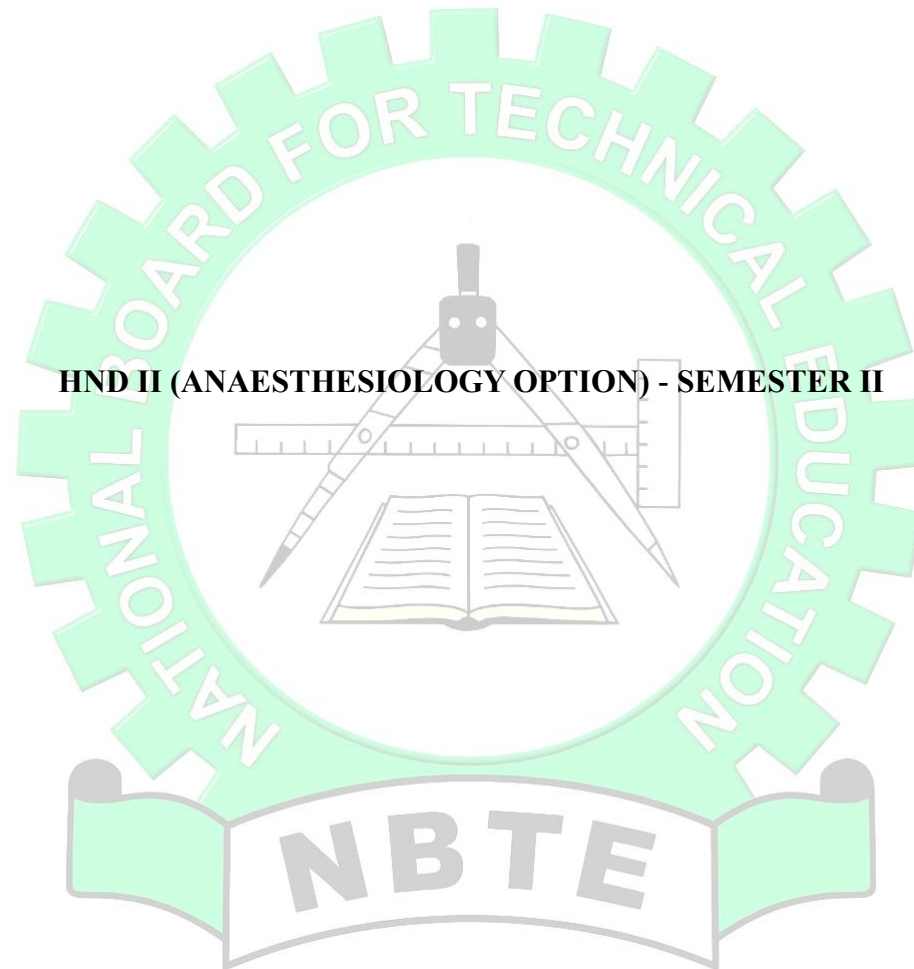
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: APPLIED PHYSIOLOGY			COURSE CODE: VLT 415		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOURS/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with skills and the knowledge of physiology in anesthetic management						
General Objective: 1.0 Know the various application of physiology and veterinary sciences						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain applied physiology. 1.2 Explain the applications of physiology to veterinary sciences. 1.3 Explain the physiology of blood, body fluids and electrolytes.	- Explain applied physiology. - Explain the applications of physiology to veterinary sciences. - Explain the physiology of blood, body fluids and electrolytes.	Textbooks Journals Internet Pictures Posters	Demonstrate electric activity of the heart, smooth and skeletal muscles.	Guide students to: Demonstrate electric activity of the heart, smooth and skeletal muscles.	kymographs Physiographs Reagents Etc.
General Objective: 2.0 Know the application of physiology in anesthesiology.						
4-6	2.1 Explain the role of physiology in anesthetic management. 2.2 Describe	- Explain the role of physiology in anesthetic management. - Explain monitoring	Textbooks Journals Internet Pictures Posters	- Measure vital signs (pulse, respiration, temperature). - Monitor	Guide studetns to: - Measure vital signs (pulse, respiration, temperature). - Monitor physiological	Anesthesia machine/model. Vital signs monitoring equipment.

	monitoring of vital body functions during anesthesia. 2.3 Explain physiological responses to anesthetic agents. 2.4 Explain the differences in the physiology of various species in administration and management of anesthesia	of vital body functions during anesthesia. • Discuss physiological responses to anesthetic agents. • Explain the differences in the physiology of various species in administration and management of anesthesia		physiological parameters during simulated anesthesia. • Interpret physiological changes associated with anesthesia.	parameters during simulated anesthesia. • Interpret physiological changes associated with anesthesia.	Laboratory animals/mannequins and physiology charts.
General Objective: 3.0 Know the physiological basis of electrocardiography, spirometry, etc						
7-9	3.1 Explain the physiological basis conducting medical assessments such as electrocardiography, spirometry etc. 3.2 Explain the implications of abnormalities in electrocardiography, spirometry, etc on anesthetic management. 3.3 Explain some basic troubleshooting of	• Explain the physiological basis conducting medical assessments such as electrocardiography, spirometry etc. • Explain the implications of abnormalities in electrocardiography, spirometry, etc on anesthetic management. • Explain some basic	Textbooks Journals Internet Pictures Posters	• Compare readings of normal ECG, spirometry etc with abnormal reading • Interpret the readings and its implications. • Carry out basic troubleshooting skills.	Guide students to: • Compare readings of normal ECG, spirometry etc with abnormal reading • Interpret the readings and its implications. • Carry out basic troubleshooting skills.	Anesthesia machine/model. Vital signs monitoring equipment. Laboratory animals/mannequins and physiology charts.

	common equipment	troubleshooting of common equipment				
General Objective: 4.0 Know the physiological parameters that are routinely monitored during anesthesia.						
10-12	4.1 Explain the physiological parameters that are routinely taken during anesthesia. 4.2 Explain the reason physiological parameters taken are important in anesthesia. 4.3 List the equipment's that are used in taking vital parameters.	• Explain the physiological parameters that are routinely taken during anesthesia. • Explain the reason physiological parameters taken are important in anesthesia. • Discuss the equipment's that are used in taking vital parameters.	Textbooks Journals Internet Pictures Posters	• Identify the equipment used in taking vital parameters. • Use the equipment	Guide students to: • Identify the equipment used in taking vital parameters. • Use the equipment	Thermometer Stethoscope BP monitor Anesthetic monitor. Diathermy machine.
GENERAL OBJECTIVE 5.0: Understand species-specific physiology						
13-15	5.1 Know ruminant anaesthetic physiology 5.2 Describe equine anaesthetic physiology 5.3 Describe small-animal physiology 5.4 Know exotic animal physiology	• Explain ruminant anaesthetic physiology • Discuss equine anaesthetic physiology • Explain small-animal physiology • Discuss exotic animal physiology	Species physiology textbooks, LCD projector	• Carry out ruminant-specific anaesthetic adjustments (rumen, regurgitation) • Perform equine-specific protocols (large mass, anti-myopathy) • Carry out small-	Guide students to: • Carry out ruminant-specific anaesthetic adjustments (rumen, regurgitation) • Perform equine-specific protocols (large mass, anti-myopathy) • Carry out small-animal protocols	Multi-species animals, species-specific protocols

				animal protocols across canine and feline • Perform exotic-animal protocols (rabbits, reptiles, birds)	across canine and feline • Perform exotic-animal protocols (rabbits, reptiles, birds)	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

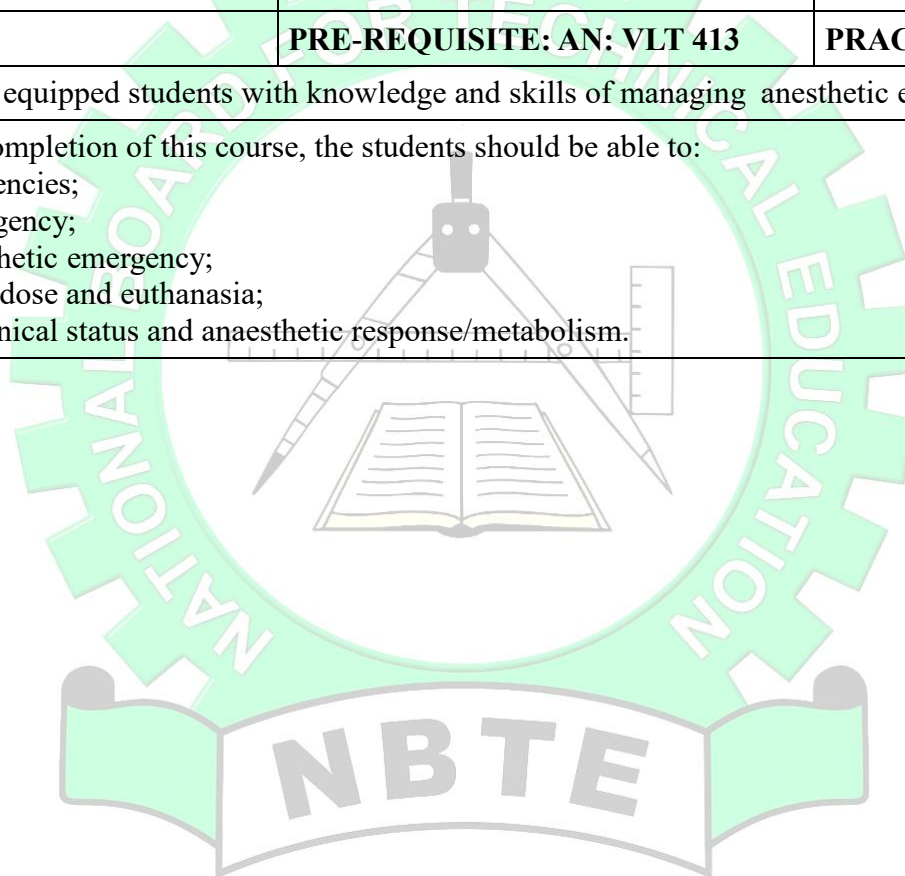




HND II (ANAESTHESIOLOGY OPTION) - SEMESTER II

ANESTHETIC EMERGENCIES AND CLIMATE STRESS ANAESTHESIA

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANESTHETIC EMERGENCIES AND CLIMATE STRESS ANAESTHESIA	COURSE CODE: VLA 421	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE: AN: VLT 413	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equipped students with knowledge and skills of managing anesthetic emergencies		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know about medical emergencies; 2.0 Understand anesthetic emergency; 3.0 Know how to manage anesthetic emergency; 4.0 Understand anaesthetic overdose and euthanasia; 5.0 Know the relationship of clinical status and anaesthetic response/metabolism.		



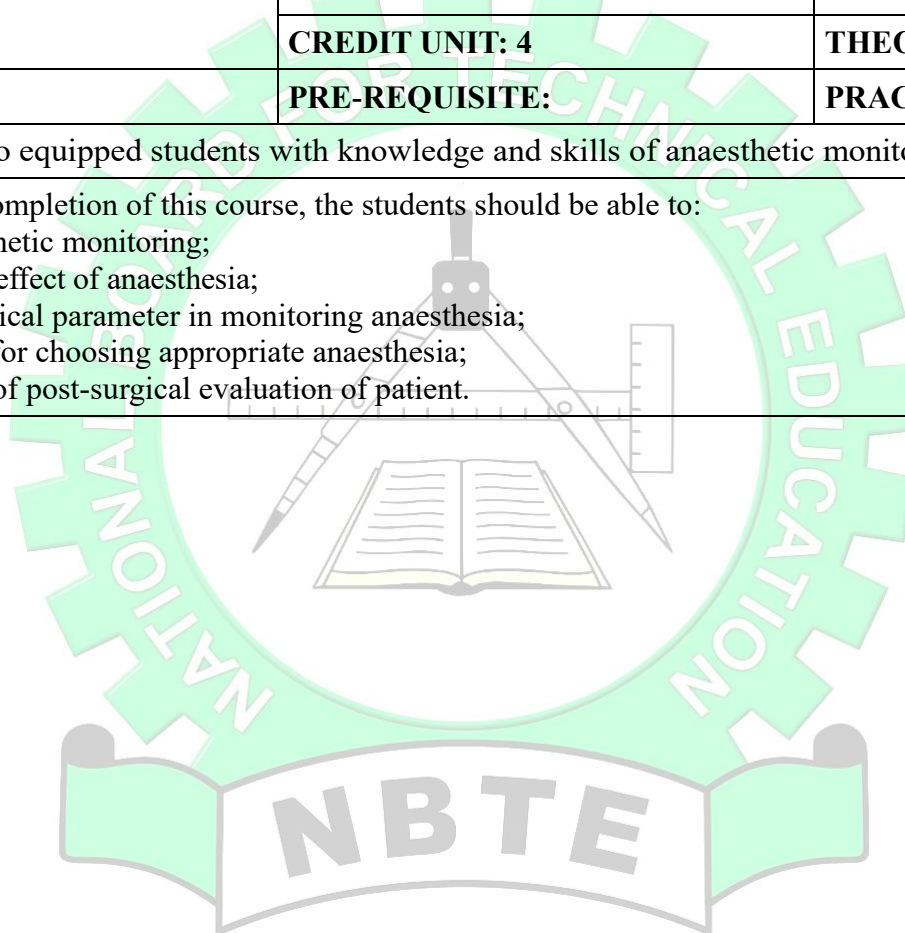
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANESTHETIC EMERGENCIES AND CLIMATE STRESS ANAESTHESIA			COURSE CODE: VLA 421		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equipped students with knowledge and skills of managing anesthetic emergencies						
General Objective 1.0: Know about medical emergencies						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define medical emergency 1.2 Give examples of medical emergencies 1.3 Explain how to recognize medical emergencies	• Explain medical emergency • Discuss examples of medical emergencies • Explain how to recognize medical emergencies	Text Books Journals Periodicals Internet Posters Charts			
General Objective 2.0: Understand anesthetic emergency						
4-6	2.1 Define anesthetic emergency 2.2 Give examples of anesthetic emergencies 2.3 Explain the various types of anesthetic emergency	• Explain anesthetic emergency • Discuss examples of anesthetic emergencies • Explain the various types of anesthetic	Text Books Journals Periodicals Internet Posters Charts	• Identify facilities use in monitoring anesthetic emergency • Demonstrate how to use anesthetic emergency	Guide students to: • Identify facilities use in monitoring anesthetic emergency • Demonstrate how to use anesthetic emergency monitoring	Pulse oximeter ECG Esophageal BP monitor Manometer Thermometer

	2.4 Explain how to recognize anesthetic emergency	• emergency • Explain how to recognize anesthetic emergency		monitoring facilities	facilities	
General Objective 3.0: Know how to manage anesthetic emergency						
7-9	3.1 Explain how anesthetic emergencies are managed 3.2 Explain various steps and options in management of anesthetic emergencies 3.3 List and explain function(s) of equipment use in anesthetic emergency	• Explain how anesthetic emergencies are managed • Explain various steps and options in management of anesthetic emergencies • Explain function(s) of equipment use in anesthetic emergency	Text Books Journals Periodicals Internet Posters Charts	• Identify equipment use for managing anesthetic emergency	Guide students to: • Identify equipment use for managing anesthetic emergency	Ventilator Suction machine CNS/CUS Drugs Blankets e.t.c
General Objective 4.0: Understand anaesthetic overdose and euthanasia						
10-12	4.1 Define anaesthetic overdose 4.2 Define the concept of euthanasia 4.3 List and explain the function of drug use in anesthetics emergencies	• Explain anaesthetic overdose • Explain the concept of euthanasia • Discuss the function of drug use in anesthetics emergencies	Textbooks Journals Periodicals Internet Posters Charts			
General Objective 5.0: Know the relationship of clinical status and anaesthetic response/metabolism						

13-15	5.1 Mention clinical states that affect anaesthetic response 5.2 Explain the importance of clinical status on metabolism of anaesthetic agents 5.3 List the clinical conditions that negatively affect anaesthetic drug metabolism	• Discuss clinical states that affect anaesthetic response • Explain the importance of clinical status on metabolism of anaesthetic agents • Explain the clinical conditions that negatively affect anaesthetic drug metabolism	Textbooks Journals Periodicals Internet Posters Charts		
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%					

ANAESTHETIC MONITORING AND EVALUATION

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANAESTHETIC MONITORING AND EVALUATION	COURSE CODE: VLA 422	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equipped students with knowledge and skills of anaesthetic monitoring		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the concept of anaesthetic monitoring; 2.0 Understand how to monitor effect of anaesthesia; 3.0 Know how to interpret clinical parameter in monitoring anaesthesia; 4.0 Conduct patient evaluation for choosing appropriate anaesthesia; 5.0 Understand the importance of post-surgical evaluation of patient.		



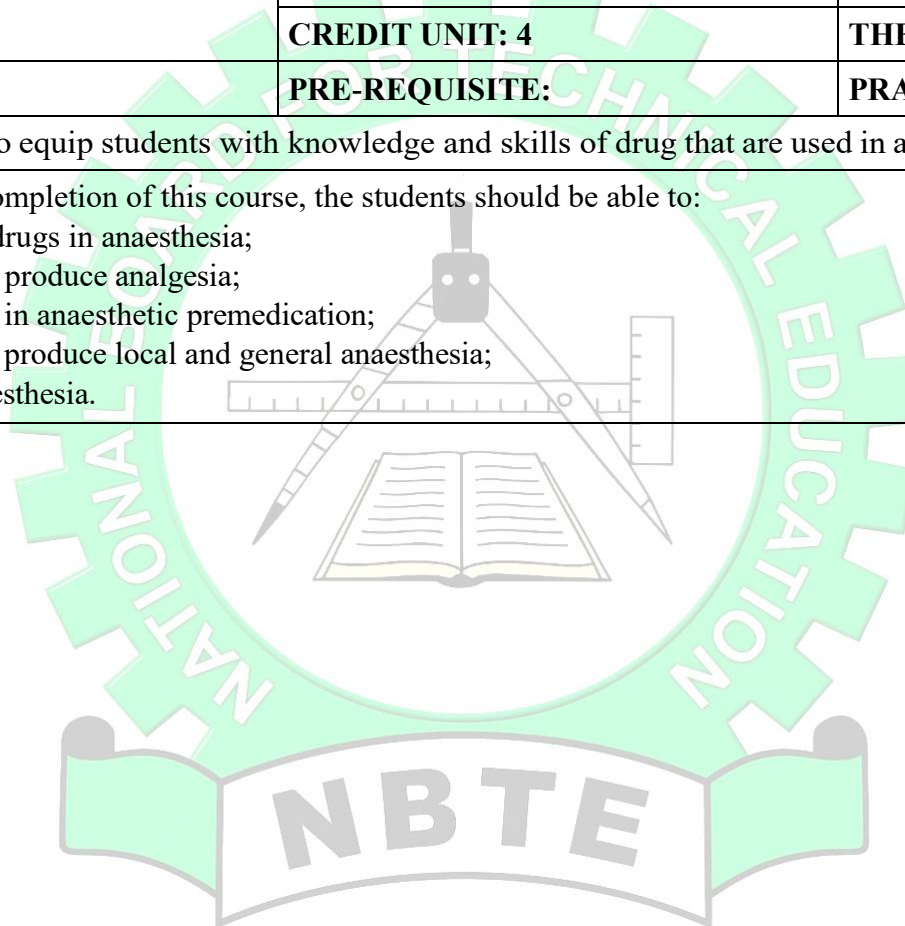
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANAESTHETIC MONITORING AND EVALUATION			COURSE CODE: VLA 422		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equipped students with knowledge and skills of anaesthetic monitoring						
General Objective:1.0: Know the concept of anaesthetic monitoring						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain the concept of monitoring anaesthesia 1.2 Explain why anaesthesia needs to be monitored 1.3 List some of the equipment needed for monitoring anaesthesia	• Explain the concept of monitoring anaesthesia • Explain why anaesthesia needs to be monitored • Discuss some of the equipment needed for monitoring anaesthesia	Textbooks, Journal, Internet posters	• Identify the equipment used for anaesthetic monitoring	Guide students to: • Identify the equipment used for anaesthetic monitoring	Anaesthesia workstation and ancillary equipment
General Objective:2.0: Understand how to monitor effect of anaesthesia						
4-6	2.1 Explain how to conduct anaesthetic monitoring 2.2 Explain the functions of	• Explain how to conduct anaesthetic monitoring • Explain the functions of	Textbooks, Journal Internet posters Pictures	• Operate equipment used for anaesthetic monitoring • Identify the	Guide students to: • Operate equipment used for anaesthetic monitoring • Identify the parameter	Anaesthetic workstation and ancillary equipment t

	equipment used in anaesthetic monitoring 2.3 List the clinical parameters used for anaesthetic monitoring	equipment used in anaesthetic monitoring • Discuss the clinical parameters used for anaesthetic monitoring		parameter measured by each Equipment	measured by each equipment	
General Objective:3.0: Know how to interpret clinical parameter in monitoring anaesthesia						
7-9	3.1 Explain important clinical parameters used in anaesthetic monitoring 3.2 Describe the clinical parameters in relation to patient status and surgical procedure 3.3 Describe actionable measures to be taken in specific states manifested by the clinical parameters monitored	• Explain important clinical parameters used in anaesthetic monitoring • Discuss the clinical parameters in relation to patient status and surgical procedure • Explain actionable measures to be taken in specific states manifested by the clinical parameters monitored	Textbooks, Journal Internet posters, Picture			
General Objective:4.0: Conduct patient evaluation for choosing appropriate anaesthesia						
10-12	4.1 Define patient evaluation for anaesthesia 4.2 Explain the various tests used to	• Explain patient evaluation for anaesthesia • Explain the various tests used to	Textbooks, Journal, Internet posters, picture	• Carry out patient evaluation for anaesthesia selection	Guide students to: • Carry out patient evaluation for anaesthesia selection	Animal Patient, evaluation equipment

	evaluate patients for anaesthesia selection 4.3 Describe step by step measures for evaluating patients in specific conditions for anaesthesia selection	evaluate patients for anaesthesia selection • Discuss step by step measures for evaluating patients in specific conditions for anaesthesia selection				
General Objective:5.0: Understand the importance of post-surgical evaluation of patient						
13-15	5.1 Define post-surgical status 5.2 Explain the importance of anaesthesia on the patient post-surgically 5.3 Describe the measures for evaluating anaesthesia patient status post-surgical	• Explain post-surgical status • Explain the importance of anaesthesia on the patient post-surgically • Discuss the measures for evaluating anaesthesia patient status post-surgical	Textbooks, Journal, Internet posters, picture	• Demonstrate patient evaluation for anaesthesia post surgically	Guide students to: • Demonstrate patient evaluation for anaesthesia post surgically	Animal patient, Evaluation equipment
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

NEUROPHARMACOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: NEUROPHARMACOLOGY I	COURSE CODE: VLA 423	CONTACT HOURS: 4 HOUR/WEEK
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 3 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of drug that are used in anesthesia		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the concept of using drugs in anaesthesia; 2.0 Know drugs that are used to produce analgesia; 3.0 Know drugs that are used in in anaesthetic premedication; 4.0 Know drugs that are used to produce local and general anaesthesia; 5.0 Know stages of general anaesthesia.		

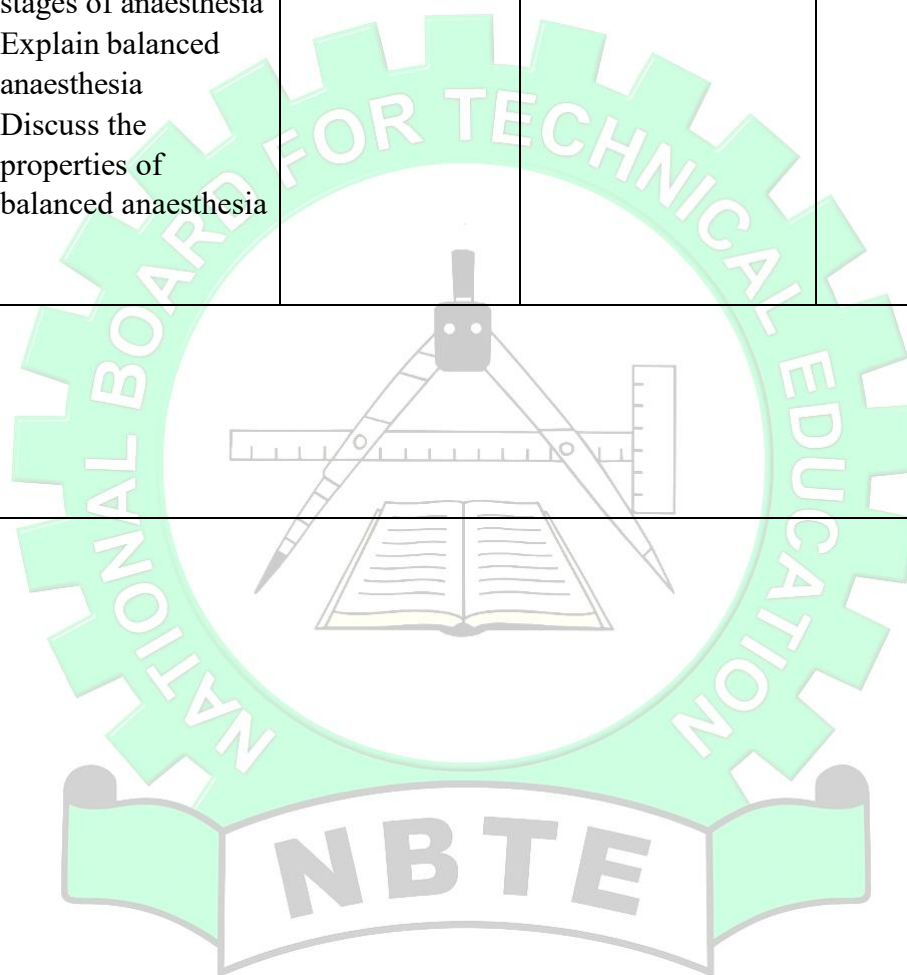


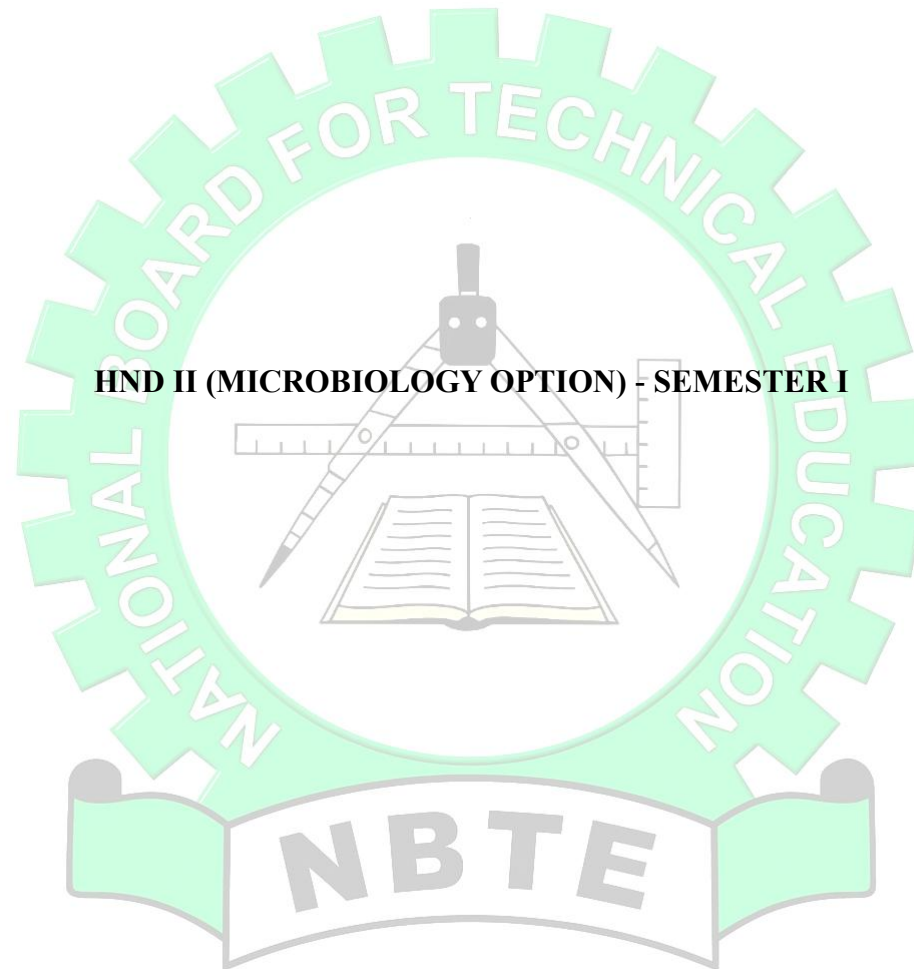
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: NEUROPHARMACOLOGY I			COURSE CODE: VLA 423		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 3 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of drug that are used in anesthesia						
General Objective 1.0: Know the general concept of using drugs in anaesthesia						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain the concept of anaesthesia and the types 1.2 Explain the historical antecedent of use of drugs in achieving anaesthesia 1.3 Explain the current trends on drug use in anaesthesia	- Explain the concept of anaesthesia and the types - Discuss the historical antecedent of use of drugs in achieving anaesthesia - Explain the current trends on drug use in anaesthesia	Textbooks Journals Internet			
General Objective2.0: Know drugs that are used to produce analgesia						
4-6	2.1 Explain anaesthesia and analgesia 2.2 Explain and	- Explain anaesthesia and analgesia - Explain and	Textbooks Journals Internet	Identify analgesia effect and properties of	Guide students to: Identify Analgesia effect and properties	Rats NSAID Narcotic Analgesic

	differentiate between narcotic, non analgesic and narcotic antagonist 2.3 List some examples of analgesics and species in which they are used 2.4 Explain the uses of various analgesics and narcotic antagonists	differentiate between narcotic, non analgesic and narcotic antagonist • Explain some examples of analgesics and species in which they are used • Explain the uses of various analgesics and narcotic antagonists		selected narcotic and non narcotic analgesia in rats	of selected narcotic and non narcotic analgesia in rats	Syringes& Needles Analgesic Equipment
General Objective 3.0: Know drugs that are used to produce anaesthetic premedication						
7-9	3.1 Define premedication and rationale for premedication 3.2 Mention types of drugs used in premedication (sedative, muscle relax analgesics and atropinization) 3.3 Explain current trend in premedication (use of xylazine) with atropinization	• Explain premedication and rationale for premedication • Discuss types of drugs used in premedication (sedative, muscle relax analgesics and atropinization) • Explain current trend in premedication (use of xylazine) with	Textbooks Journals Internet	• Identify various drugs used in premedication • Determine the effect of xylazine on a named animal species	• Guide students to: • Identify various drugs used in premedication • Determine the effect of xylazine on a named animal species	Various groups of drugs used for premedication

		atropinization				
General Objective 4.0: Know drugs that are used to produce local and general anaesthesia						
10-12	4.1 Differentiate between local and general anaesthesia 4.2 List drugs that are used to produce local and general anaesthesia 4.3 Explain other approaches in the use of local and general anaesthetics 4.4 Explain the different classes of general anaesthetics 4.5 List examples of various classes of general anaesthetics 4.6 Explain the species in which each of the classes is indicated and its contraindication	• Differentiate between local and general anaesthesia • Discuss drugs that are used to produce local and general anaesthesia • Discuss other approaches in the use of local and general anaesthetics • Explain the different classes of general anaesthetics • Discuss examples of various classes of general anaesthetics • Explain the species in which each of the classes is indicated and its contraindication	Textbooks Journals Internet	• Determine anaesthetic effect of lignocaine and chloroform • Carry out effect of lower epidural administration of lignocaine in goats	Guide students to • Determine anaesthetic effect of lignocaine and chloroform • Carry out effect of lower epidural administration of lignocaine in goats	Lignocaine Chloroform Pin Cotton wool Hypodermic Syringes 23&21 Guage needle Razor blade Jar with cover Rat, rabbit Lignocaine Hypodermic Syrine 21guage Needle Goat Razor blade Soap
General Objective 5.0: Know stages of general anaesthesia						
13-15	5.1 Explain the various of stages of anaesthesia	• Discuss the various of stages of anaesthesia	Textbooks Journals Internet			

	5.2 Enumerate the properties of various stages of anaesthesia 5.3 Define balanced anaesthesia 5.4 Outline the properties of balanced anaesthesia	• Explain the properties of various stages of anaesthesia • Explain balanced anaesthesia • Discuss the properties of balanced anaesthesia				
COURSE ASSESSMENT: Course work 10 Test/Assignments 10% Practical 40% Examination 40% = 100%						





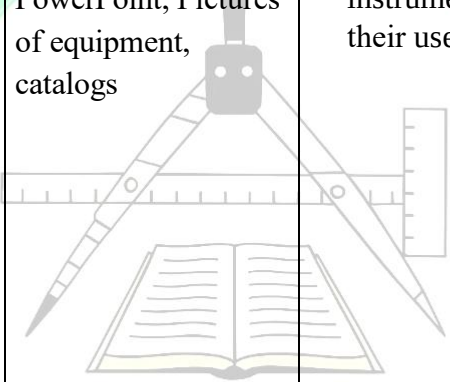
HND II (MICROBIOLOGY OPTION) - SEMESTER I

INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES	COURSE CODE: VLM 411	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course is designed to equip students with Knowledge and skills of microbiology instrumentation modernized with LIMS, automated PCR, automated ELISA readers, and digital microscopy addressing.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the various types instrument in microbiology laboratory; 2.0 Demonstrate the use of instrument in Bacteriology laboratory; 3.0 Demonstrate the use of instrument Virology laboratory; 4.0 Demonstrate the use of instrument Parasitology laboratory; 5.0 Demonstrate the use of instrument Mycology laboratory.		

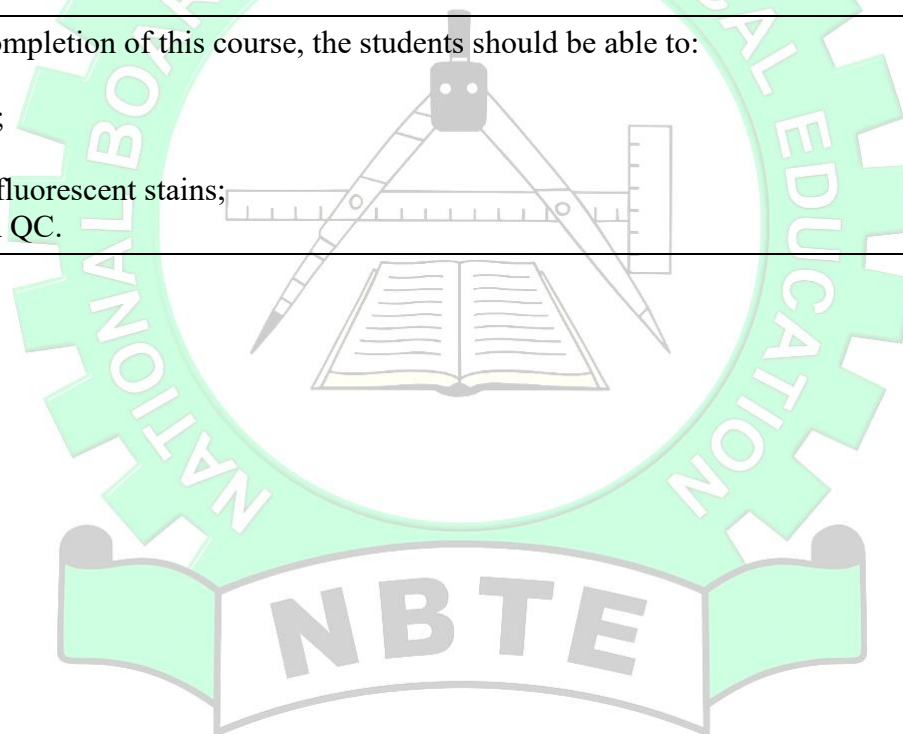
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: INSTRUMENTATION AND DIGITAL LABORATORY TECHNOLOGIES			COURSE CODE: VLM 411		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of microbiology instrumentation modernized with LIMS, automated PCR, automated ELISA readers, and digital microscopy addressing.						
GENERAL OBJECTIVE 1.0: Understand microbiology laboratory instrumentation						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Outline the instruments common to microbiology 1.2 Explain the uses of the various instruments 1.3 Describe the principle and mechanism of their functions	- Explain the various types of instruments and their mechanisms of actions - Explain the uses of the various instrument - Discuss the principle and mechanism of their functions	Textbooks, PowerPoint Pictures of equipment, Catalogs	Identify the instruments and their uses	Guide students to: Identify the instruments and their uses	Microscope, water bath, Centrifuge, incubator, autoclave, Mettler weigh balance,
GENERAL OBJECTIVE 2.0: Demonstrate the use of instrument in Bacteriology laboratory						
4-6	2.1 list specific	Discuss each	Textbooks,	Identify the	Guide students to:	Microscope, water

	instruments used in bacteriology laboratory 2.2 Explain the uses of each of the instruments 2.3 Explain the expected outcome of the use of the instruments	instrument used in bacteriology laboratory - Explain the uses of each of the instrument - Explain the expected outcome of the use of the instrument	PowerPoint, Pictures of equipment, catalogs	instruments and their uses	Identify the instruments and their uses	bath, Centrifuge, incubator, autoclave, Mettler weigh balance, wire loop, colony counter, Petri-dish, Bunsen burner.
GENERAL OBJECTIVE 3.0: Demonstrate the use of instrument Virology laboratory						
7-9	3.1 list specific instrument used in virology laboratory 3.2 Explain the uses of each of the instrument 3.3 Explain the expected outcome of the use of the instrument	- Discuss each instrument used in virology laboratory - Explain the uses of each of the instrument - Explain the expected outcome of the use of the instrument	Textbooks, PowerPoint, Pictures of equipment, catalogs	Identify the instruments and their uses	Guide students to: Identify the instruments and their uses	Gel, Vortex mixer, Magnetic stirrer, pipette, ELIZA machine, U Ph-meter Microscope, water bath, Centrifuge, incubator, autoclave, colony counter,
GENERAL OBJECTIVE 4.0: Demonstrate the use of instrument Parasitology laboratory						
10-12	4.1 list specific instruments used in parasitology laboratory 4.2 Explain the uses of each of the	- Explain each instruments used in parasitology laboratory - Explain the uses of each of the	Textbooks, PowerPoint, Pictures of equipment, catalogs	Identify the instruments and their uses	Guide students to: Identify the instruments and their uses	Microscope, water bath, Centrifuge, incubator, autoclave, Mettler, Beaman's

	instruments 4.3 Explain the expected outcome of the use of the instrument	instruments • Explain the expected outcome of the use of the instrument				apparatus, Petri-dish,
GENERAL OBJECTIVE 5.0: Demonstrate the use of instrument Mycology Laboratory						
13-15	5.1 list specific instruments used in mycology laboratory 5.2 Explain the uses of each of the instrument 5.3 Explain the expected outcome of the use of the instrument	- Discuss each instruments used in mycology laboratory - Explain the uses of each of the instrument - Explain the expected outcome of the use of the instrument	Textbooks, PowerPoint, Pictures of equipment, catalogs 	Identify the instruments and their uses	Guide students to: Identify the instruments and their uses	Lamina flow hood, still air box, Grow bag, Neubauer chamber, Microscope, water bath, Centrifuge, incubator, autoclave, Mettler weigh balance, wire loop, colony counter, Petri-dish,
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

CULTURE, MEDIA AND STAINING TECHNIQUES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: CULTURE, MEDIA AND STAINING TECHNIQUES	COURSE CODE: VLM 412	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of culture media preparation, and staining techniques in veterinary microbiology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand culture media; 2.0 Understand culture methods; 3.0 Understand simple stains; 4.0 Understand differential and fluorescent stains; 5.0 Understand culture and stain QC.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: CULTURE, MEDIA AND STAINING TECHNIQUES			COURSE CODE: VLM 412		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of culture media preparation, and staining techniques in veterinary microbiology.						
GENERAL OBJECTIVE 1.0: Understand culture media						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain nutrient media types (basic, selective, differential, enriched) 1.2 Describe media preparation and sterilization 1.3 Describe quality control of media 1.4 Explain storage and shelf life	- Explain nutrient media types (basic, selective, differential, enriched) - Discuss media preparation and sterilization - Discuss quality control of media - Explain storage and shelf life	Culture media textbooks, LCD projector	- Prepare 6 culture media (nutrient agar, MacConkey, blood agar, EMB, MSA, SDA) - Sterilize media using autoclave - Verify with spore tests - Conduct media QC using positive and negative control strains - Store media at appropriate temperatures	Guide students to: - Prepare 6 culture media (nutrient agar, MacConkey, blood agar, EMB, MSA, SDA) - Sterilize media using autoclave - Verify with spore tests - Conduct media QC using positive and negative control strains - Store media at appropriate temperatures	Media reagents, autoclaves, spore tests, control strains

				• Document shelf life	• Document shelf life	
GENERAL OBJECTIVE 2.0: Understand culture methods						
4-6	2.1 Describe streaking for isolation 2.2 Explain spread plate and pour plate methods 2.3 Describe broth culture and shake culture 2.4 Describe specialized methods (anaerobic, microaerophilic)	• Discuss streaking for isolation • Explain spread plate and pour plate methods • Discuss broth culture and shake culture • Explain specialized methods (anaerobic, microaerophilic)	Culture methods manuals, LCD projector	• Streak 8 samples on selective and differential media • Perform spread plate and pour plate methods • Set up broth and shake cultures • Perform anaerobic and microaerophilic cultures	Guide students to: • Streak 8 samples on selective and differential media • Perform spread plate and pour plate methods • Set up broth and shake cultures • Perform anaerobic and microaerophilic cultures	Media, samples, inoculation loops, anaerobic systems
GENERAL OBJECTIVE 3.0: Understand simple stains						
7-9	3.1 Describe Gram stain 3.2 Explain acid-fast stain (Ziehl-Neelsen) 3.3 Describe capsule, spore, flagella stains 3.4 Explain negative staining	• Describe Gram stain • Explain acid-fast stain (Ziehl-Neelsen) • Describe capsule, spore, flagella stains • Explain negative staining	Staining manuals, LCD projector	• Perform Gram stain on 10 bacterial cultures • Perform ZN stain for acid-fast organisms • Perform capsule, spore, flagella stains • Perform negative staining	Guide students to: • Perform Gram stain on 10 bacterial cultures • Perform ZN stain for acid-fast organisms • Perform capsule, spore, flagella stains • Perform negative staining	Stains, slides, bacterial cultures, microscopes
GENERAL OBJECTIVE 4.0: Understand differential and fluorescent stains						

10-12	4.1 Describe McFadyean stain for anthrax 4.2 Describe Albert stain for Corynebacterium 4.3 Explain Giemsa for haemoprotozoa 4.4 Describe fluorescent stains (auramine, FITC)	• Explain McFadyean stain for anthrax • Discuss Albert stain for Corynebacterium • Explain Giemsa for haemoprotozoa • Discuss fluorescent stains (auramine, FITC)	Differential stain manuals, LCD projector	• Perform McFadyean stain on anthrax specimens • Perform Albert stain for Corynebacterium • Perform Giemsa stain on blood smears for haemoprotozoa • Perform fluorescent staining and microscopy	Guide students to: • Perform McFadyean stain on anthrax specimens • Perform Albert stain for Corynebacterium • Perform Giemsa stain on blood smears for haemoprotozoa • Perform fluorescent staining and microscopy	Stains, slides, specimens, fluorescence microscopes
GENERAL OBJECTIVE 5.0: Understand culture and stain QC						
13-15	5.1 Describe culture media QC programs 5.2 Explain stain QC 5.3 Describe troubleshooting culture and staining 5.4 Describe documentation and reporting	• Discuss culture media QC programs • Explain stain QC • Discuss troubleshooting culture and staining • Explain documentation and reporting	QC manuals, LCD projector	• Carry out media QC program • Document results • Conduct stain QC using known organisms • Troubleshoot 5 culture/staining problems • Document culture and staining results in a Report	Guide students to: • Carry out media QC program • Document results • Conduct stain QC using known organisms • Troubleshoot 5 culture/staining problems • Document culture and staining results in a Report	QC strains, troubleshooting scenarios, documentation templates

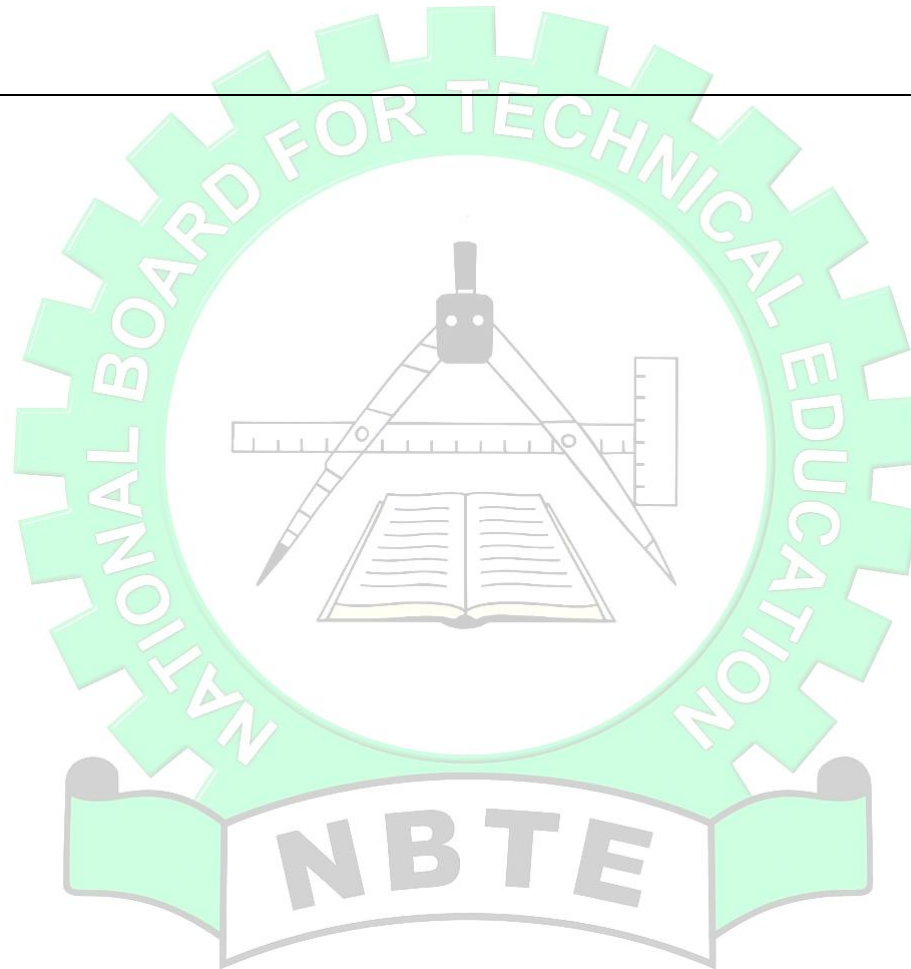
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

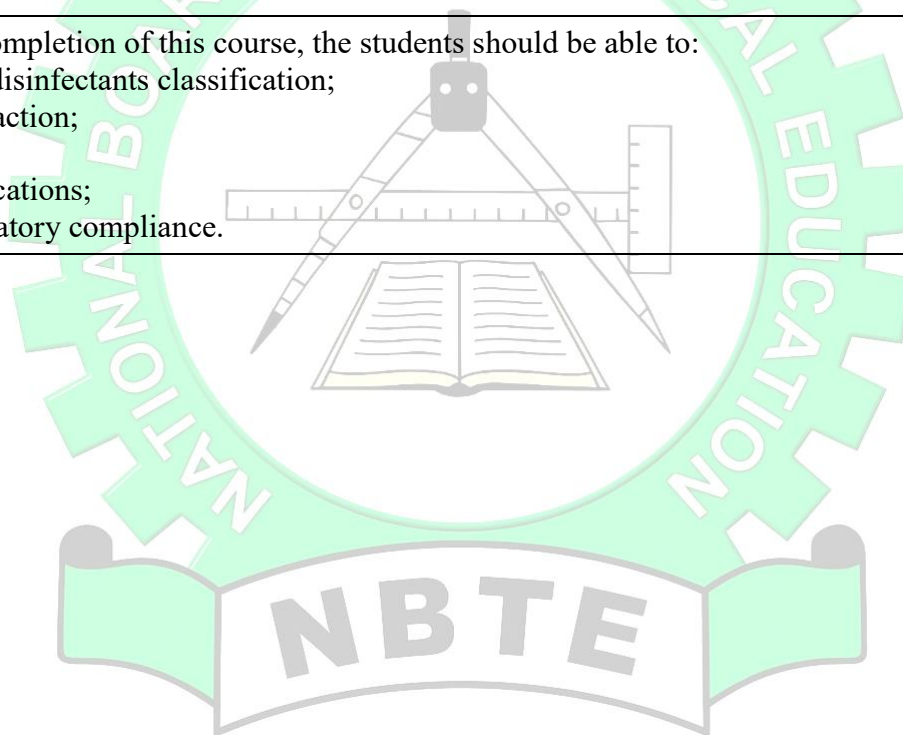
Practical 40%

Examination 40% = 100%



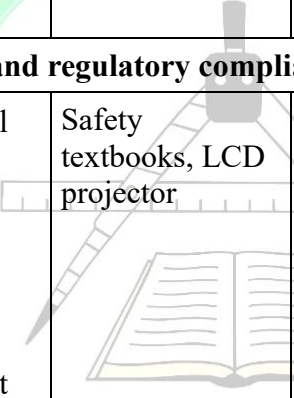
ANTISEPTICS AND DISINFECTANTS

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: ANTISEPTICS AND DISINFECTANTS	COURSE CODE: VLM 413	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEK
GOAL: This course is designed to equip students with knowledge and skills of antiseptics, disinfectants, and their applications in veterinary settings.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand antiseptics and disinfectants classification; 2.0 Understand mechanisms of action; 3.0 Understand efficacy testing; 4.0 Understand veterinary applications; 5.0 Understand safety and regulatory compliance.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: ANTISEPTICS AND DISINFECTANTS			COURSE CODE: VLM 413		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of antiseptics, disinfectants, and their applications in veterinary settings.						
GENERAL OBJECTIVE 1.0: Understand antiseptics and disinfectants classification						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Diffirentiate antiseptic vs disinfectant distinction 1.2 Explain chemical classes (alcohols, halogens, biguanides, phenols) 1.3 Describe oxidising agents and aldehydes 1.4 Explain quaternary ammonium compounds	• Distinguished antiseptic vs disinfectant distinction • Explain chemical classes (alcohols, halogens, biguanides, phenols) • Discuss oxidising agents and aldehydes • Explain quaternary ammonium compounds	Antiseptics textbooks, LCD projector	• Identify and use chemicals from each class • Use oxidising agents (peroxide, peracetic acid) • Use quaternary ammonium compounds in disinfection	Guide students to: • Identify and use chemicals from each class • Use oxidising agents (peroxide, peracetic acid) • Use quaternary ammonium compounds in disinfection	Chemical kits, application scenarios
GENERAL OBJECTIVE 2.0: Understand mechanisms of action						

4-6	2.1 Describe membrane disruption mechanisms 2.2 Explain protein denaturation 2.3 Describe nucleic acid damage 2.4 Explain oxidation mechanisms	• Discuss membrane disruption mechanisms • Explain protein denaturation • Discuss nucleic acid damage • Explain oxidation mechanisms	Mechanism textbooks, LCD projector	• Demonstrate membrane disruption using sample agents • Test protein denaturation effects • Test nucleic acid damage by UV • Test oxidation effects on microorganisms	Guide students to: • Demonstrate membrane disruption using sample agents • Test protein denaturation effects • Test nucleic acid damage by UV • Test oxidation effects on microorganisms	Agents, UV chambers, microorganisms, controls
GENERAL OBJECTIVE 3.0: Understand efficacy testing						
7-9	3.1 Describe phenol coefficient test 3.2 Explain use-dilution test 3.3 Explain European Standards (EN 1276, EN 1650) 3.4 Describe field efficacy assessment	• Discuss phenol coefficient test • Explain use-dilution test • Explain European Standards (EN 1276, EN 1650) • Explain field efficacy assessment	Efficacy testing manuals, LCD projector	• Conduct phenol coefficient test • Conduct use-dilution test • Conduct EN-standard efficacy test • Conduct field efficacy on hospital/farm surfaces	Guide students to: • Conduct phenol coefficient test • Conduct use-dilution test • Conduct EN-standard efficacy test • Conduct field efficacy on hospital/farm surfaces	Test organisms, dilution kits, EN test materials, swabs
GENERAL OBJECTIVE 4.0: Understand veterinary applications						
10-12	4.1 Describe skin antisepsis for surgery 4.2 Explain	• Discuss skin antisepsis for surgery • Explain	Veterinary application manuals, LCD projector	• Carry out pre-surgical skin antisepsis on patient	Guide students to: • Carry out pre-surgical skin antisepsis on patient	Antiseptics, disinfectants, surfaces, teat dip, dairy

	environmental disinfection (clinic, farm) 4.3 Describe equipment disinfection 4.4 Explain teat dip and dairy hygiene	environmental disinfection (clinic, farm) • Explain equipment disinfection • Explain teat dip and dairy hygiene		• Conduct environmental disinfection of clinic surfaces • Disinfect veterinary equipment following protocols • Perform teat dip in dairy operation	• Conduct environmental disinfection of clinic surfaces • Disinfect veterinary equipment following protocols • Perform teat dip in dairy operation	partner
GENERAL OBJECTIVE 5.0: Understand safety and regulatory compliance						
13-15	5.1 Describe chemical safety and PPE 5.2 Explain MSDS (Material Safety Data Sheets) 5.3 Describe environmental impact assessment 5.4 Explain NAFDAC registration of antiseptics/disinfectants	• Describe chemical safety and PPE • Explain MSDS (Material Safety Data Sheets) • Describe environmental impact assessment • Explain NAFDAC registration of antiseptics/disinfectants	Safety textbooks, LCD projector 	• Carry out chemical safety protocols with PPE • Compile MSDS for 10 chemicals • Carry out assessment on environmental impact of chemical disinfectants • Review NAFDAC-registered antiseptics/disinfectants	Guide students to: • Carry out chemical safety protocols with PPE • Compile MSDS for 10 chemicals • Carry out assessment on environmental impact of chemical disinfectants • Review NAFDAC-registered antiseptics/disinfectants	PPE, MSDS templates, environmental tools, NAFDAC documents

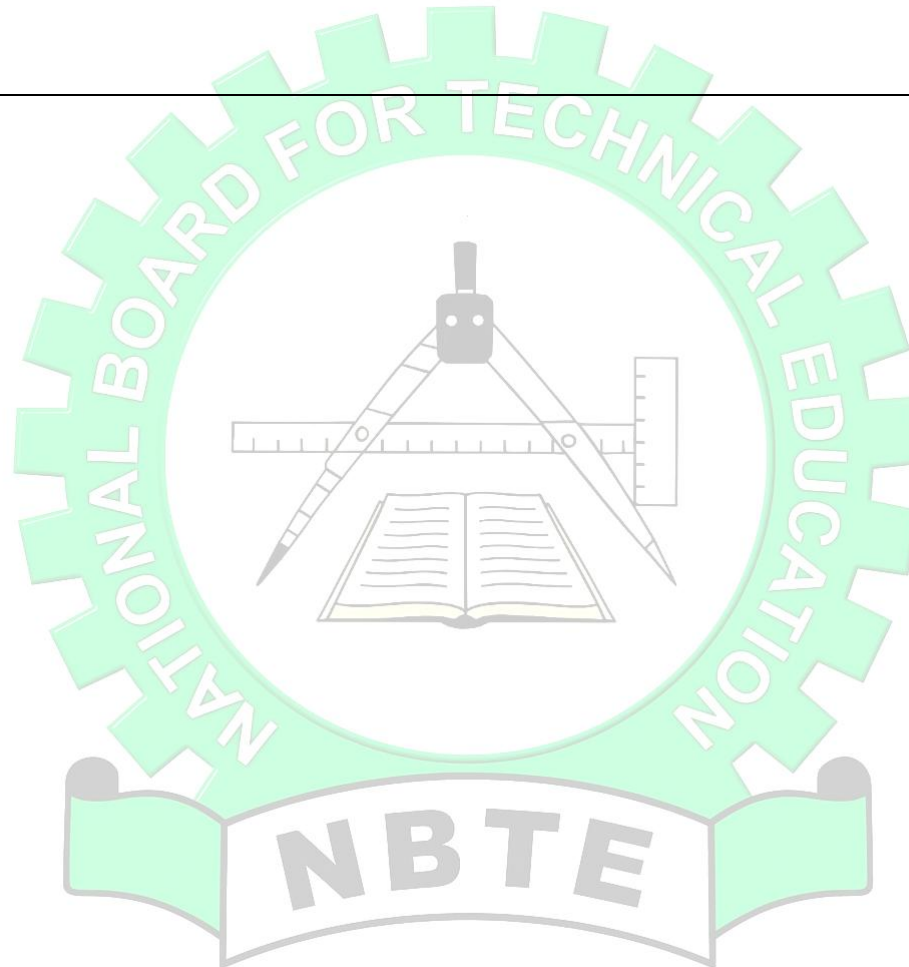
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

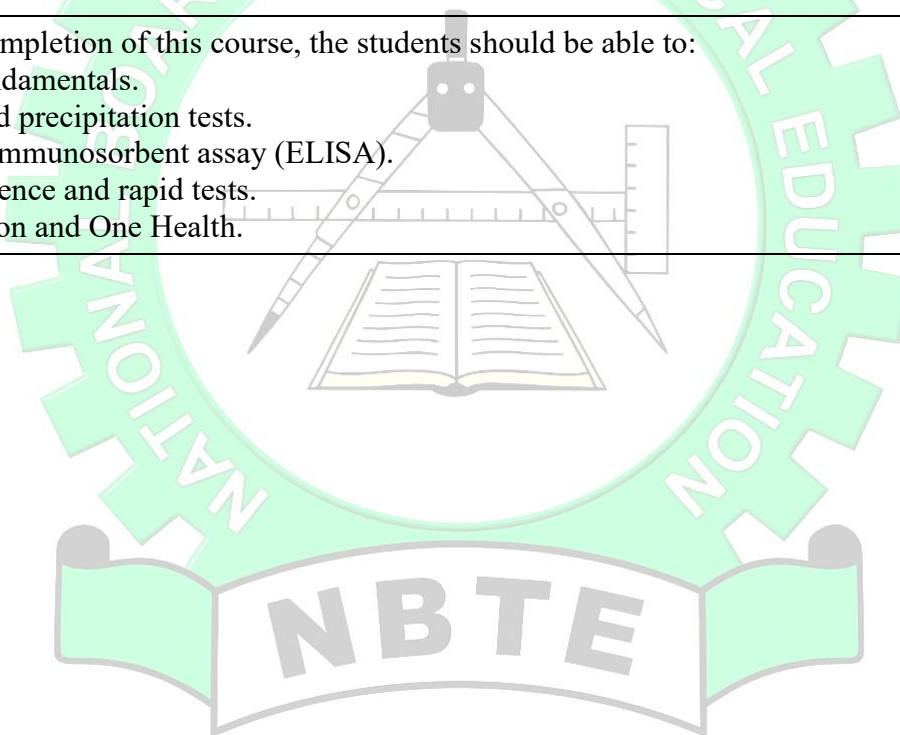
Practical 40%

Examination 40% = 100%



IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS	COURSE CODE: VLM 414	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equipped students with knowledge and skills of immunology and serological diagnostics in veterinary microbiology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand immunology fundamentals. 2.0 Understand agglutination and precipitation tests. 3.0 Understand Enzyme linked immunosorbent assay (ELISA). 4.0 Understand immunofluorescence and rapid tests. 5.0 Understand vaccine evaluation and One Health.		



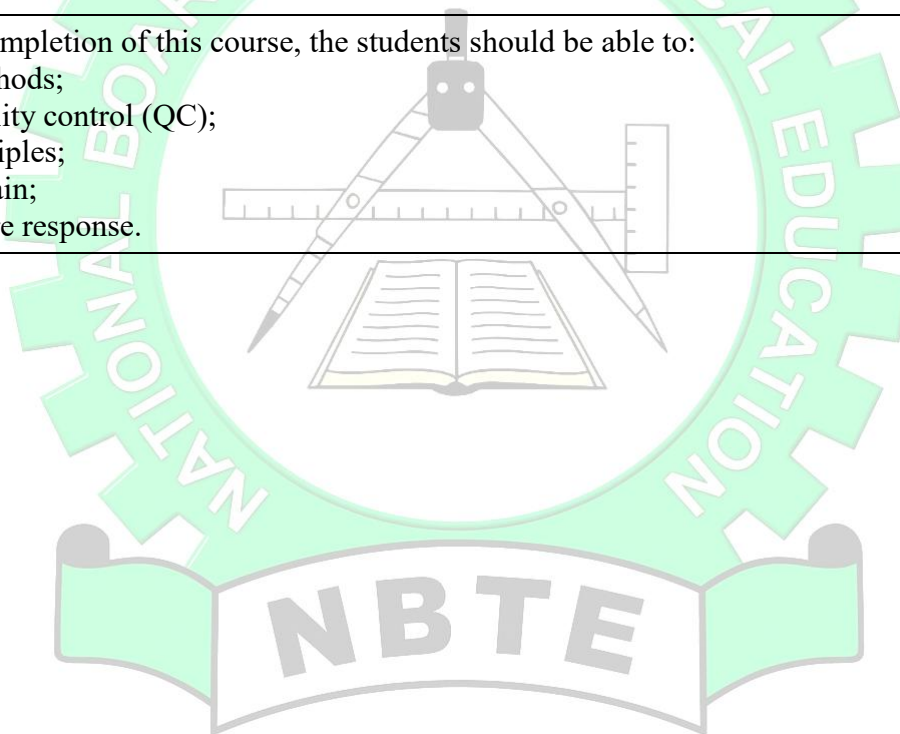
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS			COURSE CODE: VLM 414		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equipped students with knowledge and skills of immunology and serological diagnostics in veterinary microbiology.						
GENERAL OBJECTIVE 1.0: Understand immunology fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define innate and adaptive immunity 1.2 Explain immune cells and antibodies 1.3 Describe hypersensitivity reactions 1.4 Explain immunization principles	• Explain innate and adaptive immunity • Explain immune cells and antibodies • Discuss hypersensitivity reactions • Discuss immunization principles	Immunology textbooks, LCD projector	• Identify innate and adaptive responses in case scenarios • Identify immune cells on stained blood smears • Identify hypersensitivity reaction types • Profile immunization protocols for livestock	Guide students to: • Identify innate and adaptive responses in case scenarios • Identify immune cells on stained blood smears • Identify hypersensitivity reaction types • Profile immunization protocols for livestock	Case scenarios, blood smears, microscopes, vaccination protocols
GENERAL OBJECTIVE 2.0: Understand agglutination and precipitation tests						

4-6	2.1 Describe slide and tube agglutination 2.2 Explain latex agglutination 2.3 Explain AGID and immunodiffusion 2.4 Describe complement fixation test (CFT)	• Explain slide and tube agglutination • Explain latex agglutination • Explain AGID and immunodiffusion • Discuss complement fixation test (CFT)	Agglutination textbooks, LCD projector	• Perform slide and tube agglutination for Brucella • Perform latex agglutination tests • Perform AGID for EIA or bovine leukosis • Perform CFT for FMD or CBPP	Guide students to: • Perform slide and tube agglutination for Brucella • Perform latex agglutination tests • Perform AGID for EIA or bovine leukosis • Perform CFT for FMD or CBPP	Antigens, sera, agglutination kits, AGID/CFT equipment
GENERAL OBJECTIVE 3.0: Understand Enzyme linked immunosorbent assay (ELISA)						
7-9	3.1 Explain ELISA principles (direct, indirect, competitive, sandwich) 3.2 Describe ELISA reagent preparation and plate setup 3.3 Explain ELISA running and signal development 3.4 Explain ELISA result interpretation	• Explain ELISA principles (direct, indirect, competitive, sandwich) • Describe ELISA reagent preparation and plate setup • Explain ELISA running and signal development • Explain ELISA result interpretation	ELISA textbooks, LCD projector	• Set up indirect ELISA for antibody detection • Run competitive ELISA • Run sandwich ELISA for antigen detection • Interpret ELISA using S/P ratios and cut-offs	Guide students to: • Set up indirect ELISA for antibody detection • Run competitive ELISA • Run sandwich ELISA for antigen detection • Interpret ELISA using S/P ratios and cut-offs	ELISA plates, antigens, conjugates, plate readers
GENERAL OBJECTIVE 4.0: Understand immunofluorescence and rapid tests						
10-12	4.1 Explain direct and indirect immunofluorescence	• Explain direct and indirect immunofluorescence	Immunoassay textbooks, LCD	• Perform indirect immunofluorescence	Guide students to: • Perform indirect immunofluorescence	Fluorescence microscopes, LFT kits, flow

	e 4.2 Describe lateral-flow tests (LFT) 4.3 Explain flow cytometry (intro) 4.4 Explain immunohistochemistry (IHC)	- Describe lateral-flow tests (LFT) - Explain flow cytometry (intro) - Explain immunohistochemistry (IHC)	projector	- Operate 5 LFTs for infectious diseases - Demonstrate flow cytometry (or simulator) - Perform IHC on tissue sections	- Operate 5 LFTs for infectious diseases - Demonstrate flow cytometry (or simulator) - Perform IHC on tissue sections	cytometer, IHC reagents
GENERAL OBJECTIVE 5.0: Understand vaccine evaluation and One Health						
13-15	5.1 Describe vaccine potency testing 5.2 Explain post-vaccination antibody titre 5.3 Explain herd immunity assessment 5.4 Describe One Health serology	- Discuss vaccine potency testing - Explain post-vaccination antibody titre - Explain herd immunity assessment - Explain One Health serology	Vaccine evaluation textbooks, LCD projector	- Test vaccine potency in lab conditions - Measure post-vaccination antibody titres - Assess herd immunity for sample flock or herd - Conduct serology in One Health context	Guide students to: - Test vaccine potency in lab conditions - Measure post-vaccination antibody titres - Assess herd immunity for sample flock or herd - Conduct serology in One Health context	Vaccine samples, post-vaccination sera, herd data, One Health frameworks
EVALUATION: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

STERILIZATION AND COLD-CHAIN MANAGEMENT

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: STERILIZATION AND COLD-CHAIN MANAGEMENT	COURSE CODE: VLM 415	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of sterilization methods plus cold-chain management for samples, vaccines, and biologics.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand sterilization methods; 2.0 Understand sterilization quality control (QC); 3.0 Understand cold-chain principles; 4.0 Understand vaccine cold-chain; 5.0 Understand cold-chain failure response.		

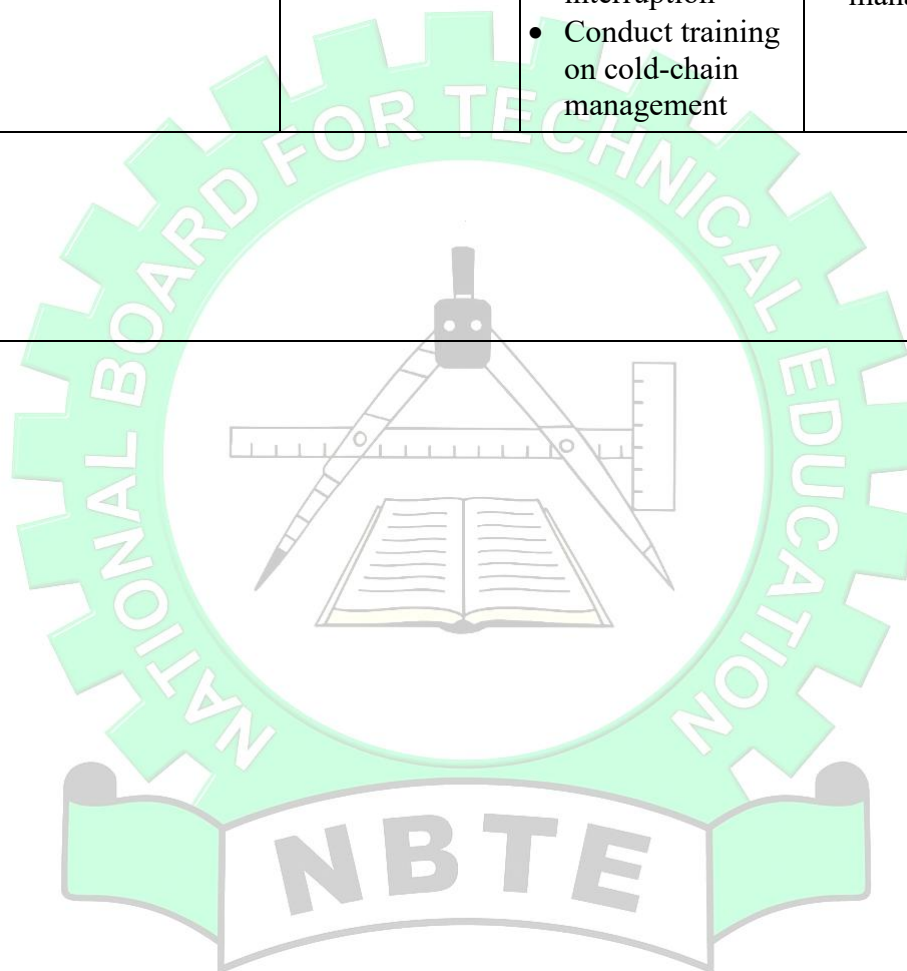


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: STERILIZATION AND COLD-CHAIN MANAGEMENT			COURSE CODE: VLM 415		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of sterilization methods plus cold-chain management for samples, vaccines, and biologics.						
GENERAL OBJECTIVE 1.0: Understand sterilization methods						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe moist heat sterilization (autoclave) 1.2 Describe dry heat sterilization (hot air oven) 1.3 Explain chemical sterilization 1.4 Explain radiation and filtration sterilization	• Explain moist heat sterilization (autoclave) • Discuss dry heat sterilization (hot air oven) • Discuss chemical sterilization • Explain radiation and filtration sterilization	Sterilization textbooks, LCD projector	• Operate autoclave with biological indicators • Operate hot air oven for glassware • Conduct chemical sterilization (ethylene oxide, glutaraldehyde) • Conduct radiation (UV) and filtration sterilization	Guide students to: • Operate autoclave with biological indicators • Operate hot air oven for glassware • Conduct chemical sterilization (ethylene oxide, glutaraldehyde) • Conduct radiation (UV) and filtration sterilization	Autoclaves, hot air ovens, chemicals, UV chambers, filters

GENERAL OBJECTIVE 2.0: Understand sterilization QC						
4-6	2.1 Explain biological indicators (BI) 2.2 Explain chemical indicators 2.3 Explain physical monitoring 2.4 Describe validation protocols	• Explain biological indicators (BI) • Explain chemical indicators • Explain physical monitoring • Describe validation protocols	Sterilization QC manuals, LCD projector	• Use biological indicators (<i>B. stearothermophilus</i>) for autoclave validation • Use chemical indicators (tapes, strips) • Conduct physical monitoring (temperature, pressure, time) • Carry out validation protocols for sterilizer	Guide students to: • Use biological indicators (<i>B. stearothermophilus</i>) for autoclave validation • Use chemical indicators (tapes, strips) • Conduct physical monitoring (temperature, pressure, time) • Carry out validation protocols for sterilizer	Biological indicators, chemical indicators, monitoring equipment
GENERAL OBJECTIVE 3.0: Understand cold-chain principles						
7-9	3.1 Describe cold-chain principles for biological samples 3.2 Explain temperature ranges (4°C, -20°C, -80°C) 3.3 Explain transport options (cold-pack, dry ice, liquid nitrogen) 3.4 Describe ultra-low-temperature freezer	• Explain cold-chain principles for biological samples • Explain temperature ranges (4°C, -20°C, -80°C) • Explain transport options (cold-pack, dry ice, liquid nitrogen) • Discuss ultra-low-temperature freezer	Cold-chain manuals, LCD projector	• Map cold-chain requirements for 10 sample types • Store samples at correct temperatures • Pack samples using cold-pack, dry ice, LN2 shippers • Operate ULT (-80°C) freezer;	Guide students to: • Map cold-chain requirements for 10 sample types • Store samples at correct temperatures • Pack samples using cold-pack, dry ice, LN2 shippers • Operate ULT (-80°C) freezer; document inventory and alarms	Cold-chain shippers, ULT freezer, dry ice, LN2 dewars

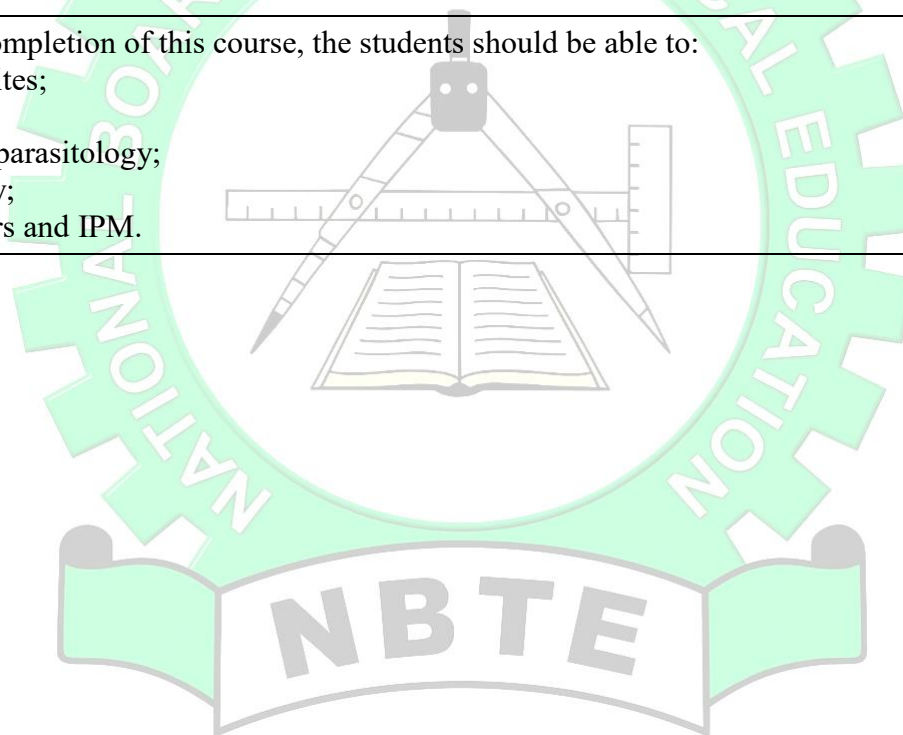
	management	management		document inventory and alarms		
GENERAL OBJECTIVE 4.0: Understand vaccine cold-chain						
10-12	4.1 Define vaccine cold-chain principles 4.2 Define vaccine fridge management 4.3 Define temperature monitoring (data-loggers) 4.4 Define cold-chain audit	• Explain vaccine cold-chain principles • Discuss vaccine fridge management • Discuss temperature monitoring (data-loggers) • Explain cold-chain audit	Vaccine cold-chain manuals, LCD projector	• Carry out WHO/OIE vaccine cold-chain principles • Manage vaccine fridge at clinic • Deploy data-loggers in vaccine fridges for 4 weeks • Conduct cold-chain audit at clinic	Guide students to: • Carry out WHO/OIE vaccine cold-chain principles • Manage vaccine fridge at clinic • Deploy data-loggers in vaccine fridges for 4 weeks • Conduct cold-chain audit at clinic	Vaccine fridges, data-loggers, audit checklists
GENERAL OBJECTIVE 5.0: Understand cold-chain failure response						
13-15	5.1 Describe cold-chain failure investigation 5.2 Explain documentation and chain-of-custody 5.3 Explain backup and contingency planning 5.4 Explain training and competency	• Explain cold-chain failure investigation • Discuss documentation and chain-of-custody • Explain backup and contingency planning • Explain training and competency	Cold-chain failure manuals, LCD projector	• Investigate simulated cold-chain failure • Identify root cause • Maintain cold-chain documentation and chain-of-custody • Design	Guide students to: • Investigate simulated cold-chain failure • Identify root cause • Maintain cold-chain documentation and chain-of-custody • Design backup/contingency for cold-chain interruption	Failure scenarios, documentation templates, contingency plans

				backup/contingency for cold-chain interruption • Conduct training on cold-chain management	• Conduct training on cold-chain management	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



PARASITOLOGY AND APIARY PATHOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: PARASITOLOGY AND APIARY PATHOLOGY	COURSE CODE: VLM 416	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOURS/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary parasitology integrated with apiary pathology and small-ruminant diagnostics.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand protozoan parasites; 2.0 Understand helminths; 3.0 Understand small-ruminant parasitology; 4.0 Understand apiary pathology; 5.0 Understand arthropod vectors and IPM.		

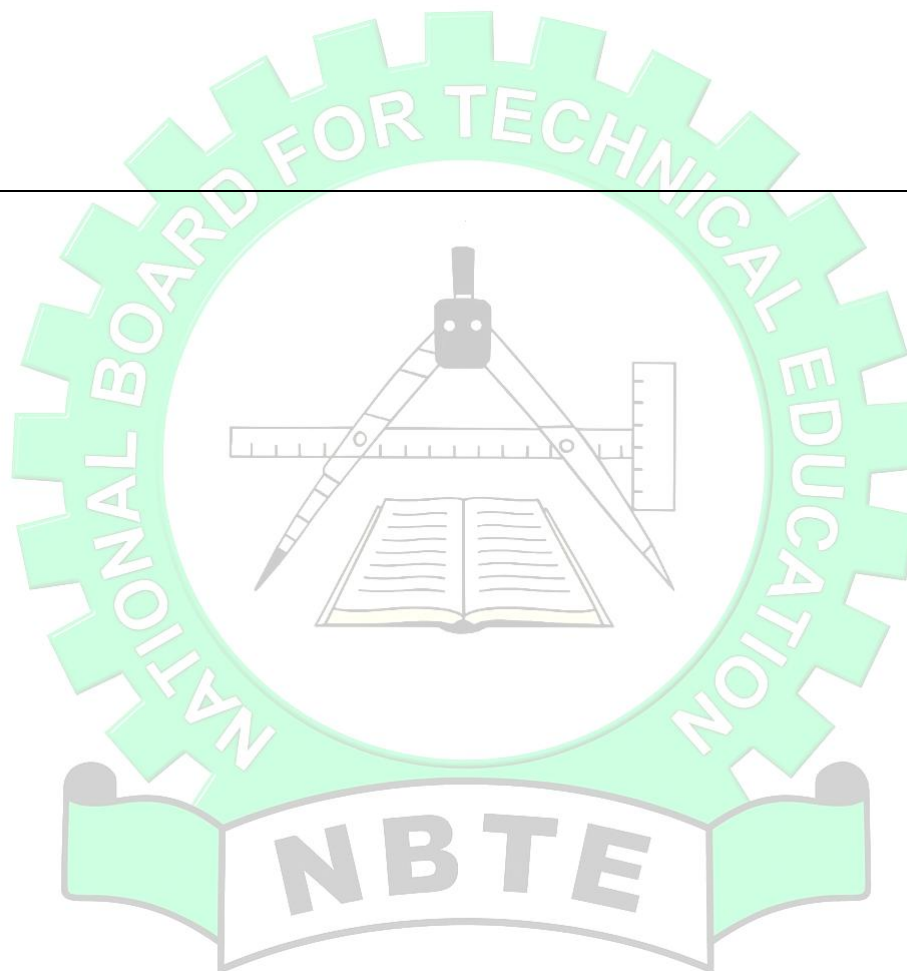


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: PARASITOLOGY AND APIARY PATHOLOGY			COURSE CODE: VLM 416		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary parasitology integrated with apiary pathology and small-ruminant diagnostics.						
GENERAL OBJECTIVE 1.0: Understand protozoan parasites						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe haemoprotozoa (Trypanosoma, Babesia, Theileria, Plasmodium) 1.2 Explain GI protozoa (Eimeria, Cryptosporidium, Giardia) 1.3 Explain other protozoa (Toxoplasma, Neospora, Leishmania) 1.4 Describe protozoan staining and	• Discuss haemoprotozoa (Trypanosoma, Babesia, Theileria, Plasmodium) • Explain GI protozoa (Eimeria, Cryptosporidium, Giardia) • Discuss other protozoa (Toxoplasma, Neospora, Leishmania) • Explain protozoan staining and	Parasitology textbooks, LCD projector	• Examine blood smears for haemoprotozoa • Examine faecal samples for GI protozoa • Conduct serology (IFAT, ELISA) for Toxoplasma, Neospora • Apply Giemsa, modified ZN for protozoan staining	Guide students to: • Examine blood smears for haemoprotozoa • Examine faecal samples for GI protozoa • Conduct serology (IFAT, ELISA) for Toxoplasma, Neospora • Apply Giemsa, modified ZN for protozoan staining	Microscopes, samples, staining reagents, ELISA kits

	microscopy	microscopy				
GENERAL OBJECTIVE 2.0: Understand Helminthes						
4-6	2.1 Explain nematodes (Haemonchus, Trichostrongylus, Ascaris) 2.2 Explain cestodes (Taenia, Echinococcus, Moniezia) 2.3 Explain trematodes (Fasciola, Schistosoma) 2.4 Explain faecal egg counts and identification	- Explain nematodes (Haemonchus, Trichostrongylus, Ascaris) - Explain cestodes (Taenia, Echinococcus, Moniezia) - Explain trematodes (Fasciola, Schistosoma) - Explain faecal egg counts and identification	Helminth textbooks, LCD projector	- Identify nematode species by morphology - Identify cestode proglottids and eggs - Identify trematode eggs and adults - Conduct McMaster FEC on faecal samples	Guide students to: - Identify nematode species by morphology - Identify cestode proglottids and eggs - Identify trematode eggs and adults - Conduct McMaster FEC on faecal samples	Microscopes, samples, McMaster chambers, reference specimens
GENERAL OBJECTIVE 3.0: Understand small-ruminant parasitology						
7-9	3.1 Describe FAMACHA eye-colour scoring 3.2 Explain PPR/CCPP context for parasitism 3.3 Explain targeted selective treatment (TST) 3.4 Explain faecal egg count reduction test (FECRT)	- Discuss FAMACHA eye-colour scoring - Explain PPR/CCPP context for parasitism - Discuss targeted selective treatment (TST) - Explain faecal egg count reduction test (FECRT)	Small-ruminant parasitology textbooks, LCD projector	- Conduct FAMACHA scoring on 30 small ruminants - Diagnose parasitism in context of viral disease (PPR) - Conduct TST on small-ruminant herd - Conduct FECRT to	Guide students to: - Conduct FAMACHA scoring on 30 small ruminants - Diagnose parasitism in context of viral disease (PPR) - Conduct TST on small-ruminant herd - Conduct FECRT to assess resistance	FAMACHA cards, small ruminants, faecal samples, anthelmintics

				assess resistance		
GENERAL OBJECTIVE 4.0: Understand apiary pathology						
10-12	4.1 Describe Varroa mite identification and counting 4.2 Explain Nosema diagnostics (Apis and ceranae) 4.3 Describe American Foulbrood (AFB) diagnostics 4.4 Explain European Foulbrood (EFB) and chalkbrood	• Discuss Varroa mite identification and counting • Explain Nosema diagnostics (Apis and ceranae) • Explain American Foulbrood (AFB) diagnostics • Discuss European Foulbrood (EFB) and chalkbrood	Apiary pathology manuals, LCD projector, model hive	• Conduct hive inspection • Count Varroa via alcohol wash • Conduct Nosema microscopy on bee guts • Quantify spore • Perform AFB ropiness test • Confirm with Holst milk test • Identify EFB and chalkbrood lesions	Guide students to: • Conduct hive inspection • Count Varroa via alcohol wash • Conduct Nosema microscopy on bee guts • Quantify spore • Perform AFB ropiness test • Confirm with Holst milk test • Identify EFB and chalkbrood lesions	Model hive, Varroa-counting kits, microscopes, AFB test reagents
GENERAL OBJECTIVE 5.0: Understand arthropod vectors and IPM						
13-15	5.1 Describe tick, mite, lice identification 5.2 Explain dipteran vectors (Glossina, Stomoxys) 5.3 Explain integrated parasite management (IPM) 5.4 Explain One Health zoonotic parasites	• Explain tick, mite, lice identification • Discuss dipteran vectors (Glossina, Stomoxys) • Explain integrated parasite management (IPM) • Explain One Health zoonotic parasites	Arthropod textbooks, LCD projector	• Identify 5 tick species, mites, lice using stereomicroscope • Identify Glossina, Stomoxys, Culicoides • Design IPM program for sample farm • Profile zoonotic	Guide students to: • Identify 5 tick species, mites, lice using stereomicroscope • Identify Glossina, Stomoxys, Culicoides • Design IPM program for sample farm • Profile zoonotic parasites in One	Stereomicroscopes, arthropod collections, IPM templates

				parasites in One Health context	Health context	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



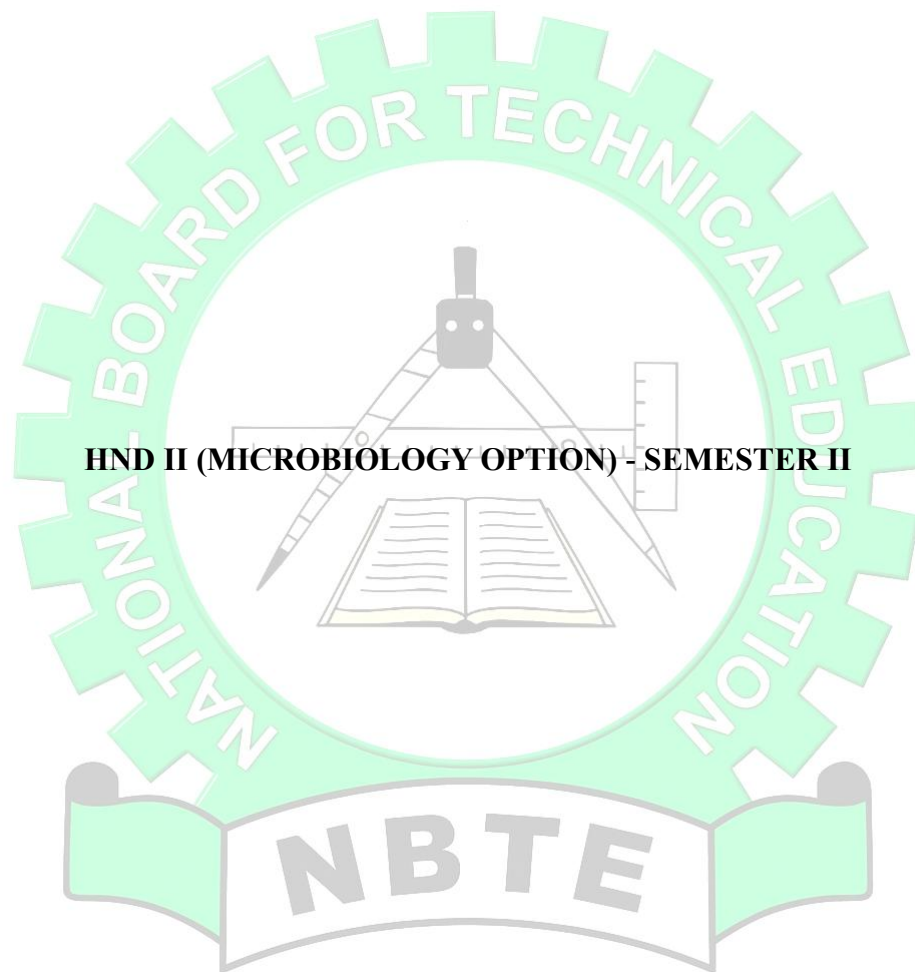
BACTERIOLOGY (POULTRY, SWINE AND SMALL-RUMINANT DIAGNOSTICS)

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: BACTERIOLOGY (POULTRY, SWINE AND SMALL-RUMINANT DIAGNOSTICS)	COURSE CODE: VLM 417	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOURS/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary bacteriology integrated with species-specific diagnostics for poultry, swine, and small ruminants.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand veterinary bacteria identification. 2.0 Understand poultry bacteriology. 3.0 Understand swine bacteriology. 4.0 Understand small-ruminant bacteriology. 5.0 Understand antimicrobial susceptibility.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: BACTERIOLOGY (POULTRY, SWINE AND SMALL-RUMINANT DIAGNOSTICS)			COURSE CODE: VLM 417		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary bacteriology integrated with species-specific diagnostics for poultry, swine, and small ruminants.						
GENERAL OBJECTIVE 1.0: Understand veterinary bacteria identification						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-2	1.1 Describe Gram-positive bacteria identification 1.2 Describe Gram-negative bacteria identification 1.3 Describe spirochetes, mycoplasma, chlamydia identification 1.4 Explain specialised veterinary bacteria (Brucella, Mycobacterium)	• Explain Gram-positive bacteria identification • Explain Gram-negative bacteria identification • Discuss spirochetes, mycoplasma, chlamydia identification • Explain specialised veterinary bacteria (Brucella, Mycobacterium)	Bacteriology textbooks, LCD projector	• Isolate Gram-positive and Gram-negative bacteria • Identify Gram-positive and Gram-negative bacteria • Identify Mycoplasma and spirochetes • Isolate Brucella and Mycobacterium under BSL-2/3	Guide student to: • Isolate and identify Gram-positive bacteria • Isolate and identify Gram-negative bacteria • Identify Mycoplasma and spirochetes • Isolate Brucella and Mycobacterium under BSL-2/3	Selective media, biochemical kits, BSL-2/3 lab access

GENERAL OBJECTIVE 2.0: Understand poultry bacteriology						
3-5	2.1 Describe Salmonella identification (egg, environment, hatchery) 2.2 Describe E. coli, Pasteurella, Mycoplasma in poultry 2.3 Explain Newcastle, IB, AI serological surveillance 2.4 Describe hatchery sanitation swab protocols	- Describe Salmonella identification (egg, environment, hatchery) - Describe E. coli, Pasteurella, Mycoplasma in poultry - Explain Newcastle, IB, AI serological surveillance - Describe hatchery sanitation swab protocols	Poultry bacteriology textbooks, LCD projector	- Screen eggs and environment for Salmonella using ISO 6579 - Isolate E. coli, Pasteurella, Mycoplasma from poultry - Run HI test for Newcastle and IB on poultry sera - Conduct hatchery sanitation audit with pathogen swabs	Guide students to: - Screen eggs and environment for Salmonella using ISO 6579 - Isolate E. coli, Pasteurella, Mycoplasma from poultry - Run HI test for Newcastle and IB on poultry sera - Conduct hatchery sanitation audit with pathogen swabs	Selective media, ISO 6579 protocol, HI antigens, hatchery partner
GENERAL OBJECTIVE 3.0: Understand swine bacteriology						
6-8	3.1 Describe ASF molecular diagnostics (PCR) 3.2 Explain CSF ELISA/PCR 3.3 Describe PRRS testing 3.4 Explain swine outbreak investigation	- Discuss molecular diagnostics (PCR) - Explain CSF ELISA/PCR - Explain PRRS testing - Discuss swine outbreak investigation	Swine bacteriology textbooks, LCD projector	- Conduct ASF PCR on swine samples; interpret Ct - Run CSF ELISA on swine serum - Run PRRS ELISA and PCR - Conduct simulated swine outbreak investigation	Guide students to: - Conduct ASF PCR on swine samples; interpret Ct - Run CSF ELISA on swine serum - Run PRRS ELISA and PCR - Conduct simulated swine outbreak investigation	PCR equipment, ASF/CSF/PRRS kits, swine samples
GENERAL OBJECTIVE 4.0: Understand small-ruminant bacteriology						

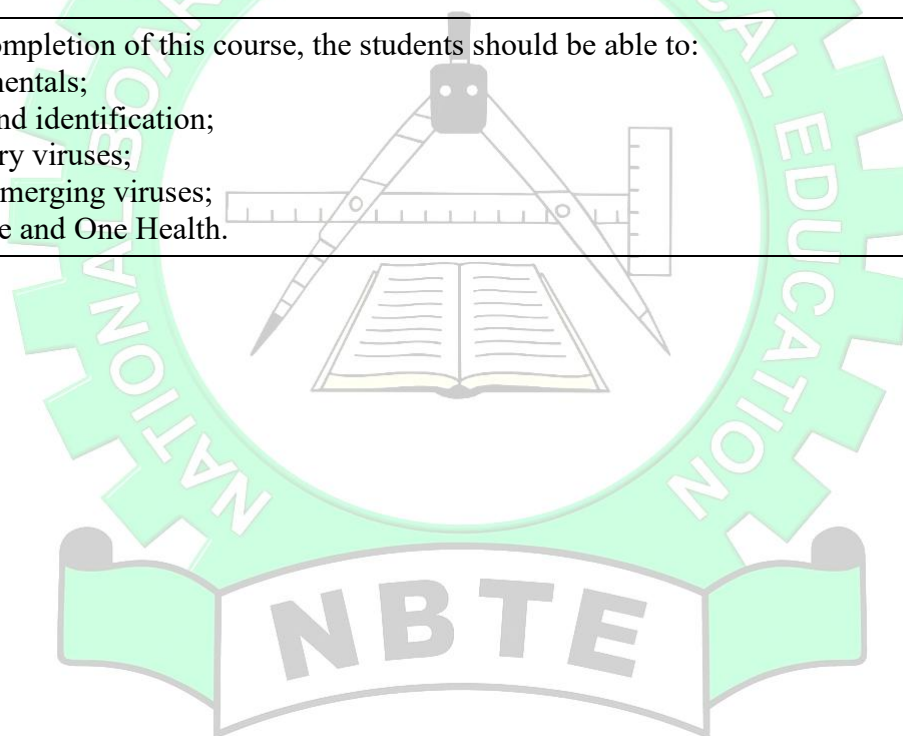
9-11	4.1 Describe PPR ELISA and PCR 4.2 Explain CCP ELISA and PCR 4.3 Explain Mycoplasma in small ruminants 4.4 Describe brucellosis in sheep and goats	• Discuss PPR ELISA and PCR • Explain CCP ELISA and PCR • Explain Mycoplasma in small ruminants • Discuss brucellosis in sheep and goats	Small-ruminant bacteriology textbooks, LCD projector	• Run PPR ELISA and PCR on small-ruminant samples • Run CCP ELISA • Isolate Mycoplasma from small ruminants • Run brucellosis Rose Bengal test on small-ruminant sera	Guide students to: • Run PPR ELISA and PCR on small-ruminant samples • Run CCP ELISA • Isolate Mycoplasma from small ruminants • Run brucellosis Rose Bengal test on small-ruminant sera	PPR/CCP ELISA, PCR equipment, Mycoplasma media, RB antigen
GENERAL OBJECTIVE 5.0: Understand antimicrobial susceptibility						
12-15	5.1 Describe Kirby-Bauer disc diffusion 5.2 Explain MIC determination 5.3 Explain CLSI/EUCAST interpretation 5.4 Describe AMR surveillance (One Health)	• Describe Kirby-Bauer disc diffusion • Explain MIC determination • Explain CLSI/EUCAST interpretation • Describe AMR surveillance (One Health)	AMR textbooks, LCD projector	• Perform Kirby-Bauer disc diffusion • Determine MIC using broth dilution • Interpret results using CLSI/EUCAST • Conduct AMR surveillance in One Health context	Guide students to: • Perform Kirby-Bauer disc diffusion • Determine MIC using broth dilution • Interpret results using CLSI/EUCAST • Conduct AMR surveillance in One Health context	Mueller-Hinton, discs, MIC strips, CLSI guidelines
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (MICROBIOLOGY OPTION) - SEMESTER II

VIROLOGY AND CLIMATE-DRIVEN EMERGING DISEASES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: VIROLOGY AND CLIMATE-DRIVEN EMERGING DISEASES	COURSE CODE: VLM 421	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of veterinary virology with focus on climate-driven emerging diseases addressing.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand virology fundamentals; 2.0 Understand virus isolation and identification; 3.0 Understand priority veterinary viruses; 4.0 Understand climate-driven emerging viruses; 5.0 Understand viral surveillance and One Health.		

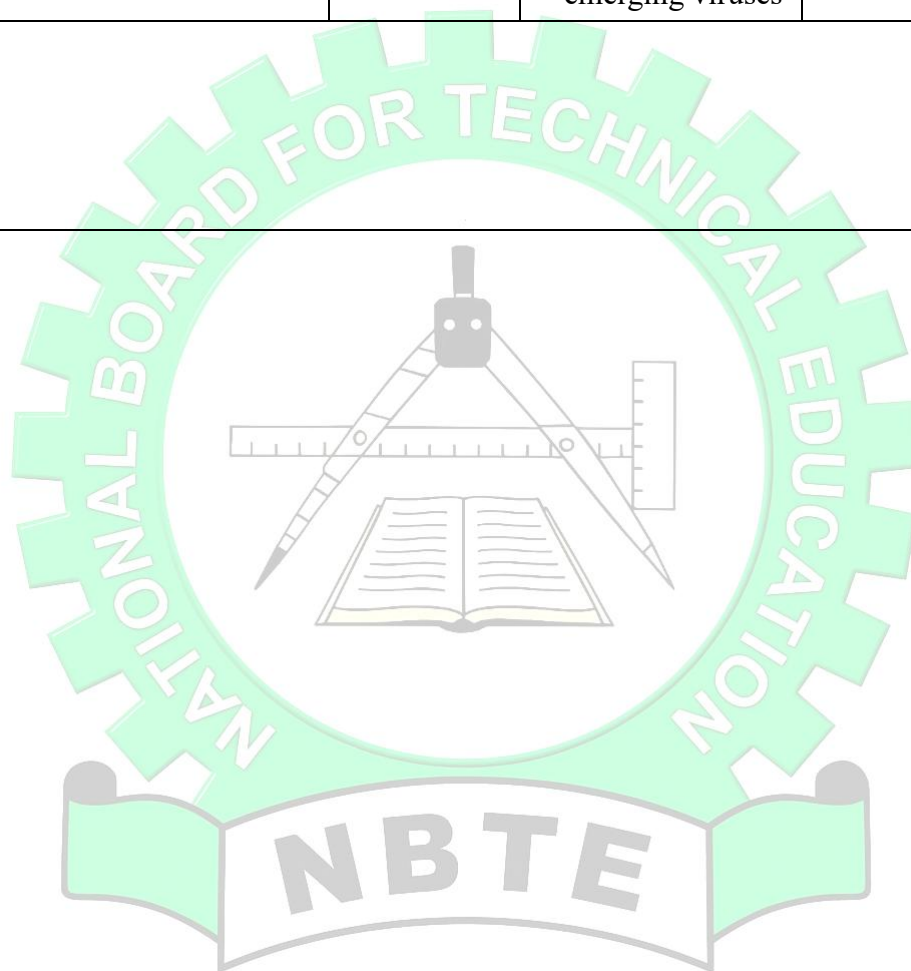


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: VIROLOGY AND CLIMATE-DRIVEN EMERGING DISEASES			COURSE CODE: VLM 421		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is desgined to equip studnets with knowledge and skills of veterinary virology with focus on climate-driven emerging diseases addressing.						
GENERAL OBJECTIVE 1.0: Understand virology fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe virus families (DNA, RNA viruses) 1.2 Explain virus structure and replication 1.3 Explain virus host range and tropism 1.4 Describe viral pathogenesis	• Explain virus families (DNA, RNA viruses) • Discuss virus structu re and replication • Explain virus host range and tropism • Explain viral pathogenesis	Virology textbooks, LCD projector	• Examine EM images of 8 virus families • Identify by morphology • Study virus replication cycles for 5 viruses • Profile host range and tropism for veterinary viruses • Document pathogenesis pathways	Guide students to: • Examine EM images of 8 virus families • Identify by morphology • Study virus replication cycles for 5 viruses • Profile host range and tropism for veterinary viruses • Document pathogenesis pathways	EM atlases, replication diagrams, profiling templates

GENERAL OBJECTIVE 2.0: Understand virus isolation and identification						
4-6	2.1 Describe virus isolation in cell culture 2.2 Describe virus identification by serology 2.3 Describe virus identification by PCR 2.4 Explain electron microscopy in virology	• Discuss virus isolation in cell culture • Explain virus identification by serology • Explain virus identification by PCR • Discuss electron microscopy in virology	Virology methods textbooks, LCD projector	• Perform virus isolation in cell culture • Observe CPE • Identify viruses using HI, VN, ELISA • Identify viruses using PCR • Examine viruses by negative-stain EM (or demo)	Guide students to: • Perform virus isolation in cell culture • Observe CPE • Identify viruses using HI, VN, ELISA • Identify viruses using PCR • Examine viruses by negative-stain EM (or demo)	Cell cultures, virus seeds, serological reagents, PCR equipment
GENERAL OBJECTIVE 3.0: Understand priority veterinary viruses						
7-9	3.1 Explain FMD, rinderpest, PPR diagnostics 3.2 Explain avian influenza, Newcastle, Marek 3.3 Explain ASF, CSF, rabies 3.4 Explain canine parvovirus, distemper, FIP	• Explain FMD, rinderpest, PPR diagnostics • Explain avian influenza, Newcastle, Marek • Explain ASF, CSF, rabies • Explain canine parvovirus, distemper, FIP	Veterinary virology atlases, LCD projector	• Run FMD, rinderpest, PPR diagnostics • Run AI, Newcastle, Marek diagnostics • Run ASF, CSF, rabies diagnostics • Run canine parvo, distemper, FIP diagnostics	Guide students to: • Run FMD, rinderpest, PPR diagnostics • Run AI, Newcastle, Marek diagnostics • Run ASF, CSF, rabies diagnostics • Run canine parvo, distemper, FIP diagnostics	ELISA kits, PCR equipment, LFT kits, reference materials
GENERAL OBJECTIVE 4.0: Understand climate-driven emerging viruses						
10-12	4.1 Explain Rift Valley	• Explain Rift Valley	Climate-	• Run RVF ELISA	Guide students to:	RVF/WNV/CC

	Fever diagnostics 4.2 Explain West Nile, Crimean-Congo fever 4.3 Describe emerging arboviruses 4.4 Explain climate-vector-virus interactions	Fever diagnostics • Explain West Nile, Crimean-Congo fever • Discuss emerging arboviruses • Explain climate-vector-virus interactions	emergence virology textbooks, LCD projector	on cattle and sheep • Interpret in climate context • Run West Nile, CCHF diagnostics • Document emerging arboviruses in West Africa • Map climate-vector-virus interactions for Nigeria	• Run RVF ELISA on cattle and sheep • Interpret in climate context • Run West Nile, CCHF diagnostics • Document emerging arboviruses in West Africa • Map climate-vector-virus interactions for Nigeria	HF kits, climate data, mapping tools
GENERAL OBJECTIVE 5.0: Understand viral surveillance and One Health						
13-15	5.1 Describe viral surveillance platforms 5.2 Explain One Health zoonotic virus response 5.3 Explain outbreak investigation 5.4 Describe vaccine development pipelines	• Describe viral surveillance platforms • Explain One Health zoonotic virus response • Explain outbreak investigation • Describe vaccine development pipelines	Surveillance textbooks, LCD projector	• Set up ProMED, EMPRES-i, WAHIS subscriptions • Carry out One Health framework to zoonotic virus outbreak • Conduct outbreak investigation following WHO/OIE	Guide students to: • Set up ProMED, EMPRES-i, WAHIS subscriptions • Carry out One Health framework to zoonotic virus outbreak • Conduct outbreak investigation following WHO/OIE • Profile vaccine development for emerging viruses	Surveillance platforms, outbreak scenarios, vaccine information

				• Profile vaccine development for emerging viruses		
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



MYCOLOGY AND MYCOTOXIN DIAGNOSTICS

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: MYCOLOGY AND MYCOTOXIN DIAGNOSTICS	COURSE CODE: VLM 422	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of mycology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know Fungi and list their properties; 2.0 Know the classification of fungi based on mode of reproduction (sexual and asexual) and morphology; 3.0 Know fungi culture and Identification; 4.0 Know fungi diseases of animal; 5.0 Know Laboratory diagnosis and control of fungi diseases of economic importance.		

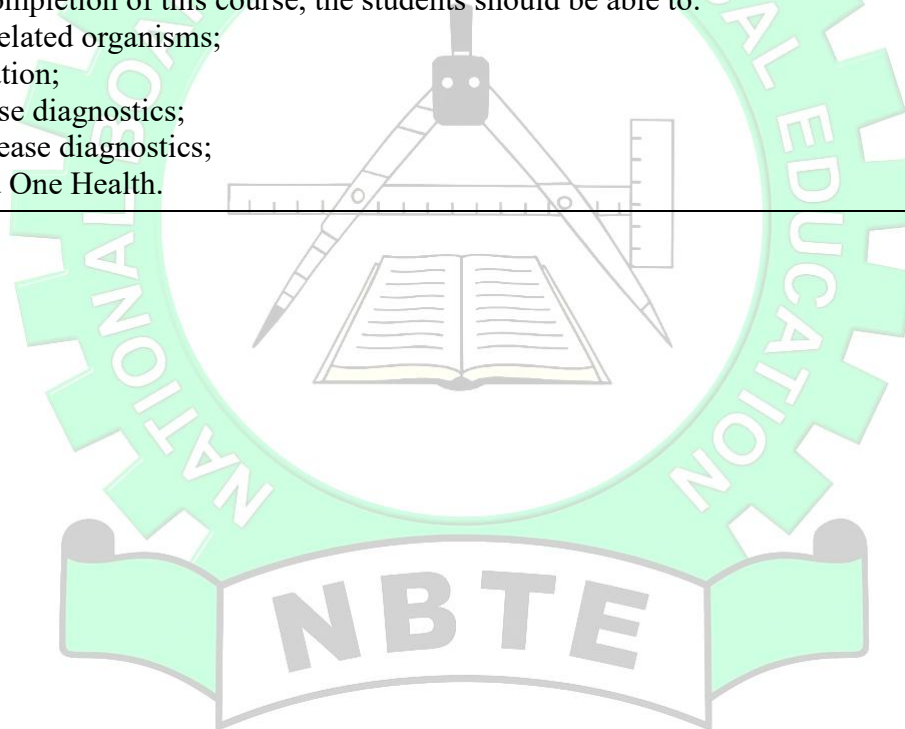
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: MYCOLOGY AND MYCOTOXIN DIAGNOSTICS			COURSE CODE: VLM 422		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of mycology.						
GENERAL OBJECTIVE 1.0: Know Fungi and list their properties						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define the properties of fungi 1.2 Outline the basic terms used in Mycology 1.3 State the role and importance of fungi in animal and Humans' health	- Explain the properties of fungi - Discuss the basic terms used in Mycology - Explain the role and importance of fungi in animal and Humans' health	Books Journals pictures PowerPoint, Charts, catalogue, posters,	Identify fungi, their relationship to human/animal, and their economic importance	Guide students to: Identify fungi, their relationship to human/animal, and their economic importance	Chart, Poster, Traps, Permanent slide, Projector,
GENERAL OBJECTIVE 2.0: Know the classification of fungi based on mode of reproduction (sexual and asexual) and morphology						
4-6	2.1 List fungi based on their Gram staining, reaction, morphological characteristics	Discuss fungi based on their Gram staining, reaction, morphological characteristics	Books Journals Charts Pictures PowerPoint Audiovisuals	Carry out fungi growth, morphology, Staining reaction and	Guide students to: Carry out fungi growth, morphology, Staining reaction and Reproduction	Microscope, media, wire loop, Bunsen burner, Petri-dish,

	(Mold and yeast) 2.2 Explain fungi based on Nutritional requirement 2.3 List the classification of fungi based on sites of infection 2.4 List the classification of fungi based on reproduction (sexual and asexual)	(Mold and yeast) • Explain fungi based on Nutritional requirement • Explain the classification of fungi based on sites of infection • Discuss the classification of fungi based on reproduction (sexual and asexual)		Reproduction		staining reagent, cotton wool,
GENERAL OBJECTIVE 3.0: 0 Know fungi staining and identification methods						
7-9	3.1 List the techniques of staining 3.2 Explain the application of the stains 3.3 Explain staining procedures	• Discuss the techniques of staining • Explain the application of the stains • Explain staining procedures	Books Journals Charts Pictures PowerPoints Audiovisuals	• Identify the staining techniques steps	Guide students to: • Identify the staining techniques steps	Microscope, media, wire loop, Bunsen burner, Petri-dish, staining reagent, cotton wool,
GENERAL OBJECTIVE 4.0: Know the procedure for fungi culture						
10-12	4.1 List different techniques for fungi culture 4.2 Explain fungi culture, identification and	• List different techniques for fungi culture • Explain fungi culture, identification and	Books Journals Charts Pictures PowerPoints Audiovisuals	• Carry out fungi culture techniques	Guide students to: • Carry out fungi culture techniques	Microscope, media, wire loop, Bunsen burner, Petri-dish, staining reagent,

	staining methods 4.3 Outline the procedure for making smears from solid media	staining methods • Outline the procedure for making smears from solid media				cotton wool
GENERAL OBJECTIVE 5.0: Know laboratory diagnosis and control of fungi diseases of economic importance						
13-15	5.1 Enumerate basic principles of fungi disease Diagnosis 5.2 List fungi diseases of economic importance 5.3 Outline types of samples for fungi disease listed in 5.2 above 5.4 Outline procedure for Laboratory test (s) required for each sample type in 5.3 above.	• Discuss basic principles Of fungi disease Diagnosis • Explain fungi diseases of economic importance • Discuss types of samples for fungi disease listed in 5.2 above • Explain procedure for Laboratory test (s) required for each sample type in 5.3 above.	Books Journals PowerPoints Charts	• Carry out samples for bacteria disease, diagnosis, • Carry out step for testing of samples for bacteria disease.	Guide students to: • Carry out samples for bacteria disease, diagnosis • Carry out step for testing of samples for bacteria disease.	Skin scrapings Urine Faces Milk Swaps Tissues
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

RICKETTSIOLOGY AND VECTOR-BORNE DISEASE DIAGNOSTICS

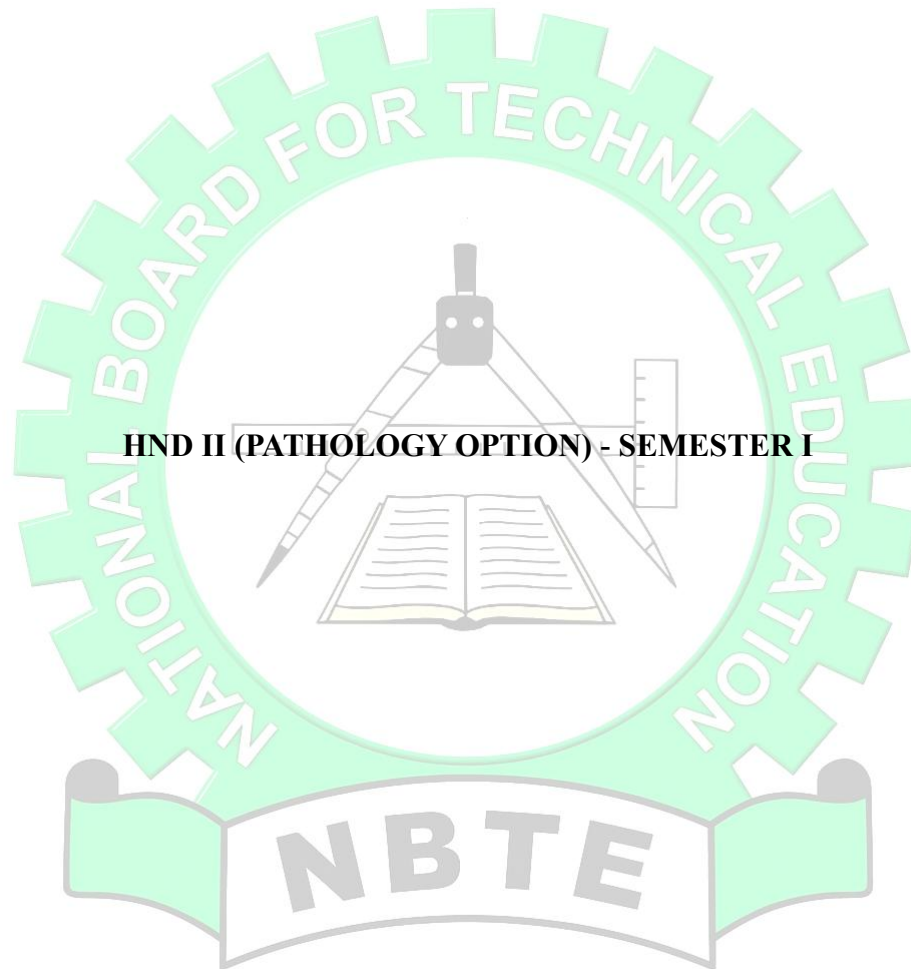
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: RICKETTSIOLOGY AND VECTOR-BORNE DISEASE DIAGNOSTICS	COURSE CODE: VLM 423	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOUR/WEEK
GOAL: This course is designed to equip students with knowledge and skills of veterinary rickettsiology and vector-borne disease diagnostics.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand rickettsiae and related organisms; 2.0 Understand vector identification; 3.0 Understand tick-borne disease diagnostics; 4.0 Understand insect-borne disease diagnostics; 5.0 Understand surveillance and One Health.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: RICKETTSIOLOGY AND VECTOR-BORNE DISEASE DIAGNOSTICS			COURSE CODE: VLM 423		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOUR/WEEK	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary rickettsiology and vector-borne disease diagnostics.						
GENERAL OBJECTIVE 1.0: Understand rickettsiae and related organisms						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe Rickettsia classification (typhus, spotted fever groups) 1.2 Explain Ehrlichia and Anaplasma 1.3 Explain Coxiella burnetii (Q fever) 1.4 Describe Chlamydia and Mycoplasma	• Explain Rickettsia classification (typhus, spotted fever groups) • Discuss Ehrlichia and Anaplasma • Explain Coxiella burnetii (Q fever) • Discuss Chlamydia and Mycoplasma	Rickettsiology textbooks, LCD projector	• Identify Rickettsia species in veterinary samples • Identify Ehrlichia and Anaplasma in blood smears • Diagnose Q fever using serology and PCR • Identify Chlamydia and Mycoplasma	Guide students to: • Identify Rickettsia species in veterinary samples • Identify Ehrlichia and Anaplasma in blood smears • Diagnose Q fever using serology and PCR • Identify Chlamydia and Mycoplasma	Microscopes, samples, serological reagents, PCR equipment
GENERAL OBJECTIVE 2.0: Understand vector identification						
4-6	2.1 Describe tick identification and life cycles	• Discuss tick identification and life cycles	Vector textbooks, LCD projector	• Identify 5 tick species and life stages	Guide students to: • Identify 5 tick species and life stages	Vector collections, stereomicroscop

	2.2 Explain mite vector identification 2.3 Explain flea vector identification 2.4 Describe mosquito and dipteran vectors	• Explain mite vector identification • Explain flea vector identification • Discuss mosquito and dipteran vectors		• Identify mite vectors of veterinary diseases • Identify flea vectors • Identify mosquitoes and other dipteran vectors	• Identify mite vectors of veterinary diseases • Identify flea vectors • Identify mosquitoes and other dipteran vectors	es, identification keys
GENERAL OBJECTIVE 3.0: Understand tick-borne disease diagnostics						
7-9	3.1 Explain heart water (Ehrlichia ruminantium) 3.2 Explain theileriosis and babesiosis 3.3 Describe Lyme disease in dogs and horses 3.4 Explain Rocky Mountain spotted fever	• Explain heart water (Ehrlichia ruminantium) • Explain theileriosis and babesiosis • Discuss Lyme disease in dogs and horses • Explain Rocky Mountain spotted fever	Tick-borne disease textbooks, LCD projector	• Diagnose heart water using PCR and serology • Diagnose theileriosis and babesiosis on blood smears • Diagnose Lyme disease using ELISA and Western blot • Diagnose RMSF using PCR and IFA	Guide students to: • Diagnose heart water using PCR and serology • Diagnose theileriosis and babesiosis on blood smears • Diagnose Lyme disease using ELISA and Western blot • Diagnose RMSF using PCR and IFA	PCR equipment, blood smears, serological kits
GENERAL OBJECTIVE 4.0: Understand insect-borne disease diagnostics						
10-12	4.1 Explain trypanosomiasis (Trypanosoma spp.) 4.2 Describe	• Explain trypanosomiasis (Trypanosoma spp.) • Discuss	Insect-borne disease textbooks, LCD projector	• Diagnose trypanosomiasis using blood smear, PCR	Guide students to: • Diagnose trypanosomiasis using blood smear, PCR	Microscopes, samples, PCR, ELISA kits

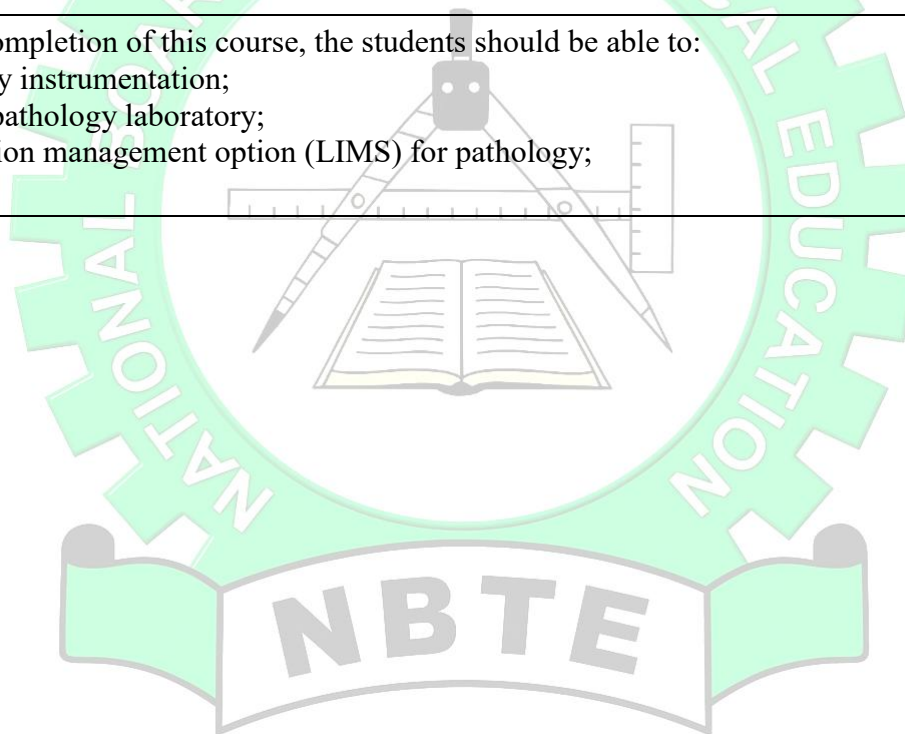
	leishmaniasis 4.3 Explain West Nile virus (WNV) 4.4 Explain Rift Valley Fever (RVF)	leishmaniasis • Explain West Nile virus (WNV) • Explain Rift Valley Fever (RVF)		• Diagnose leishmaniasis using lymph node aspirate, PCR, ELISA • Diagnose WNV using ELISA and PCR • Diagnose RVF using ELISA and PCR	• Diagnose leishmaniasis using lymph node aspirate, PCR, ELISA • Diagnose WNV using ELISA and PCR • Diagnose RVF using ELISA and PCR	
GENERAL OBJECTIVE 5.0: Understand surveillance and One Health						
13-15	5.1 Explain vector surveillance programs 5.2 Describe pathogen prevalence studies 5.3 Explain zoonotic vector-borne diseases (One Health) 5.4 Explain climate impact on vectors	• Explain vector surveillance programs • Discuss pathogen prevalence studies • Explain zoonotic vector-borne diseases (One Health) • Explain climate impact on vectors	Surveillance textbooks, LCD projector	• Set up vector surveillance using traps • Conduct pathogen prevalence study in vectors • Carry out One Health to zoonotic vector-borne disease • Map climate impact on vector distribution	Guide students to: • Set up vector surveillance using traps • Conduct pathogen prevalence study in vectors • Carry out One Health to zoonotic vector-borne disease • Map climate impact on vector distribution	Vector traps, study templates, climate data, mapping tools
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (PATHOLOGY OPTION) - SEMESTER I

INSTRUMENTATION AND SAFETY MEASURES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: INSTRUMENTATION AND SAFETY MEASURES	COURSE CODE: VLP 411	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of pathology instrumentation, safety measures, and digital laboratory technologies		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand pathology laboratory instrumentation; 2.0 Understand safety measures in pathology laboratory; 3.0 Understand laboratory information management option (LIMS) for pathology; 4.0 Understand digital pathology.		



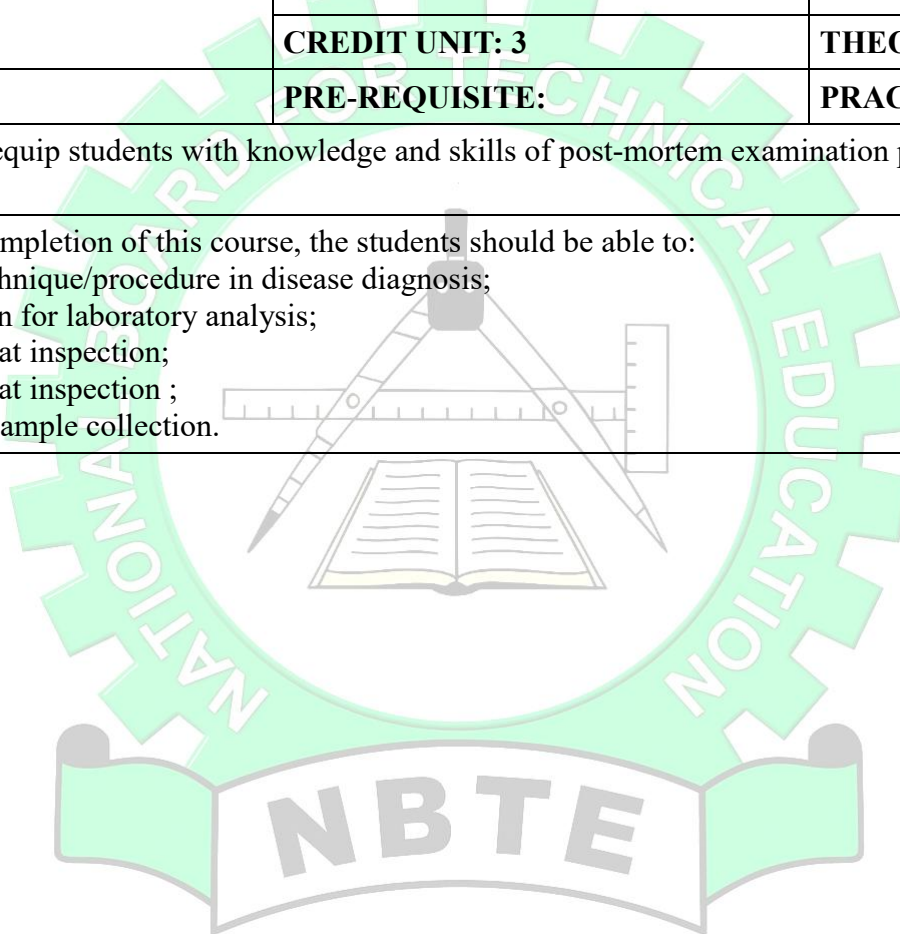
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: INSTRUMENTATION AND SAFETY MEASURES			COURSE CODE: VLP 411		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of pathology instrumentation, safety measures, and digital laboratory technologies						
GENERAL OBJECTIVE 1.0: Understand pathology laboratory instrumentation						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain microscopes (light, fluorescence, phase, digital) 1.2 List histology equipment (microtome, processor, embedder, stainer) 1.3 List haematology and biochemistry analysers 1.4 Explain ELISA and PCR equipment 1.5 Explain equipment maintenance	- Explain microscopes (light, fluorescence, phase, digital) - Discuss histology equipment (microtome, processor, embedder, stainer) - Explain haematology and biochemistry analysers - Explain ELISA and PCR equipment - Explain equipment maintenance	Pathology equipment manuals, LCD projector, internet, lecture notes, white board, marker, charts, videos	- Operate light, fluorescence, phase, digital microscopes - Operate microtome, processor, embedder, stainer - Operate haematology and biochemistry analysers - Operate ELISA reader and PCR thermocycler - Identify scheduled	Guide students to: - Operate light, fluorescence, phase, digital microscopes - Operate microtome, processor, embedder, stainer - Operate haematology and biochemistry analysers - Operate ELISA reader and PCR thermocycler - Identify scheduled equipment maintenance - Conduct equipment	Microscopes, histology equipment, analysers, ELISA/PCR equipment, PPE

				equipment maintenance • Conduct equipment maintenance	maintenance	
GENERAL OBJECTIVE 2.0: Understand safety measures in pathology lab						
4-6	2.1 Define biosafety (BSL-1, BSL-2, BSL-3) in pathology 2.2 Explain safety measures in the use of formalin and xylene. 2.3 Explain chemical, biological hazards 2.4 Explain waste management	• Discuss biosafety (BSL-1, BSL-2, BSL-3) in pathology • Explain safety measures in the use of formalin and xylene. • Explain chemical, biological hazards • Explain waste management	Laboratory safety textbooks, LCD projector internet, lecture notes, white board, marker, charts, videos	• Conduct pathology lab biosafety classification • Apply formalin and xylene safety protocols • Identify hazards and produce hazard register • Conduct waste management exercise	Guide students to: • Conduct pathology lab biosafety classification • Apply formalin and xylene safety protocols • Identify hazards and produce hazard register • Conduct waste management exercise	Biosafety checklists, PPE, hazard signs, autoclaves, biohazard bags
GENERAL OBJECTIVE 3.0: Understand LIMS for pathology						
7-10	3.1 Explain LIMS architecture for pathology workflow 3.2 Explain sample tracking and accessioning 3.3 Explain result entry and report generation 3.4 Explain cloud-based result	• Explain LIMS architecture for pathology workflow • Explain sample tracking and accessioning • Explain result entry and report generation • Explain cloud-based	LIMS manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Configure LIMS for pathology workflow • Access pathology samples through LIMS • Generate pathology reports in LIMS • Set up cloud-	Guide students to: • Configure LIMS for pathology workflow • Accession pathology samples through LIMS • Generate pathology reports in LIMS • Set up cloud-based result delivery	Demo LIMS, sample workflows, cloud accounts, PPE

	delivery	result delivery		based result delivery		
GENERAL OBJECTIVE 4.0: Understand digital pathology instruments						
11-15				• Identify digital pathology instrument • Perform the application of digital pathology • Carry out AI-assisted pathology tools	Guide students to: • Identify digital pathology instrument • Perform the application of digital pathology • Carry out AI-assisted pathology tools	Slide scanners, communication devices, digital cameras
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

POST-MORTEM EXAMINATION PRACTICE

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: POST-MORTEM EXAMINATION PRACTICE	COURSE CODE: VLP 412	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of post-mortem examination practice integrated with meat inspection.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand post-mortem technique/procedure in disease diagnosis; 2.0 Understand sample collection for laboratory analysis; 3.0 Understand ante-mortem meat inspection; 4.0 Understand post-mortem meat inspection ; 5.0 Understand slaughterhouse sample collection.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: POST-MORTEM EXAMINATION PRACTICE			COURSE CODE: VLP 412		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of post-mortem examination practice integrated with meat inspection.						
GENERAL OBJECTIVE 1.0: Understand post-mortem technique						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain PM protocols and systematic approach 1.2 Explain species-specific PM technique 1.3 Explain organ examination and lesion description 1.4 Explain PM safety and PPE	• Explain PM protocols and systematic approach • Explain species-specific PM technique • Explain organ examination and lesion description • Explain PM safety and PPE	Post-mortem manuals, LCD projector internet, white board, marker, charts, videos, lecture notes, text books	• Conduct complete PM on 3 species under supervision • Apply species-specific techniques (ruminant, equine, avian, canine) • Examine all organs • Identify lesions using standardized terminology	Guide students: • Conduct complete PM on 3 species under supervision • Apply species-specific techniques (ruminant, equine, avian, canine) • Examine all organs • Identify lesions using standardized terminology • Apply PM safety with full PPE	PM room, PPE, carcasses, PM kits

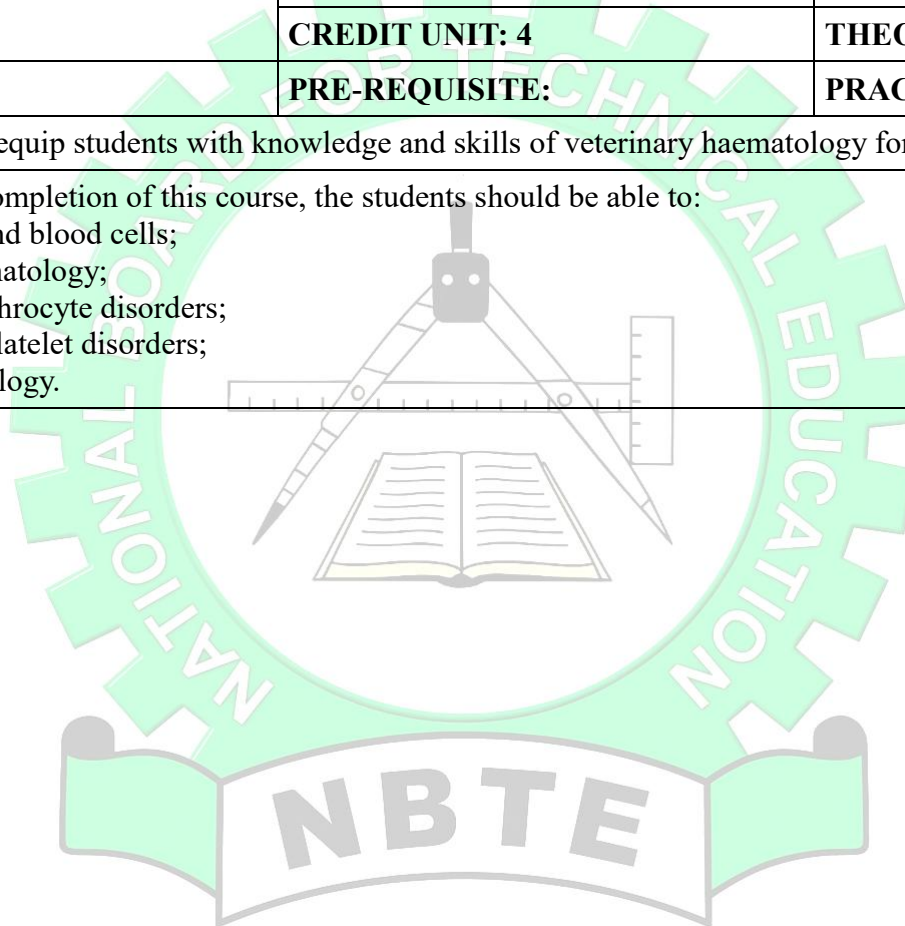
				• Apply PM safety with full PPE		
GENERAL OBJECTIVE 2.0: Understand sample collection for laboratory diagnosis						
4-6	2.1 Explain sample collection for histopathology 2.2 Explain sample collection for microbiology 2.3 Explain sample collection for toxicology 2.4 Explain sample collection for PCR/molecular	• Explain sample collection for histopathology • Explain sample collection for microbiology • Explain sample collection for toxicology • Explain sample collection for PCR/molecular	Sample collection manuals, LCD projector internet, white board, marker, charts, videos, lecture notes, text books	• Collect histopathology samples (fixation in formalin) • Collect microbiology samples (swabs, tissue) • Collect toxicology samples (liver, kidney, GI content) • Collect molecular samples (snap-frozen, RNAlater)	Guide students to: • Collect histopathology samples (fixation in formalin) • Collect microbiology samples (swabs, tissue) • Collect toxicology samples (liver, kidney, GI content) • Collect molecular samples (snap-frozen, RNAlater)	Sample containers, fixatives, swabs, tubes, fixation kits, PPE
GENERAL OBJECTIVE 3.0: Understand ante-mortem meat inspection						
7-9	3.1 Explain ante-mortem inspection protocols 3.2 Explain diseases requiring condemnation 3.3 Explain stress and welfare assessment	• Explain ante-mortem inspection protocols • Explain diseases requiring condemnation • Explain stress and welfare assessment pre-slaughter	Meat inspection manuals (FAO, Codex), LCD projector, internet, white board, marker,	• Conduct ante-mortem inspection on 20 animals at abattoir • Identify 3 cases requiring	Guide students to: • Conduct ante-mortem inspection on 20 animals at abattoir • Identify and report 3 cases requiring condemnation	Abattoir partner, PPE, inspection forms, inspection kits

	pre-slaughter 3.4 Explain documentation of findings	• Explain documentation of findings	charts, videos, lecture notes, text books	condemnation • Report 3 cases requiring condemnation • Assess animal welfare and stress pre-slaughter • Complete ante-mortem inspection forms	• Assess animal welfare and stress pre-slaughter • Complete ante-mortem inspection forms	
GENERAL OBJECTIVE 4.0: Understand post-mortem meat inspection						
10-12	4.1 Explain post-mortem inspection of carcasses, viscera 4.2 Explain some parasitic test during post mortem e.g Trichinella spiralis testing 4.3 Explain TB-lesion identification 4.4 Explain condemnation procedures and documentation	• Explain post-mortem inspection of carcasses, viscera • Explain some parasitic test during post mortem e.g Trichinella spiralis testing • Explain TB-lesion identification • Explain condemnation procedures and documentation	Meat inspection manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Conduct PM inspection on carcasses and viscera in abattoir • Conduct Trichinella testing using digestion method • Identify TB lesions • Differentiate from other granulomas • Process condemnation paperwork	Guide students to: • Conduct PM inspection on carcasses and viscera in abattoir • Conduct Trichinella testing using digestion method • Identify TB lesions • Differentiate from other granulomas • Process condemnation paperwork	Abattoir, PPE, Trichinella kit, lymph nodes, condemnation forms, PM kits
GENERAL OBJECTIVE 5.0: Understand slaughterhouse sample flow						

13-15	5.1 Explain slaughterhouse sample-flow workflow 5.2 Explain integration with laboratory confirmation 5.3 Explain documentation and chain-of-custody 5.4 Explain public-health reporting	• Explain slaughterhouse sample-flow workflow • Explain integration with laboratory confirmation • Explain documentation and chain-of-custody • Explain public-health reporting	Sample flow manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Track 15 abattoir samples through complete flow • Integrate meat inspection with lab confirmation • Maintain CoC documentation • Report public-health findings	Guide students to: • Track 15 abattoir samples through complete flow • Integrate meat inspection with lab confirmation • Maintain CoC documentation • Report public-health findings	Sample-tracking forms, lab access, public-health channels
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

HAEMATOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: HAEMATOLOGY	COURSE CODE: VLP 413	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary haematology for diagnostic interpretation.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand haemopoiesis and blood cells; 2.0 Understand automated haematology; 3.0 Understand anemia and erythrocyte disorders; 4.0 Understand leukocyte and platelet disorders; 5.0 Understand special haematology.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: HAEMATOLOGY			COURSE CODE: VLP 413		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 2 HOURS/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary haematology for diagnostic interpretation.						
GENERAL OBJECTIVE 1.0: Understand haemopoiesis and blood cells						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain haemopoiesis stages and bone marrow 1.2 Explain erythrocyte morphology and abnormalities 1.3 List leukocyte types and morphology 1.4 Explain platelet morphology	• Explain haemopoiesis stages and bone marrow • Explain erythrocyte morphology and abnormalities • Discuss leukocyte types and morphology • Explain platelet morphology	Haematology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Examine bone marrow smears • Identify precursor cells • Identify erythrocyte abnormalities on slides • Perform differential count on leukograms • Identify platelet morphology and abnormalities	Guide studetns to: • Examine bone marrow smears • Identify precursor cells • Identify erythrocyte abnormalities on slides • Perform differential count on leukograms • Identify platelet morphology and abnormalities	Microscopes, BM smears, blood smears, atlases; PPE
GENERAL OBJECTIVE 2.0: Understand total blood picture automated haematology						
4-6	2.1 Explain total blood	• Explain total blood	Haematology	• Operate CBC	Guide students to:	CBC analyser,

	picture. 2.2 Explain blood grouping. 2.3 Explain CBC analysers 2.4 Explain quality control on haematology 2.5 Explain reticulocyte counts 2.6 Explain species-specific haematology	picture. • Explain blood grouping. • Explain CBC analysers • Explain quality control on haematology • Explain reticulocyte counts • Explain species-specific haematology	lab manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	analyser on 20 samples • Run daily QC; plot Levey-Jenning's chart • Perform reticulocyte count using new methylene blue • Compare haematology across cattle, dog, cat, horse, poultry • Conduct blood grouping	• Operate CBC analyser on 20 samples • Run daily QC; plot Levey-Jenning's chart • Perform reticulocyte count using new methylene blue • Compare haematology across cattle, dog, cat, horse, poultry • Conduct blood grouping	QC materials, methylene blue, multi-species samples, haemocytometer, PPE
GENERAL OBJECTIVE 3.0: Understand anemia's and erythrocyte disorders						
7-9	3.1 Explain anemia classification (regenerative, non-regenerative) 3.2 Explain hemolytic anemia's 3.3 Explain iron-deficiency anemia 3.4 Explain chronic disease anaemia	• Explain anemia classification (regenerative, non-regenerative) • Explain hemolytic anemia's • Explain iron-deficiency anemia • Explain chronic disease anaemia	Anemia textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Classify anemia's in 10 patient cases • Diagnose hemolytic anemia using Coombs test • Diagnose iron-deficiency using serum iron, ferritin • Diagnose chronic disease anaemia	Guide students to: • Classify anemia's in 10 patient cases • Diagnose hemolytic anemia using Coombs test • Diagnose iron-deficiency using serum iron, ferritin • Diagnose chronic disease anaemia	Patient cases, Coombs reagents, iron panel kits, PPE
GENERAL OBJECTIVE 4.0: Understand leukocyte and platelet disorders						

10-12	4.1 Explain leukocytosis and leukopenia interpretation 4.2 Explain leukaemias and lymphomas 4.3 Explain thrombocytopenia 4.4 List coagulopathies (PT, aPTT, fibrinogen)	• Explain leukocytosis and leukopenia interpretation • Explain leukaemias and lymphomas • Explain thrombocytopenia • Discuss coagulopathies (PT, aPTT, fibrinogen)	Leukocyte/platelet textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Interpret leukograms in 10 sample cases • Identify leukaemia and lymphoma cells • Identify thrombocytopenia and causes • Perform PT, aPTT, fibrinogen tests	Guide students to: • Interpret leukograms in 10 sample cases • Identify leukaemia and lymphoma cells • Identify thrombocytopenia and causes • Perform PT, aPTT, fibrinogen tests	Sample cases, leukaemia slides, coagulation analyser, syringe, needle, sample bottles
GENERAL OBJECTIVE 5.0: Understand special haematology						
13-15	5.1 Explain bone marrow aspiration and core biopsy 5.2 Explain blood typing and cross-matching 5.3 Explain Coombs test (DAT) 5.4 Explain flow cytometry in haematology	• Explain bone marrow aspiration and core biopsy • Explain blood typing and cross-matching • Explain Coombs test (DAT) • Explain flow cytometry in haematology	Special haematology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes, text books	• Support bone marrow aspiration • Process samples • Perform blood typing and cross-matching • Run direct Coombs test • Demonstrate flow cytometry in haematology (or simulator)	Guide students to: • Support bone marrow aspiration • Process samples • Perform blood typing and cross-matching • Run direct Coombs test • Demonstrate flow cytometry in haematology (or simulator)	BM aspiration kits, blood typing reagents, Coombs reagents, flow cytometer, syringe, needle, sample bottle
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS	COURSE CODE: VLP 414	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary immunology and serological diagnostics applied to pathology.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand immunology fundamentals; 2.0 Understand serological methods; 3.0 Understand immunofluorescence (IF) and immunohistochemistry (IHC); 4.0 Understand autoimmunity and allergy testing; 5.0 Understand evaluation of response to vaccination		

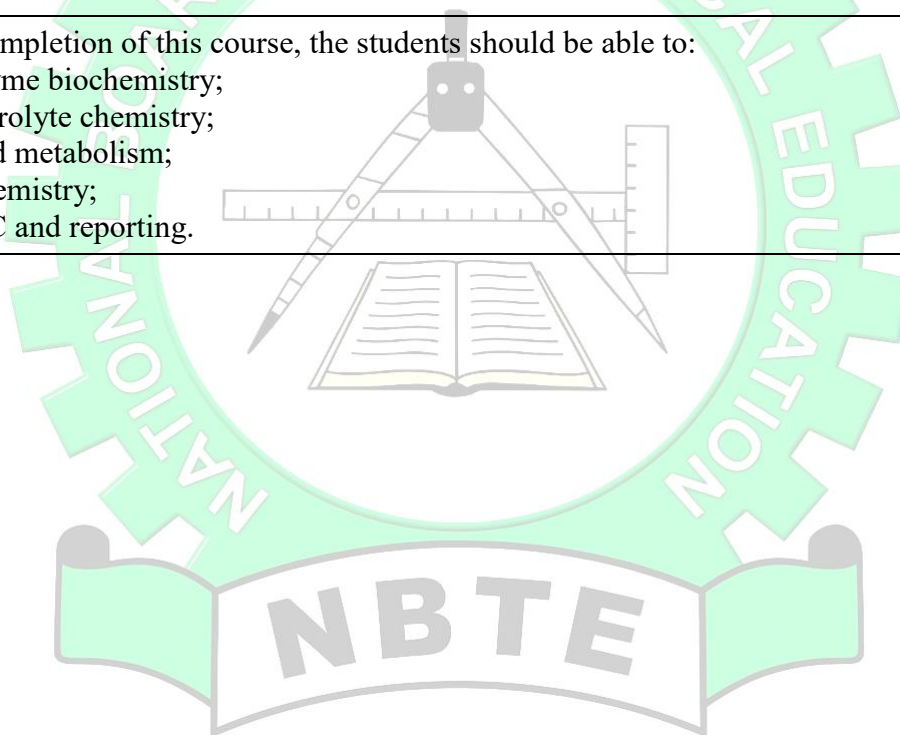
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: IMMUNOLOGY AND SEROLOGICAL DIAGNOSTICS			COURSE CODE: VLP 414		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary immunology and serological diagnostics applied to pathology.						
GENERAL OBJECTIVE 1.0: Understand immunology fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define innate and adaptive immunity 1.2 Explain immune cells and antibodies 1.3 Define hypersensitivity reactions 1.4 Define autoimmunity	• Discuss innate and adaptive immunity • Explain immune cells and antibodies • Explain hypersensitivity reactions • Discuss autoimmunity	Immunology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes,	• Identify responses in case scenarios • Identify immune cells on smears • Identify hypersensitivity reactions • Identify autoimmune diseases	Guide students to: • Identify responses in case scenarios • Identify immune cells on smears • Identify hypersensitivity reactions • Identify autoimmune diseases	Case scenarios, smears, autoimmune panels, syringe, needle, sample bottle
GENERAL OBJECTIVE 2.0: Understand serological methods						
4-6	2.1 Explain agglutination tests 2.2 Explain precipitation tests	• Explain agglutination tests • Explain precipitation tests	Serological, text books, LCD projector, internet, white	• Perform slide and tube agglutination • Perform AGID • Perform CFT	Guide students to: • Perform slide and tube agglutination • Perform AGID	Antigens, sera, AGID/CFT/ELISA equipment, syringe, needle,

	2.3 Explain complement fixation test 2.4 Explain ELISA methodology	• Explain complement fixation test • Explain ELISA methodology	board, marker, charts, videos, lecture notes,	• Perform indirect and sandwich ELISA	• Perform CFT • Perform indirect and sandwich ELISA	sample bottle
GENERAL OBJECTIVE 3.0: Understand immunofluorescence (IF) and immunohistochemistry (IHC)						
7-9	3.1 Define direct and indirect IF 3.2 Explain immunohistochemistry on tissue sections 3.3 Explain flow cytometry 3.4 Explain specific IHC markers	• Discuss direct and indirect IF • Explain immunohistochemistry on tissue sections • Explain flow cytometry • Explain specific IHC markers	Immunoassay textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Perform IF on cell samples • Perform IHC on paraffin sections • Demonstrate flow cytometry • Use specific IHC markers (CK, vimentin, CD3, CD20)	Guide students to: • Perform IF on cell samples • Perform IHC on paraffin sections • Demonstrate flow cytometry • Use specific IHC markers (CK, vimentin, CD3, CD20)	Fluorescence microscopes, IHC reagents, flow cytometer, syringe, needle, sample bottle
GENERAL OBJECTIVE 4.0: Understand autoimmunity and allergy testing						
10-12	4.1 Define antinuclear antibody (ANA) testing 4.2 Explain Coombs test 4.3 Define allergy testing 4.4 Explain rheumatoid factor and other	• Discuss ANA testing • Explain Coombs test • Explain allergy testing • Explain rheumatoid factor and other	Autoimmunity textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Conduct ANA test on patient samples • Conduct Coombs test for AIHA • Conduct intradermal allergy test • Conduct rheumatoid factor test	Guide students to: • Conduct ANA test on patient samples • Conduct Coombs test for AIHA • Conduct intradermal allergy test • Conduct rheumatoid factor test	ANA kits, Coombs reagents, allergens, RF kits, syringe, needle, sample bottle
GENERAL OBJECTIVE 5.0: Understand vaccine evaluation						

13-15	5.1 Define vaccine potency testing 5.2 Explain post-vaccination antibody titre 5.3 Explain herd immunity assessment 5.4 List DIVA strategies	• Discuss vaccine potency testing • Explain post-vaccination antibody titre • Explain herd immunity assessment • Discuss DIVA strategies	Vaccine evaluation textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Test vaccine potency • Measure post-vaccination titres • Assess herd immunity • Apply DIVA (differentiate infected from vaccinated)	Guide students to: • Test vaccine potency • Measure post-vaccination titres • Assess herd immunity • Apply DIVA (differentiate infected from vaccinated)	Vaccine samples, sera, DIVA kits, syringe, needle, sample bottle
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

CLINICAL BIOCHEMISTRY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: CLINICAL BIOCHEMISTRY	COURSE CODE: VLP 415	CONTACT HOURS: 4 HOURS/WEEKS
	CREDIT UNIT: 4	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 3 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary clinical biochemistry for diagnostic interpretation.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand protein and enzyme biochemistry; 2.0 Understand kidney and electrolyte chemistry; 3.0 Understand glucose and lipid metabolism; 4.0 Understand endocrine biochemistry; 5.0 Understand biochemistry QC and reporting.		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: CLINICAL BIOCHEMISTRY			COURSE CODE: VLP 415		CONTACT HOURS: 4 HOURS/WEEKS	
			CREDIT UNIT: 4		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 3 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary clinical biochemistry for diagnostic interpretation.						
GENERAL OBJECTIVE 1.0: Understand protein and enzyme biochemistry						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Describe total protein, albumin, globulin 1.2 Explain protein electrophoresis 1.3 Explain liver enzymes (ALT, AST, ALP, GGT) 1.4 Describe muscle enzymes (CK, LDH)	• Explain proteins • Discuss electrophoresis • Discuss liver enzymes • Discuss muscle enzymes	Clinical biochemistry textbooks, LCD projector	• Measure total protein, albumin, globulin on biochemistry analyser • Run protein electrophoresis • Interpret patterns • Run liver enzyme panel • Interpret in 5 clinical cases • Run muscle enzyme panel	Guide students to: • Measure total protein, albumin, globulin on biochemistry analyser • Run protein electrophoresis • Interpret patterns • Run liver enzyme panel • Interpret in 5 clinical cases • Run muscle enzyme panel • Interpret elevations	Biochemistry analyser, electrophoresis equipment, sera, patient cases

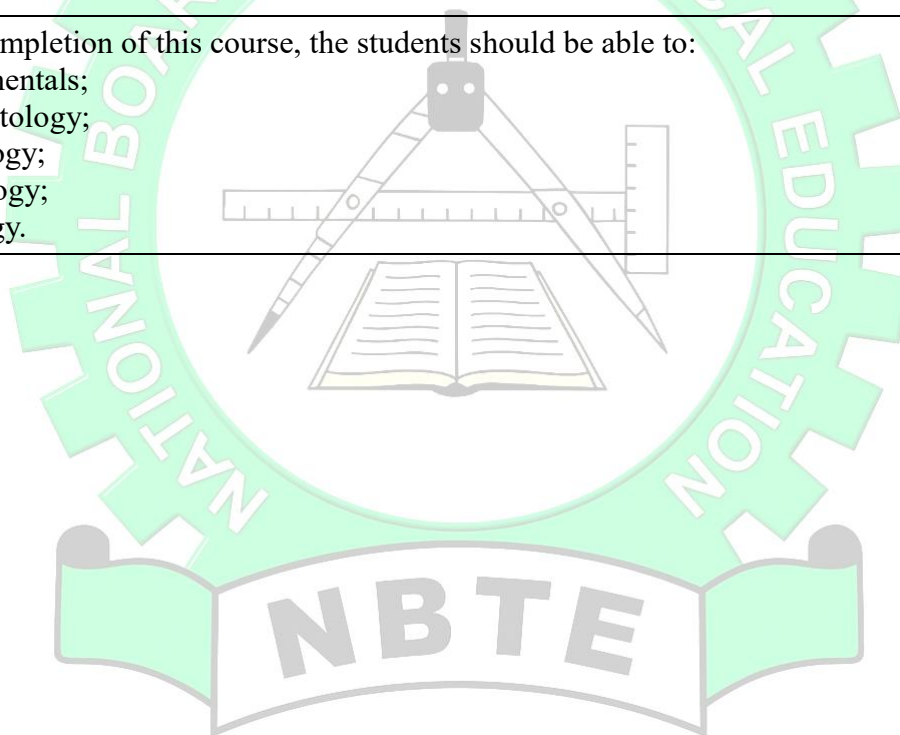
				• Interpret elevations		
GENERAL OBJECTIVE 2.0: Understand kidney and electrolyte chemistry						
4-6	2.1 Explain BUN, creatinine, SDMA 2.2 Describe electrolytes (Na, K, Cl) 2.3 Explain calcium, phosphorus, magnesium 2.4 Explain acid-base and blood gas	• Explain BUN, creatinine, SDMA • Explain electrolytes (Na, K, Cl) • Explain calcium, phosphorus, magnesium • Explain acid-base and blood gas	Renal/electrolyte textbooks, LCD projector	• Measure BUN, creatinine • Assess renal function in 5 cases • Measure electrolytes • Interpret imbalances • Measure Ca, P, Mg • Interpret in metabolic disorders • Conduct blood gas analysis • Interpret acid-base status	Guide students to: • Measure BUN, creatinine • Assess renal function in 5 cases • Measure electrolytes; interpret imbalances • Measure Ca, P, Mg • Interpret in metabolic disorders • Conduct blood gas analysis • Interpret acid-base status	Biochemistry analyser, blood gas analyser, sera, patient cases
GENERAL OBJECTIVE 3.0: Understand glucose and lipid metabolism						
7-9	3.1 Describe glucose and insulin testing 3.2 Explain fructosamine and glycated haemoglobin 3.3 Explain cholesterol,	• Explain glucose and insulin testing • Explain fructosamine and glycated haemoglobin • Explain cholesterol,	Glucose/lipid textbooks, LCD projector	• Run glucose and insulin tests • Calculate glucose insulin ratio • Run fructosamine	Guide students to: • Run glucose and insulin tests • Calculate glucose insulin ratio • Run fructosamine and glycated Hb	Glucose meters, fructosamine kits, lipid kits, patient cases

	triglycerides, lipoproteins 3.4 Describe diabetes and metabolic syndrome	triglycerides, lipoproteins • Discuss diabetes and metabolic syndrome		and glycated Hb • Run lipid panel (cholesterol, TG, HDL, LDL) • Diagnose diabetes in canine/feline cases	• Run lipid panel (cholesterol, TG, HDL, LDL) • Diagnose diabetes in canine/feline cases	
GENERAL OBJECTIVE 4.0: Understand endocrine biochemistry						
10-12	4.1 Describe thyroid function tests (T4, T3, TSH) 4.2 Explain adrenal function (cortisol, ACTH stim) 4.3 Describe reproductive hormones (progesterone, oestrogen) 4.4 Explain pancreatic enzymes (amylase, lipase, PLI)	• Explain thyroid function tests (T4, T3, TSH) • Explain adrenal function (cortisol, ACTH stim) • Discuss reproductive hormones (progesterone, oestrogen) • Explain pancreatic enzymes (amylase, lipase, PLI)	Endocrine textbooks, LCD projector	• Run thyroid panel • Diagnose hypo/hyper thyroidism • Run ACTH stim test Diagnose Cushing/Addison • Run progesterone Assess oestrous cycle • Run amylase, lipase, PLI • Diagnose pancreatitis	Guide students to • Run thyroid panel • Diagnose hypo/hyper thyroidism • Run ACTH stim test Diagnose Cushing/Addison • Run progesterone Assess oestrous cycle • Run amylase, lipase, PLI • Diagnose pancreatitis	Hormone analysers, ACTH, ELISA kits, patient cases
GENERAL OBJECTIVE 5.0: Understand biochemistry QC and reporting						

13-15	5.1 Describe biochemistry QC and Levey-Jennings 5.2 Explain reference interval determination 5.3 Explain interpretation algorithms 5.4 Explain reporting and clinical correlation	• Discuss biochemistry QC and Levey-Jennings • Explain reference interval determination • Explain interpretation algorithms • Explain reporting and clinical correlation	Biochemistry QC textbooks, LCD projector	• Run daily QC • Plot Levey-Jennings • Perform Westgard rules • Determine reference intervals using 40 healthy animals • Conduct interpretation algorithms to 10 sample panels • Carry out biochemistry reports with clinical correlation	Guide students to: • Run daily QC • Plot Levey-Jennings • Perform Westgard rules • Determine reference intervals using 40 healthy animals • Conduct interpretation algorithms to 10 sample panels • Carry out biochemistry reports with clinical correlation	QC materials, healthy animals, interpretation algorithms, report templates
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

CYTOLOGY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: CYTOLOGY	COURSE CODE: VLP 416	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of veterinary cytology for diagnostic interpretation of cell preparations.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand cytology fundamentals; 2.0 Understand inflammatory cytology; 3.0 Understand neoplastic cytology; 4.0 Understand body fluid cytology; 5.0 Understand specialty cytology.		



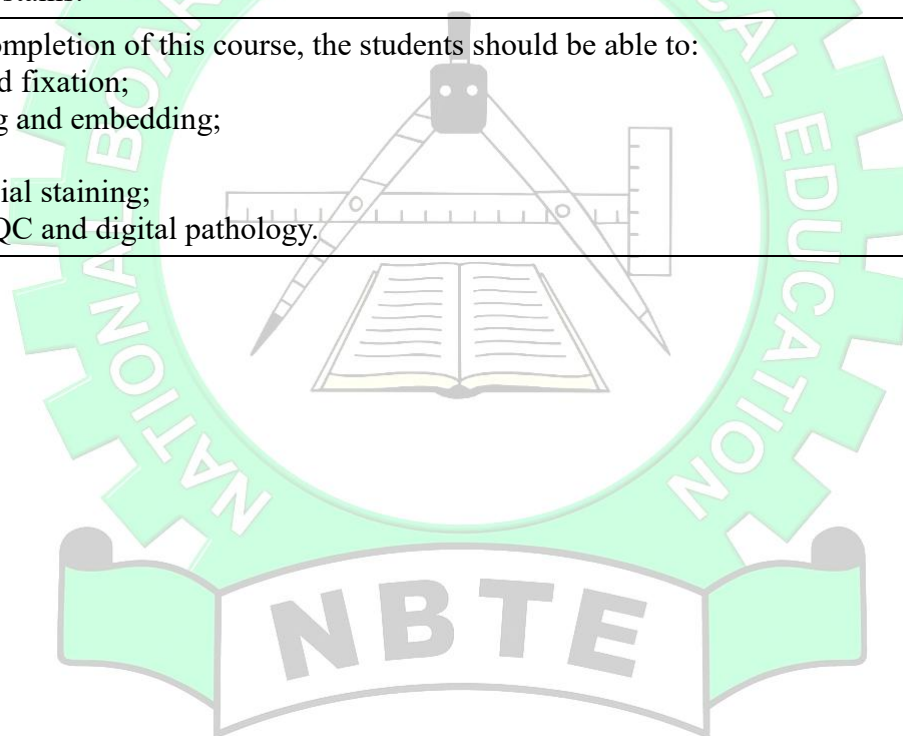
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: CYTOLOGY			COURSE CODE: VLP 416		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of veterinary cytology for diagnostic interpretation of cell preparations.						
GENERAL OBJECTIVE 1.0: Understand cytology fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define cytology 1.2 Explain cytology sample types (FNA, smear, brush, fluid) 1.3 Explain cytology sample collection 1.4 Explain cytology preparation and staining 1.5 Differentiate cytology from histopathology	- Define cytology - Explain cytology sample types (FNA, smear, brush, fluid) - Explain cytology sample collection - Explain cytology preparation and staining - Differentiate cytology from histopathology	Cytology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	- Identify and collect 4 cytology sample types - Perform FNA on superficial masses - Prepare and stain cytology slides (Diff-Quik, Wright) - Compare cytology and histopathology approaches	Supervise sample ID Discuss FNA Lead preparation Discuss comparison	FNA needles, slides, stains, microscopes, sample bottle, PPE
GENERAL OBJECTIVE 2.0: Understand inflammatory cytology						
4-6	2.1 Explain acute inflammation	Explain acute inflammation	Inflammatory cytology	Identify acute inflammation on 5	Guide students to: Identify acute	Sample cytology slides,

	cytology (neutrophils) 2.2 Explain chronic inflammation (lymphocytes, plasma cells, macrophages) 2.3 Explain granulomatous inflammation 2.4 Explain eosinophilic inflammation	cytology (neutrophils) - Explain chronic inflammation (lymphocytes, plasma cells, macrophages) - Explain granulomatous inflammation - Explain eosinophilic inflammation	textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	slides - Identify chronic inflammation on 5 slides - Identify granulomatous inflammation on 5 slides - Identify eosinophilic inflammation on 5 slides	inflammation on 5 slides - Identify chronic inflammation on 5 slides - Identify granulomatous inflammation on 5 slides - Identify eosinophilic inflammation on 5 slides	microscopes, atlases, PPE
GENERAL OBJECTIVE 3.0: Understand neoplastic cytology						
7-9	3.1 Explain criteria of malignancy 3.2 Explain round cell tumours 3.3 Explain epithelial tumours 3.4 Explain mesenchymal tumours	- Explain criteria of malignancy - Explain round cell tumours - Explain epithelial tumours - Explain mesenchymal tumours	Cytology of tumours textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	- Carry out malignancy criteria to 10 sample cytologies - Identify round cell tumours (lymphoma, mast cell, histiocytoma, plasmacytoma, TVT) - Identify epithelial tumours (carcinoma, adenoma) - Identify mesenchymal tumours (sarcoma)	Guide students to: - Carry out malignancy criteria to 10 sample cytologies - Identify round cell tumours (lymphoma, mast cell, histiocytoma, plasmacytoma, TVT) - Identify epithelial tumours (carcinoma, adenoma) - Identify mesenchymal tumours (sarcoma)	Tumour cytology slides, atlases, PPE.

GENERAL OBJECTIVE 4.0: Understand body fluid cytology						
10-12	4.1 Describe transudates, exudates, modified transudates 4.2 Explain abdominal/thoracic effusions 4.3 Explain CSF analysis 4.4 Describe joint fluid analysis	• Discuss transudates, exudates, modified transudates • Explain abdominal/thoracic effusions • Explain CSF analysis • Discuss joint fluid analysis	Body fluid cytology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Classify fluid based on protein, cell count • Analyse abdominal or thoracic effusions • Process and analyse CSF • Process and analyse joint fluid	Supervise classification, effusion and analysis Demonstrate CSF and joint fluid analysis	Fluid samples, cytology equipment, atlases, PPE
GENERAL OBJECTIVE 5.0: Understand special cytology						
13-15	5.1 Explain respiratory cytology 5.2 Explain urinary cytology 5.3 Explain reproductive cytology (vaginal, semen) 5.4 Explain lymph node cytology	• Explain respiratory cytology • Explain urinary cytology • Explain reproductive cytology (vaginal, semen) • Explain lymph node cytology	Specialty cytology textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Process and analyse BAL/tracheal wash • Process and analyse urinary cytology • Process vaginal and semen cytology • Process lymph node FNA cytology	Guide students to: • Process and analyse BAL/tracheal wash • Process and analyse urinary cytology • Process vaginal and semen cytology • Process lymph node FNA cytology	Specialty samples, cytology equipment, atlases, PPE
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

HISTOPATHOLOGIC TECHNIQUES

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: HISTOPATHOLOGIC TECHNIQUES	COURSE CODE: VLP 417	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of histopathologic techniques including tissue processing, embedding, microtomy, and special stains.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand tissue sliding and fixation; 2.0 Understand tissue processing and embedding; 3.0 Understand microtomy; 4.0 Understand routine and special staining; 5.0 Understand histopathology QC and digital pathology.		



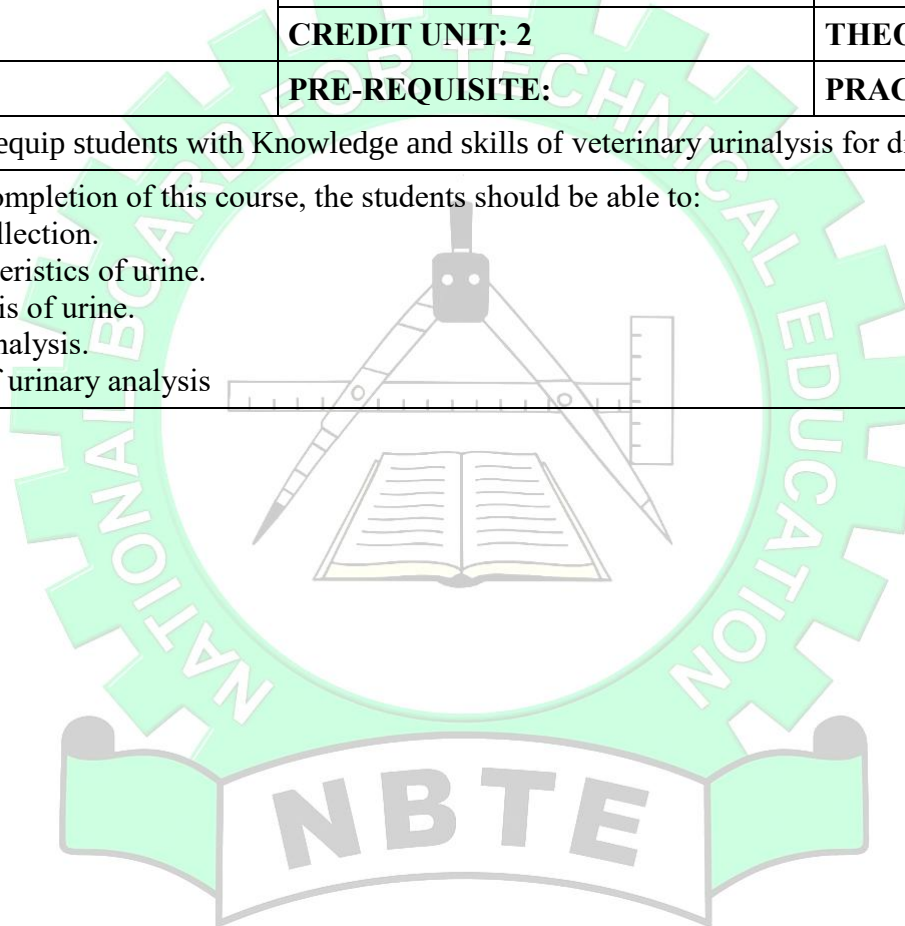
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: HISTOPATHOLOGIC TECHNIQUES			COURSE CODE: VLP 417		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of histopathologic techniques including tissue processing, embedding, microtomy, and special stains.						
GENERAL OBJECTIVE 1.0: Understand tissue fixation						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 List fixative types (formalin, Bouin, alcohol, glutaraldehyde) 1.2 Explain fixation principles and timing 1.3 Explain special fixatives for specific tissues 1.4 Explain post-fixation processing	- List fixative types (formalin, Bouin, alcohol, glutaraldehyde) - Explain fixation principles and timing - Explain special fixatives for specific tissues - Explain post-fixation processing	Fixation textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	- Prepare 10% NBF and other fixatives - Fix tissues following standard protocols - Apply Bouin and alcohol fixatives for special tissues - Conduct post-fixation washing and storage	Guide studetns to: - Prepare 10% NBF and other fixatives - Fix tissues following standard protocols - Apply Bouin and alcohol fixatives for special tissues - Conduct post-fixation washing and storage	Fixatives, tissue samples, containers, processing trays, PPE
GENERAL OBJECTIVE 2.0: Understand tissue processing and embedding						
4-6	2.1 Explain dehydration	Explain dehydration through alcohols	Tissue processing	Perform manual dehydration	Guide students to: Perform manual	Alcohols, xylene, paraffin,

	through alcohols 2.2 Explain clearing in xylene 2.3 Explain infiltration and embedding in paraffin 2.4 Explain automated tissue processor operation	• Explain clearing in xylene • Explain infiltration and embedding in paraffin • Explain automated tissue processor operation	manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes	through alcohols • Perform xylene clearing • Perform paraffin infiltration and embedding • Operate automated tissue processor	dehydration through alcohols • Perform xylene clearing • Perform paraffin infiltration and embedding • Operate automated tissue processor	embedding moulds, tissue processor, PPE
GENERAL OBJECTIVE 3.0: Understand microtomy						
7-9	3.1 List microtome types (rotary, sliding, cryostat) 3.2 Explain microtome operation and section cutting 3.3 Explain section mounting and drying 3.4 Explain frozen sections (cryostat)	• List microtome types (rotary, sliding, cryostat) • Explain microtome operation and section cutting • Explain section mounting and drying • Explain frozen sections (cryostat)	Microtomy manuals, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Identify and operate rotary microtome • Cut 5-µm paraffin sections • Mount sections on slides; dry on warmer • Cut frozen sections on cryostat	Guide students to: • Identify and operate rotary microtome • Cut 5-µm paraffin sections • Mount sections on slides; dry on warmer • Cut frozen sections on cryostat	Microtomes, blades, slides, warming plates, cryostat, PPE
GENERAL OBJECTIVE 4.0: Understand routine and special staining						
10-12	4.1 Explain haematoxylin and eosin (H&E) 4.2 Explain special stains (PAS, Masson trichrome, Gomori, Congo red)	• Explain haematoxylin and eosin (H&E) • Explain special stains (PAS, Masson trichrome, Gomori, Congo red)	Histological staining textbooks, LCD projector, internet, white board, marker, charts, videos,	• Perform H&E staining on 10 sections • Perform PAS, Masson trichrome, Gomori, Congo red	Guide students to: • Perform H&E staining on 10 sections • Perform PAS, Masson trichrome, Gomori, Congo red	Stains, slides, mounting media, coverslips, archives, PPE

	4.3 Explain staining double shooting 4.4 Explain slide cover slipping and storage	• Explain staining double shooting • Explain slide cover slipping and storage	lecture notes	• Troubleshoot 5 staining problems • Coverslip and archive 20 slides	• Troubleshoot 5 staining problems • Coverslip and archive 20 slides	
GENERAL OBJECTIVE 5.0: Understand histopathology QC and digital pathology						
13-15	5.1 Explain slide quality assessment 5.2 Explain lab QC programs 5.3 Explain digital slide scanning 5.4 Explain slide archiving and retrieval	• Explain slide quality assessment • Explain lab QC programs • Explain digital slide scanning • Explain slide archiving and retrieval	Histopathology QC textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Assess slide quality (section thickness, staining, mounting) • Conduct lab QC for stains and equipment • Scan 20 slides using digital slide scanner • Maintain slide archive with retrieval system	Guide students to: • Assess slide quality (section thickness, staining, mounting) • Conduct lab QC for stains and equipment • Scan 20 slides using digital slide scanner • Maintain slide archive with retrieval system	Quality checklists, slide scanners, archive systems, PPE
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

URINALYSIS

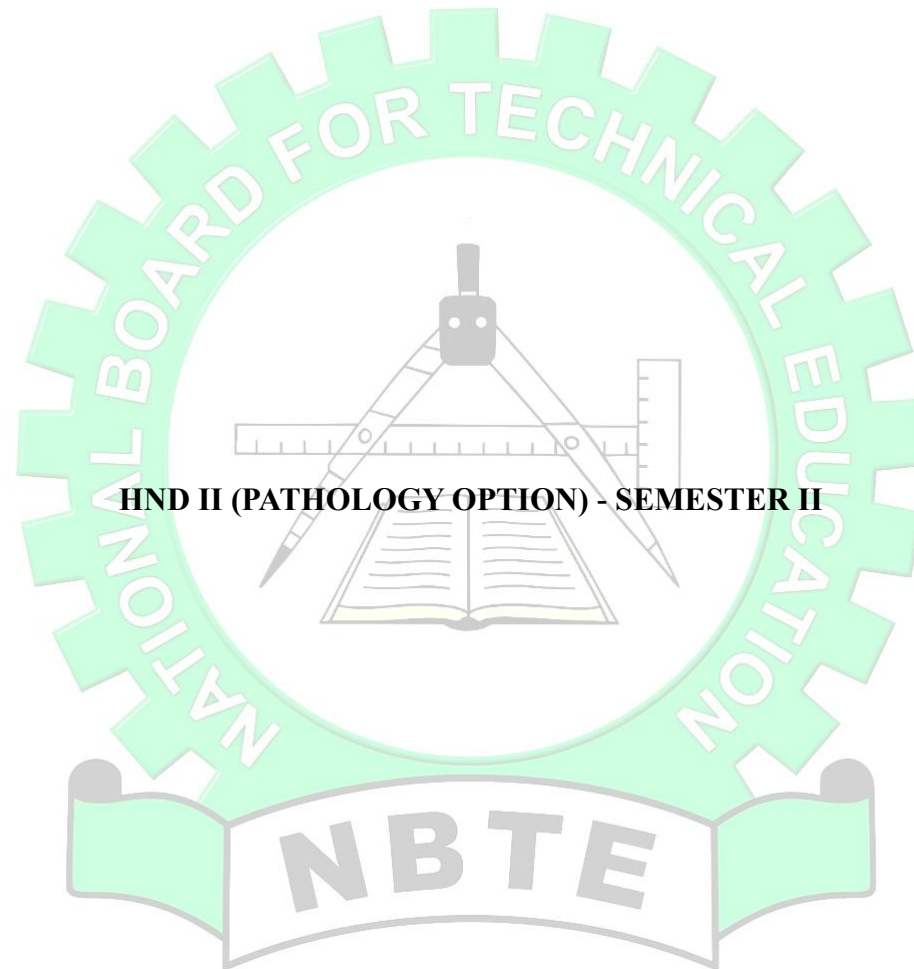
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: URINALYSIS	COURSE CODE: VLP 418	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: I	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of veterinary urinalysis for diagnostic interpretation.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand urine sample collection. 2.0 Understand physical characteristics of urine. 3.0 Understand chemical analysis of urine. 4.0 Understand microscopic urinalysis. 5.0 Understand interpretation of urinary analysis		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: URINALYSIS			COURSE CODE: VLP 418		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: I			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of veterinary urinalysis for diagnostic interpretation.						
GENERAL OBJECTIVE 1.0: Understand urine sample collection						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Explain free-catch collection 1.2 Explain cystocentesis 1.3 Explain catheterization 1.4 Explain sample preservation and timing	• Explain free-catch collection • Explain cystocentesis • Explain catheterization • Explain sample preservation and timing	Urinalysis textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	• Collect free-catch samples from canine/feline patients • Perform cystocentesis under ultrasound guidance • Catheterize male and female patients • Preserve samples and document collection time	Guide students to: • Collect free-catch samples from canine/feline patients • Perform cystocentesis under ultrasound guidance • Catheterize male and female patients • Preserve samples and document collection time	Patients, sample containers, ultrasound, catheters, PPE
GENERAL OBJECTIVE 2.0: Understand physical examination of urine						
4-6	2.1 Explain colour and	• Explain colour and	Physical	• Assess colour and	Guide students to:	Urine samples,

	clarity 2.2 Explain specific gravity (refractometer) 2.3 Explain odour 2.4 Explain volume measurement	clarity - Explain specific gravity (refractometer) - Explain odour - Explain volume measurement	examination textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	clarity of 10 urine samples - Measure specific gravity using refractometer - Document urine odour for clinical correlation - Measure 24-hour urine volume	- Assess colour and clarity of 10 urine samples - Measure specific gravity using refractometer - Document urine odour for clinical correlation - Measure 24-hour urine volume	refractometers, volumetric tools, PPE.
GENERAL OBJECTIVE 3.0: Understand chemical analysis of urine						
7-9	3.1 Explain dipstick analysis 3.2 Explain protein quantification 3.3 Explain urine glucose, ketones 3.4 Explain urine pH and electrolytes	- Explain dipstick analysis - Explain protein quantification - Explain urine glucose, ketones - Explain urine pH and electrolytes	Chemical urinalysis textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	- Perform dipstick on 10 urine samples - Interpret the results - Quantify protein using UPC (urine protein creatinine) - Measure glucose and ketones quantitatively - Measure pH and electrolytes	Guide students to: - Perform dipstick on 10 urine samples - Interpret the results - Quantify protein using UPC (urine protein creatinine) - Measure glucose and ketones quantitatively - Measure pH and electrolytes	Dipsticks, urine samples, protein analyser, pH meters, PPE
GENERAL OBJECTIVE 4.0: Understand microscopic urinalysis						
10-12	4.1 Explain urine sediment preparation	Explain urine sediment preparation	Sediment microscopy textbooks, LCD	Prepare urine sediment by centrifugation	Guide students to: Prepare urine sediment by centrifugation	Centrifuges, microscopes, sediment atlases,

	4.2 List cellular elements (RBC, WBC, epithelial) 4.3 Explain casts (hyaline, granular, cellular) 4.4 Explain crystals and microorganisms	- List cellular elements (RBC, WBC, epithelial) - Explain casts (hyaline, granular, cellular) - Explain crystals and microorganisms	projector, internet, white board, marker, charts, videos, lecture notes	- Identify cellular elements on 10 sediments - Identify casts on 10 sediments - Identify crystals and microorganisms	- Identify cellular elements on 10 sediments - Identify casts on 10 sediments - Identify crystals and microorganisms	PPE
GENERAL OBJECTIVE 5.0: Understand urinary disorders interpretation						
13-15	5.1 Explain UTI diagnosis (culture, sensitivity) 5.2 Explain renal disease interpretation 5.3 Explain urolithiasis assessment 5.4 Explain diabetes and metabolic disorders	- Explain UTI diagnosis (culture, sensitivity) - Explain renal disease interpretation - Explain urolithiasis assessment - Explain diabetes and metabolic disorders	Urinary disorders textbooks, LCD projector, internet, white board, marker, charts, videos, lecture notes	- Diagnose UTI with culture and sensitivity - Interpret urinalysis in renal disease - Assess urolithiasis with sediment and imaging correlation - Interpret urinalysis in diabetes/metabolic disorders	Guide students to: - Diagnose UTI with culture and sensitivity - Interpret urinalysis in renal disease - Assess urolithiasis with sediment and imaging correlation - Interpret urinalysis in diabetes/metabolic disorders	Culture media, patient cases, imaging records
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HND II (PATHOLOGY OPTION) - SEMESTER II

IMMUNOPATHOLOGY

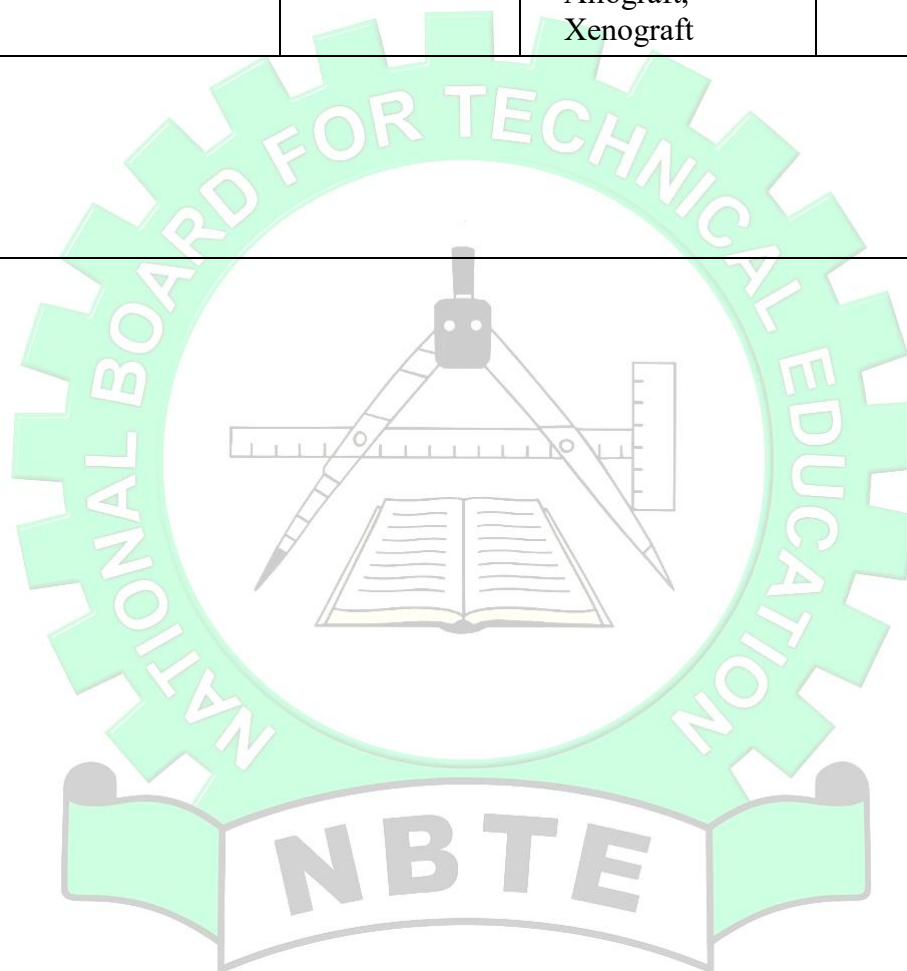
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: IMMUNOPATHOLOGY	COURSE CODE: VLP 421	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEKS
GOAL: This course is designed to equip students with Knowledge and skills of immunopathology focusing on immune-mediated disease diagnosis.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Know the relationship between the immune system and disease processes; 2.0 Know autoimmune diseases and hypersensitivity reactions; 3.0 Know immune mediated diseases and disorders; 4.0 Know immunological diagnostic techniques; 5.0 Know transplantation and tumor immunology.		

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: IMMUNOPATHOLOGY			COURSE CODE: VLP 421		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEKS	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of immunopathology focusing on immune-mediated disease diagnosis.						
GENERAL OBJECTIVE 1.0: Know the relationship between the immune system and disease processes						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define Immunopathology 1.2 Explain components of immune system 1.3 Explain the functions of immune organs and cells 1.4 Explain disease processes in immune system	• Explain Immunopathology • Explain components of immune system • Explain the functions of immune organs and cells • Explain disease processes in immune system	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify normal cells from diseased immune system	Guide students to: • Identify normal cells from diseased immune system	Pictures, Atlas, Projector, Internet, PPE
GENERAL OBJECTIVE 2.0: Know autoimmune diseases and hypersensitivity reactions.						
4-6	2.1 Define autoimmune disease 2.2 Explain the	• Explain autoimmune disease	Textbooks, Journals, Pictures,	• Identify autoimmune	Guide students to: • Identify autoimmune	ANA kits, microscopes, RF kits, TgAA kits,

	mechanism of autoimmunity 2.3 List types of autoimmune diseases 2.4 Explain various diagnostic approaches used in autoimmune diseases	• Explain the mechanism of autoimmunity • Discuss types of autoimmune diseases • Explain various diagnostic approaches used in autoimmune diseases	Projector, white board marker, internet, Charts	reactions using diagnostic tests • Perform various diagnostic test used in autoimmune disease e.g ANA test, RF test, ELISA	reactions using diagnostic tests • Demonstrate various diagnostic test used in autoimmune disease e.g ANA test, RF test, ELISA	PPE
GENERAL OBJECTIVE 3.0: Know immune mediated diseases and disorders.						
7-9	3.1 Explain Immune mediated disorders 3.2 List various types of immune mediated disorders 3.3 Explain the mechanisms of immune mediated diseases and disorders in animals	• Explain Immune mediated disorders • Discuss various types of immune mediated disorders • Explain the mechanisms of immune mediated diseases and disorders in animals	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify various immunodeficiency disorders in animals • Carry out various diagnostic test used in immunodeficiency disorders in animals e.g Complete Blood Count (CBC), Serum immunoglobulin Quantification (SIQ) test, ELISA	Guide students to: • Identify various immunodeficiency disorders in animals • Carry out various diagnostic test used in immunodeficiency disorders in animals e.g Complete Blood Count (CBC), Serum immunoglobulin Quantification (SIQ) test, ELISA	Blood sample, Reagents, Microscope, PPE, ELISA Reader, Glass slides and cover slip
GENERAL OBJECTIVE 4.0: Know immunological diagnostic techniques.						

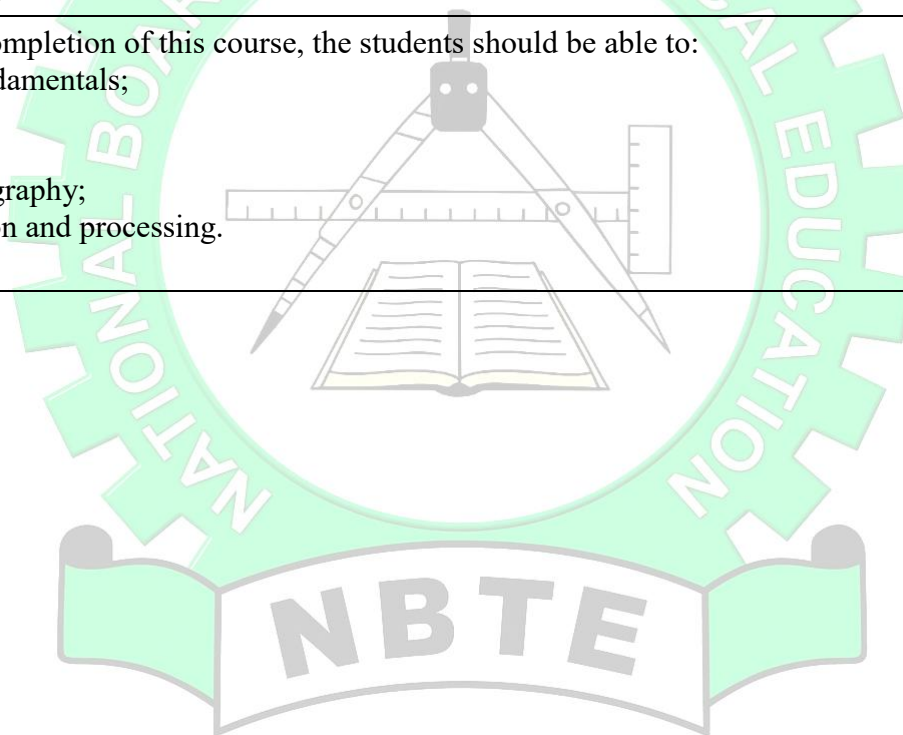
10-12	4.1 Explain diagnostic techniques in immunology 4.2 List various types of immunological techniques used in diagnostic Laboratories e.g Immunohistochemistry 4.3 Explain various immunological techniques used in diagnostic Laboratory for animals	• Explain diagnostic techniques in immunology • Discuss various types of immunological techniques used in diagnostic Laboratories e.g Immunohistochemistry • Explain various immunological techniques used in diagnostic Laboratory for animals	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify various immunological diagnostic techniques used in the Laboratories • Carry out various diagnostic tests used in immunopathological techniques e.g ELISA, Immunofluorescence (IF) test, Immunohistochemistry (ihc) test	Guide students to: • Identify various immunological diagnostic techniques used in the Laboratories • Carry out various diagnostic tests used in immunopathological techniques e.g ELISA, Immunofluorescence (IF) test, Immunohistochemistry (ihc) test	Blood sample, Reagents, Microscope, PPE, ELISA Reader, Glass slides and cover slip
GENERAL OBJECTIVE 5.0: Know transplantation and tumor immunology.						
13-15	5.1 Define Tumor and Transplantation 5.2 List various techniques used in tumor transplantation in animals 5.3 List various immunotherapy procedures used in animals	• Explain Tumor and Transplantation • Discuss various techniques used in tumor transplantation in animals • Discuss various immunotherapy procedures used in animals	Teaching aids such as: Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify various techniques used in tumor transplantation • Perform various immunotherapy reporting procedures • Carry out tumor transplantation techniques and immunotherapy	Guide students to: • Identify various techniques used in tumor transplantation • Perform various immunotherapy reporting procedures • Carry out tumor transplantation techniques and immunotherapy reporting procedures	Tumor samples, microscope, reagents, glass slides and cover slip, experimental animals, chats, PPE.

				reporting procedures e.g Allograft, Xenograft	e.g Allograft, Xenograft	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



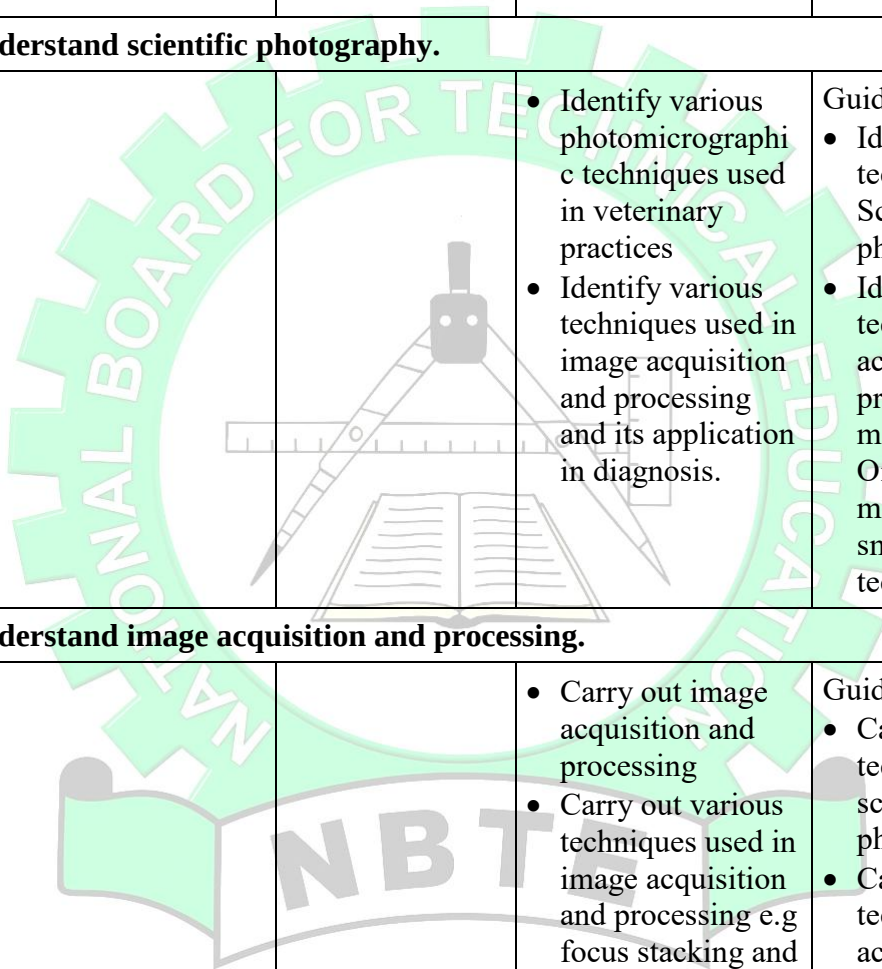
DIGITAL MICROSCOPY AND PHOTOGRAPHY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: DIGITAL MICROSCOPY AND PHOTOGRAPHY	COURSE CODE: VLT 422	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 0 HOUR/WEEKS
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of microscopy and photography for veterinary pathology addressing (digital lab technologies).		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand microscopy fundamentals; 2.0 Understand slide scanning; 3.0 Understand telepathology; 4.0 Understand scientific photography; 5.0 Understand image acquisition and processing.		

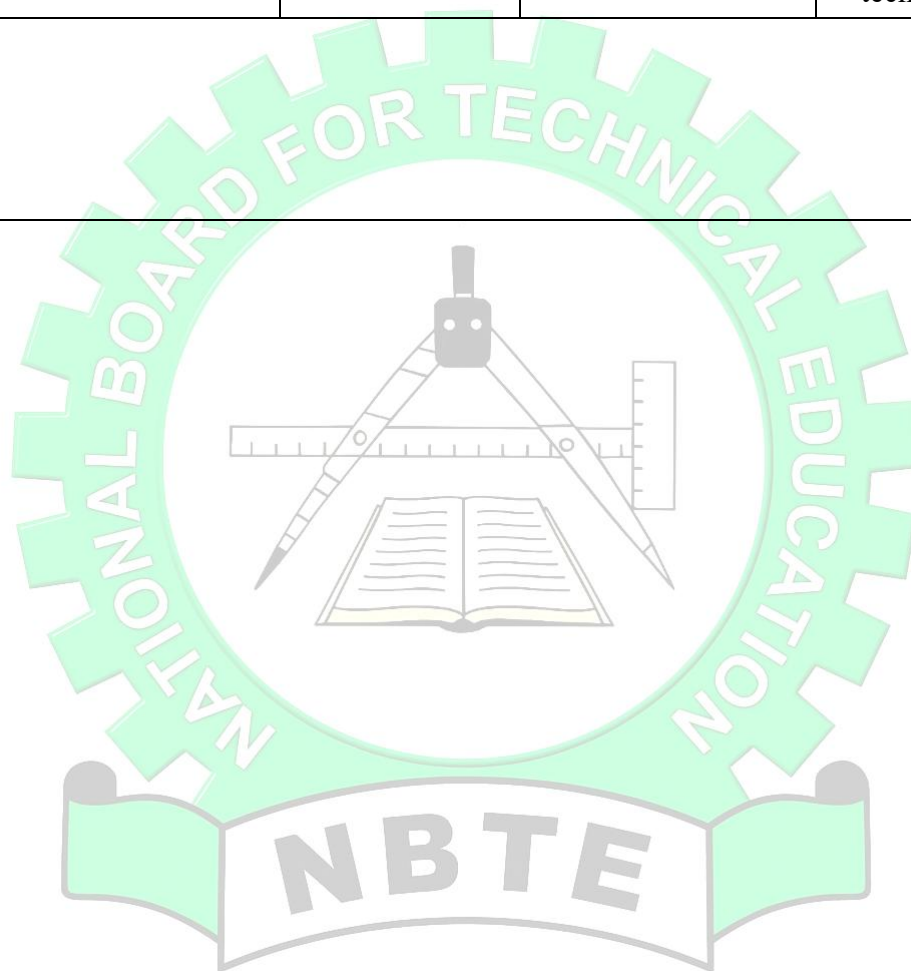


PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: DIGITAL MICROSCOPY AND PHOTOGRAPHY			COURSE CODE: VLT 422		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 0 HOUR/WEEKS	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with Knowledge and skills of digital microscopy and photography for veterinary pathology						
GENERAL OBJECTIVE 1.0: Understand digital microscopy fundamentals						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3				- Identify microscope set up with camera settings and configurations CCD/CMOS - Identify bright field, dark field, phase contrast illumination - Perform use of image acquisition software (LASX, NIS-Elements)	Guide students to: - Identify microscope set up with camera settings and configurations CCD/CMOS - Identify bright field, dark field, phase contrast illumination - Perform use of image acquisition software (LASX, NIS-Elements)	Microscopes, camera, computers, acquisition software, Microscope, Camara, LCD projector, Pictures, Charts, Internet, Digital microscope, video, scanner, Zoom, PPE
GENERAL OBJECTIVE 2.0: Understand slide scanning.						

4-6			• Identify the various applications with the use of slides • Identify various types of slide imaging system e.g whole-slide imaging (WSI) systems • Identify processes of storage and archiving • Perform digital slide scanning processes, storage and archiving	Guide students to: • Identify the various applications with the use of slides • Identify various types of slide imaging system e.g whole-slide imaging (WSI) systems • Identify processes of storage and archiving • Perform digital slide scanning processes, storage and archiving	Microscopes, samples, image processing software, camera, glass slides and cover slips, LCD projector, Pictures, Charts, Internet, Digital microscope, video, scanner, Zoom, PPE, WSI manuals.
GENERAL OBJECTIVE 3.0: Understand telepathology.					
7-9			• Identify various platforms of telepathology and its applications • Carry out telepathology with various types and procedures • Identify the importance of the application of telepathology • Demonstrate the	Guide students to: • Identify various platforms of telepathology and its applications • Carry out telepathology with various types and procedures • Identify the importance of the application of telepathology	Slide scanners, computers, archive systems, Telepathology manuals, LCD projector, Charts Telepathology platforms, sample cases, PPE

				application of telepathology	• Demonstrate the application of telepathology	
GENERAL OBJECTIVE 4.0: Understand scientific photography.						
10-12				• Identify various photomicrographic techniques used in veterinary practices • Identify various techniques used in image acquisition and processing and its application in diagnosis.	Guide students to: • Identify the various techniques for Scientific photomicrography • Identify various techniques of image acquisition and processing e.g Wet mount preparation, Oil immersion microscopy, and smart preparation techniques	Microscopes, samples, image processing software, camera, glass slides and cover slips, textbooks, LCD projector, Pictures, Charts, Internet, Digital microscope, video, scanner, Zoom, PPE, WSI manuals.
GENERAL OBJECTIVE 5.0: Understand image acquisition and processing.						
13-15				• Carry out image acquisition and processing • Carry out various techniques used in image acquisition and processing e.g focus stacking and Z-stacks, colour correction.	Guide students to: • Carry out the various techniques for scientific photomicrography • Carry out various techniques of image acquisition and processing e.g Wet mount preparation, Oil immersion	Cameras, specimens, editing software, forensic protocols, PPE, Textbooks, LCD projector, Camera, Charts, Manuals, Journals, white board marker

					microscopy, and smart preparation techniques	
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						



HISTOCHEMISTRY AND IMMUNOCHEMISTRY

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: HISTOCHEMISTRY AND IMMUNOCHEMISTRY	COURSE CODE: VLP 423	CONTACT HOURS: 3 HOURS/WEEKS
	CREDIT UNIT: 3	THEORETICAL: 1 HOUR/WEEKS
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 2 HOURS/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of histochemistry and immunochemistry techniques for tissue staining.		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand the fundamentals of histochemistry and immunochemistry; 2.0 Understand special histochemistry stains; 3.0 Understand the procedures of histochemistry and immunochemistry techniques; 4.0 Understand Immunohistochemistry and tumor markers; 5.0 Understand diagnostic methods used in immunohistochemistry.		

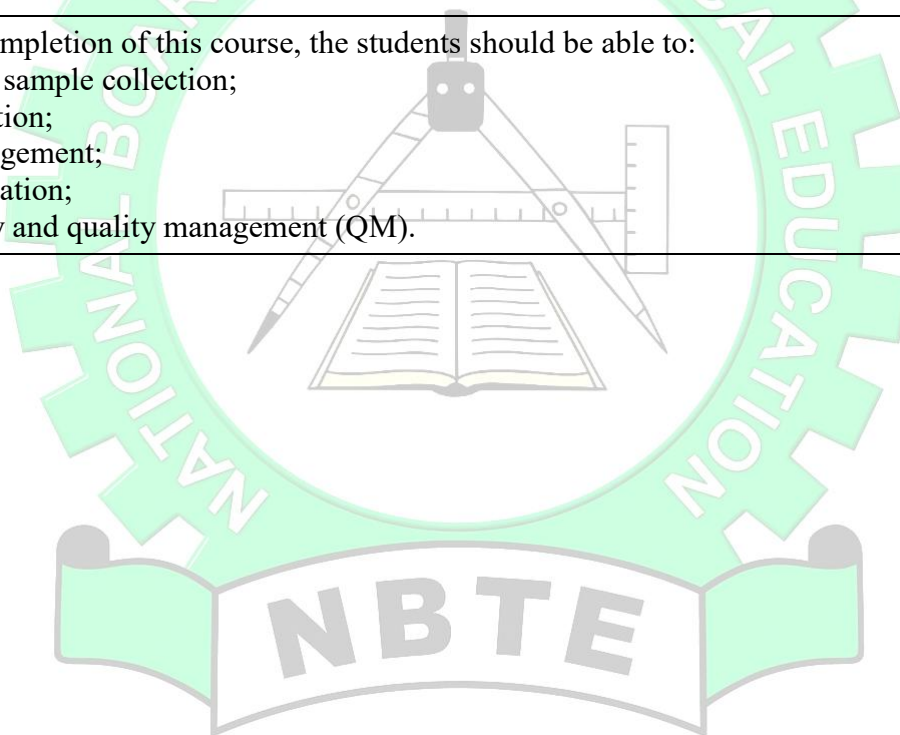
PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: HISTOCHEMISTRY AND IMMUNOCHEMISTRY			COURSE CODE: VLT 423		CONTACT HOURS: 3 HOURS/WEEKS	
			CREDIT UNIT: 3		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 2 HOURS/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of histochemistry and immunochemistry techniques for tissue staining.						
GENERAL OBJECTIVE 1.0: Understand the fundamentals of histochemistry and immunochemistry						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define common terms in histochemistry and immunochemistry 1.2 Explain various methods and techniques employed in immunohistochemistry Laboratory 1.3 Explain the importance and applications of immunohistochemistry to veterinary Laboratory	- Discuss common terms in histochemistry and immunochemistry - Explain various methods and techniques employed in immunohistochemistry Laboratory - Explain the importance and applications of immunohistochemistry to veterinary Laboratory	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	- Identify different techniques used in histochemistry and immunochemistry Laboratory - Carry out the techniques in immunohistochemistry laboratory e.g Direct and indirect IHC technique, Peroxidase-Antiperoxidase (PAP) technique	Guide students to: - Identify different techniques used in histochemistry and immunochemistry Laboratory - Demonstrate the techniques in immunohistochemistry laboratory e.g Direct and indirect IHC technique, Peroxidase-Antiperoxidase (PAP) technique	Stains, antigen-preserving fixatives, blocking reagents, mixer and analyzers, PPE

	technologist	technologist				
GENERAL OBJECTIVE 2.0: Understand special histochemistry stains						
4-6	2.1 Define Stains 2.2 List common stains used in histochemistry Laboratory 2.3 Explain various staining techniques	- Discuss Stains - Explain common stains used in histochemistry Laboratory - Explain various staining techniques	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	- Identify different stains and staining techniques used in HC Laboratory - Carry out various methods of staining samples in HC	Guide students to: - Identify different stains and staining techniques used in HC Laboratory - Carry out various methods of staining samples in HC	Samples, Stains and Reagents Kits, staining rack, PPE
GENERAL OBJECTIVE 3.0: Understand the procedures of histochemistry and immunochemistry techniques						
7-9	3.1 Explain the principles of immunohistochemistry 3.2 Explain techniques used in IHC Laboratory 3.3 Mention the applications of IHC in veterinary practices	- Explain the principles of immunohistochemistry - Explain techniques used in IHC Laboratory - Discuss the applications of IHC in veterinary practices	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	- Identify different techniques used in immunohistochemistry Laboratory - Carry out the techniques in histochemistry laboratory e.g Direct and indirect IHC technique, Peroxidase-Antiperoxidase (PAP) technique	Guide students to: - Identify different techniques used in immunohistochemistry Laboratory - Carry out the techniques in histochemistry laboratory e.g Direct and indirect IHC technique, Peroxidase-Antiperoxidase (PAP) technique	IHC reagents, antigen retrieval equipment, DAB, AEC, controls, PPE
GENERAL OBJECTIVE 4.0: Understand IHC and tumor markers						
10-12	4.1 Define tumor and tumor markers 4.2 List types of tumor	Discuss tumor and tumor markers	Textbooks, Journals, Pictures,	Identify different tumor markers used in IHC	Guide students to: Identify different tumor markers used in	IHC kits, tumor samples, antibodies,

	and tumor markers used in IHC Laboratory 4.3 Explain the techniques used in tumor identification	• Explain types of tumor and tumor markers used in IHC Laboratory • Explain the techniques used in tumor identification	Projector, white board marker, internet, Charts	Laboratory • Perform tumor identification using IHC tumor markers	IHC Laboratory • Perform tumor identification using IHC tumor markers	Reagents, controls, PPE
GENERAL OBJECTIVE 5.0: Understand diagnostic methods used in immunohistochemistry						
13-15	5.1 List diagnostic methods used in IHC Laboratory 5.2 Explain the principles used in IHC diagnosis 5.3 Explain the applications of immunodiagnostic techniques in Veterinary Laboratory	• Discuss diagnostic methods used in IHC Laboratory • Explain the principles used in IHC diagnosis • Explain the applications of immunodiagnostic techniques in Veterinary Laboratory	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify various diagnostic methods used in IHC • Demonstrate the various application methods used in IHC Laboratories	Guide students to: • Identify various diagnostic methods used in IHC • Demonstrate the various application methods used in IHC Laboratories	Fluorescence microscopes, IF reagents, ISH kits, image analysis software, PPE
COURSE ASSESSMENT: Course work 10% Test/Assignments 10% Practical 40% Examination 40% = 100%						

SAMPLE COLLECTION, PRESERVATION AND TRANSPORTATION

PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY		
COURSE TITLE: SAMPLE COLLECTION, PRESERVATION AND TRANSPORTATION	COURSE CODE: VLP 424	CONTACT HOURS: 2 HOURS/WEEKS
	CREDIT UNIT: 2	THEORETICAL: 1 HOUR/WEEK
YEAR: II SEMESTER: II	PRE-REQUISITE:	PRACTICAL: 1 HOUR/WEEKS
GOAL: This course is designed to equip students with knowledge and skills of sample collection, preservation, and transportation integrating cold-chain management		
GENERAL OBJECTIVES: On completion of this course, the students should be able to: 1.0 Understand the principles of sample collection; 2.0 Understand sample preservation; 3.0 Understand cold-chain management; 4.0 Understand sample transportation; 5.0 Understand chain-of-custody and quality management (QM).		



PROGRAMME: HND VETERINARY LABORATORY TECHNOLOGY						
COURSE TITLE: SAMPLE COLLECTION, PRESERVATION AND TRANSPORTATION			COURSE CODE: VLT 424		CONTACT HOURS: 2 HOURS/WEEKS	
			CREDIT UNIT: 2		THEORETICAL: 1 HOUR/WEEK	
YEAR: II SEMESTER: II			PRE-REQUISITE:		PRACTICAL: 1 HOUR/WEEKS	
COURSE SPECIFICATION: THEORETICAL AND PRACTICAL						
GOAL: This course is designed to equip students with knowledge and skills of sample collection, preservation, and transportation integrating cold-chain management						
GENERAL OBJECTIVE 1.0: Understand the principles of sample collection						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
1-3	1.1 Define common terms in sample collection 1.2 List types of samples relevant to Veterinary Laboratory Technologist 1.3 Describe the procedures for sample collection	• Discuss common terms in sample collection • Explain types of samples relevant to Veterinary Laboratory Technologist • Explain the procedures for sample collection	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify species-specific collection sites for different animals • Prepare and restrain patients humanely • Identify appropriate volumes and containers for different sample types • Carry out various methods of sample collection	Guide students to: • Identify species specific collection sites for different animals • Prepare and restrain patients humanely • Identify appropriate volumes and containers for different sample types • Carry out various methods of sample collection	Samples, sample bottles/containers, swabs, PPE, charts, manuals

GENERAL OBJECTIVE 2.0: Understand sample preservation						
4-6	2.1 Define the term preservation 2.2 List various preservatives used in veterinary Laboratory 2.3 Explain the principles of sample preservation.	• Explain the term preservation • Discuss various preservatives used in veterinary Laboratory • Explain the principles of sample preservation.	Teaching aids such as: Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify different types of preservatives used in the Veterinary Laboratory • Identify different samples and the best method of preservation • Demonstrate the uses of preservatives in sample preservation	Guide students to: • Identify different types of preservatives used in the Veterinary Laboratory • Identify different samples and the best method of preservation • Demonstrate the uses of preservatives in sample preservation	Fixatives, refrigerators, freezers, preservative tubes, syringes, measuring tubes and conical flask, Liquid Nitrogen, Cannister, PPE
GENERAL OBJECTIVE 3.0: Understand cold-chain management						
7-9	3.1 Define cold-chain 3.2 List different temperature ranges (4°C, -20°C, -80°C, LN2) for cold-chain 3.3 Explain methods of cold-chain packaging 3.4 Explain the importance of cold-chain to samples, vaccines and biologicals in Veterinary practices	• Explain cold-chain • Discuss different temperature ranges (4°C, -20°C, -80°C, LN2) for cold-chain • Explain methods of cold-chain packaging • Explain the importance of cold-chain to samples, vaccines and biologicals in Veterinary practices	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Identify cold-chain requirements for sample types • Identify types of cold-chain and their applications • Demonstrate cold-chain packaging and monitoring	Guide students to: • Identify cold-chain requirements for sample types • Identify types of cold-chain and their applications • Demonstrate cold-chain packaging and monitoring	Fridges, freezers, dry-ice, cold-packs, Liquid Nitrogen (LN), data-loggers, ULT freezer, audit checklists, PPE

GENERAL OBJECTIVE 4.0: Understand sample transportation						
10-12	4.1 List different classifications of sample transportation (Category A and B classifications) 4.2 Explain triple packaging system 4.3 Explain the importance of documentation and labelling in sample transportation	• Discuss different classifications of sample transportation (Category A and B classifications) • Explain triple packaging system • Explain the importance of documentation and labelling in sample transportation	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Classify samples per IATA standards • Carry out triple-packaging system of sample transportation • Carry out sample packaging and transportation • Carry out documentation and proper labelling	Guide students to: • Classify samples per IATA standards • Carry out triple-packaging system of sample transportation • Carry out sample packaging and transportation • Carry out documentation and proper labelling	IATA standards, packaging materials, documentation forms, Ice-packs, PPE, Markers, Camera.
GENERAL OBJECTIVE 5.0: Understand chain-of-custody and quality management (QM)						
13-15	5.1 Explain chain-of-custody documentation 5.2 Explain sample-reception protocols 5.3 Explain rejection criteria, quality monitoring and incident reporting	• Explain chain-of-custody documentation • Explain sample-reception protocols • Explain rejection criteria, quality monitoring and incident reporting	Textbooks, Journals, Pictures, Projector, white board marker, internet, Charts	• Carry out the Chain of Custody (CoC) documentation protocol • Carry out sample reception protocols and state rejection criteria	Guide students to: • Carry out the Chain of Custody documentation protocol • Carry out sample reception protocols and state rejection criteria	CoC forms, reception checklists, rejection criteria, incident reports, PPE, Workbook.

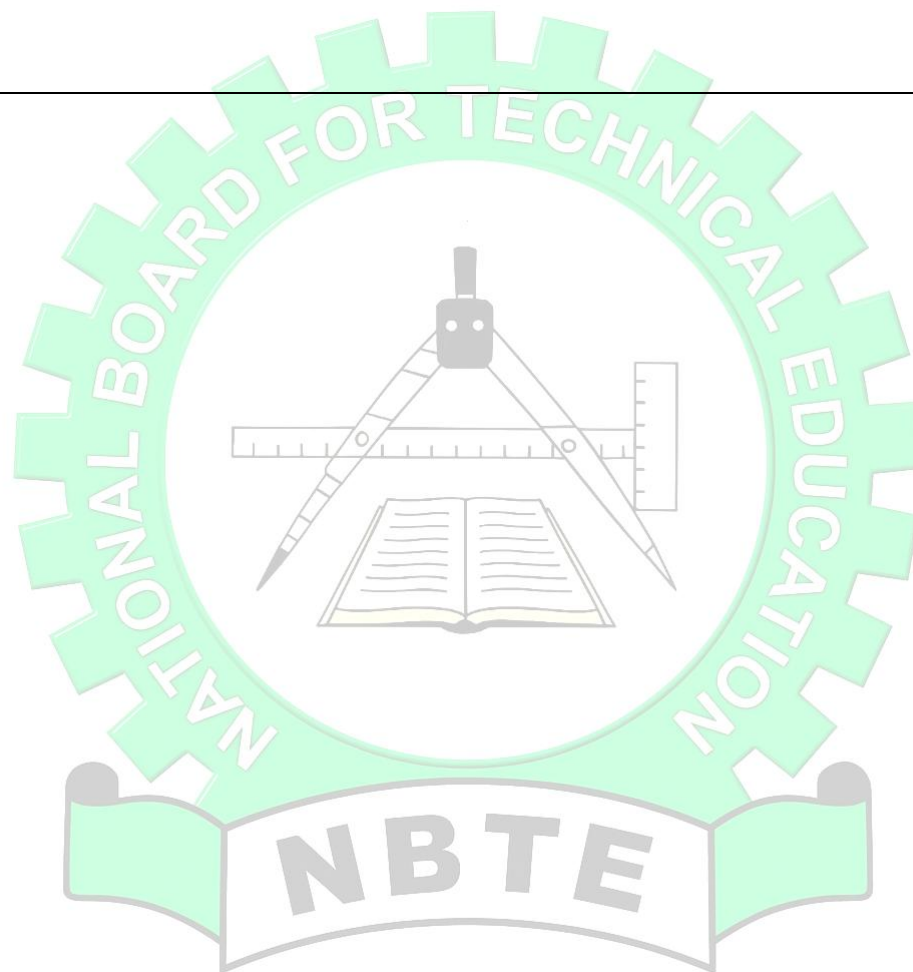
COURSE ASSESSMENT:

Course work 10%

Test/Assignments 10%

Practical 40%

Examination 40% = 100%



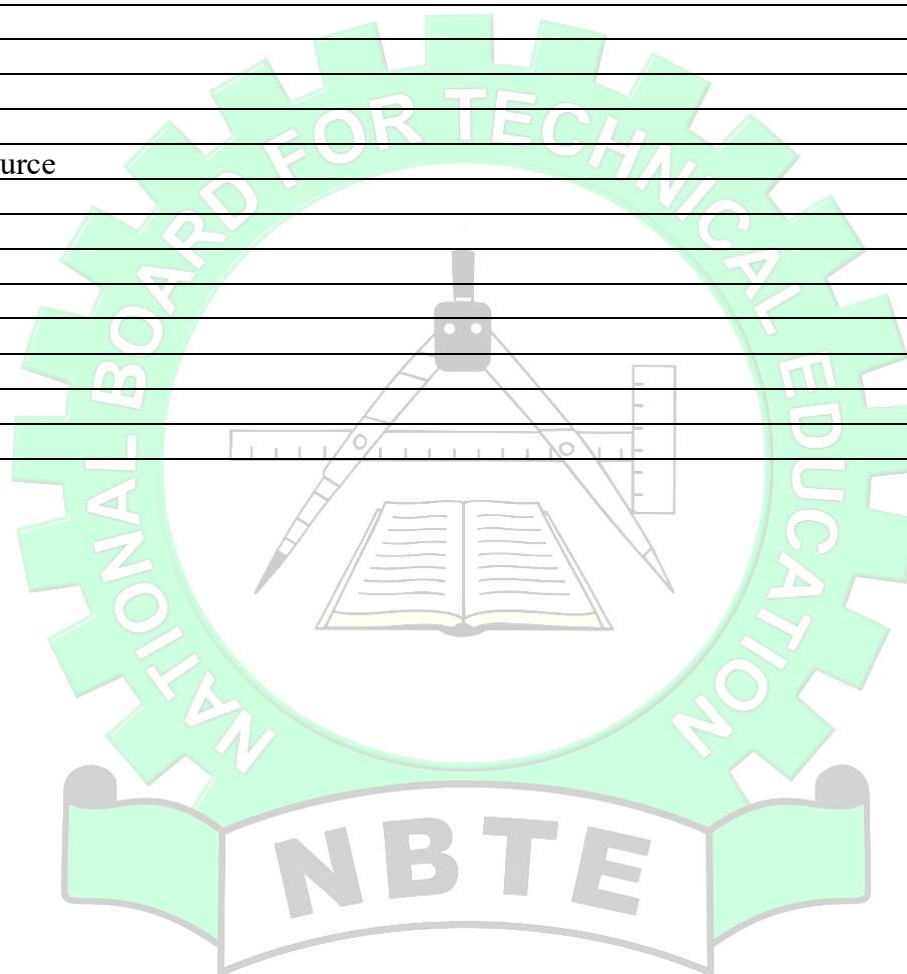
LIST OF MINMUM RESOURCES/PHYSICAL FACILITIES

VETERINARY HOSPITAL

S/NO	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
A.	RECEPTION:	
1.	Reception chairs	8
2.	Table and chair	1 set
3.	File cabinet	1
B	CLINIC (SMALL AND LARGE ANIMAL)	3
1.	Digital weighing scale	2
2.	Deep Freezer	4
3.	Suction machine	3
4.	Stethoscope	9
5.	Endo- tracheal tube	5
6.	Elizebathal collar	5 sets
7.	Hoof trimmer	4 sets
8.	Orphthamoscope	4
9.	Stomach tube	1
10.	Emasculator	8
11.	Dog catcher	5
12.	Vaginal speculum	2
13.	Small animal examination table	2
14.	Burdizzo	2
15.	Probang	1
16.	Drip stand	1
17.	Medication cabinet	2
18.	Autoclave	2
19.	Steam sterilizer	2
20.	Electric dehorner	1
21.	Gas dehorner	1
22.	Otoscope	3

23.	Obstetric box	1
24.	Knapsack sprayer	4
25.	Clinical thermometer	20
26.	Crush	1
27.	Scale (digital)	5
C	Surgical unit	
1.	Anesthetic machine	3
2.	Theatre lamp	1
3.	Thermo-cautery machine	2
4.	Small animal surgical box	2
5.	Large animal surgical box	1
6.	Post mortem box	2
7.		
D	Diagnostic laboratories	
1.	Haemo-analyzer	1
2.	Electrolyte Analyzer	1
3.	Chemical Analyzer	1
4.	Genotype machine	1
5.	Computer-assisted semen analyzer	1
6.	Milk analyzer	2
7.	Deep Freezer	1
8.	Refrigerator	1
9.	Incubator	4
10.	Binocular Microscope	2
11.	Stereo microscope	1
12.	Refractometer	3
13.	Micro-haematocrit centrifuge	2
14.	Micro-haematocrit reader	2
15.	Micro-haematocrit tubes	2
16.	ELISA reader	1
17.	PH meter	4
18.	Haematospin	1

E.	Diagnostic imaging Laboratory	
1.	X-Ray machine	1
2.	X-Ray film dryer	1
3.	X-Ray film illuminator	2
4.	X-Ray film hanger	10
5.	X-Ray cabinet	1
6.	Dark room	1
7.	Endoscope cold light source	1
8.	Gastro scope	1
9.	Stabilizer	1
10.	Ultrasound machine	1
F.	Pharmacy	
1.	Drug cabinet	2
2.	Refrigerator	1
3.	Drug inventory	
4.	First aid box	



LIST OF EQUIPMENTS IN PATHOLOGY LABORATORY

NECROPSY LABORATORY

S/No	Description of items	Quantity
1	Room roofed and well protected	1
2	Sustainable source of water	1
3	Working bench(stainless steel table)	2
4	Concrete floor well sloped for easy drainage and cleaning	1
5	Post mortem kits(knives, scissors, thumb forceps, bone cutter etc)	1
6	Protective clothing, masks, gloves.	6
7	Functional deep freezers	1
8	Source of light(bright)	4point
9	Glass slides and cover slips	10packs
10	Stains (Romanowsky)	4 liters
11	Forms and record books	50 forms,record book 1
12	Incinerator	1
13	Board for taking pictures	1
14	Camera	1
15	White board for writing interaction	1
16	Measuring cylinders (500ml,1000ml,2000ml)	3each
17	Butcher board	1
18	Stools (furniture) 10pieces	10pieces
19	Mechanized bone cutter (electric powered)	1

HISTOPATHOLOGY LABORATORY

S/N	Name of Equipment	Quantity
1	Fume cabinet	1
2	Automatic tissue processor	1
3	Embedding Centre	1
4	Microtome	1

5	Paratrimmer	1
6	Microtome blades (low grade)	1
7	Laboratory Microwave	1
8	Floating-out bath	1
9	Hot plate	1
10	Laboratory oven	1
11	Wax dispenser	1
12	Automatic strainer	1
13	Dissection kits	1
14	Dissection platform	1
15	Centrifuge (table top)	1
16	Refrigerator	1
17	Gas cylinder/burner/tripod stand	1 each
18	Microscope (optical binocular)	1
19	Microscope(camera-fixed)	1
20	Staining jars (set)	1
21	Autoclave	1
22	Hot air oven	1
23	Immunostiner	1
24	Projector	1

CLINICAL CHEMISTRY LABORATORY

S/N	Name of Equipment	Quantity
1	Auto chemistry analyzer	1
2	Auto haemoanalyser	1
3	Table top centrifuge	1
4	Micro-haematocrit centrifuge	1
5	Spectrophotometer	1
6	Incubator	1
7	Hot air oven	1
8	Weighing balance	1

9	Water bath	1
10	Micropipette	10 packs
11	Autoclave	1
12	Test tubes (glass, plastic)	100 pieces
13	Test tube rack	1
14	Measuring cylinder	3
15	Refrigerator	1
16	Deep freezer	1
17	Microscope (optical binocular)	1
18	Microscope(camera-fixed)	2
19	Staining jars(set)	1
20	Pipette tips	5packs

LIST OF EQUIPMENT IN MICROBIOLOGY LABORATORY

S/NO	ITEM/DESCRIPTION	QTY REQUIRED
A.	BACTERIOLOGICAL EQUIPMENTS	10
1	Microscope (Binocular)	2
2	Incubator	1
3	Hot Air oven	1
4	Water distiller	2
5	Autoclave	1
6	Weighing balance (electronic)	1
7	Hot plate	1
8	Colony counter	1
9	Water bath	1
10	Refrigerator	1
11	Deep freezer	1
12	Anaerobic jar	1
B.	VIROLOGY EQUIPMENTS	1
1	Egg Candler	1
2	CO ₂ incubator	1

3	Well washer	1
4	Incubator shaker	1
5	Vice & clamp	1
6	Refrigerated centrifuge	1
7	ELISA Reader	1
8	Biosafety cabinet (CLASS II)	1
9	Trough	1
10	Tiles	1
11	Revco (-8 ⁰ c)	1
12	Liquid Nitrogen Jar	1
13	Centrifuge	1

PARASTOLOGY LABORATORY

S/NO	ITEM/DESCRIPTION	QUANTITY REQUIRED
1	Microhaematocrit Centrifuge & Reader	1
2	Refrigerator	1
3	Bucket centrifuge	2
4	Hot plate	1
5	Microscope (Binocular)	10
6	C0 ₂ Incubator	1
7	Dissecting microscope	1
8	Hot Air Oven	1
9	Incubator shaker	1
10	pH Meter	1
11	Water bath	1

LIST OF PARTICIPANTS FOR THE NATIONAL CURRICULUM REVIEW WORKSHOP

S/N	Names	Adress	Email
1.	Prof. Idris M. Bugaje	Executive Secretary, NBTE	es@nbte.gov.ng
2.	Prof. H Sharubutu	Usman Danfodiyo University, Sokoto	Gsharubutu@gmail.com
3.	Prof. Aliyu Muhammad Wakawa	College of Agriculture and Animal Science Mando, Kaduna	Asmwakawa@gmail.com
4.	Dr Aliyu Abdulkadir	College of Agriculture and Animal Science Mando, Kaduna	Abaliqadir@gmail.com
5.	Dr Chukwu Otuh	Federal College of Veterinary and Medical Laboratory Technology, Vom	Chyooks@gmail.com
6.	Paul A. Auta	Federal College of Veterinary and Medical Laboratory Technology, Vom	Paulaauta@gmail.com
7.	Dr. Abdulmalik Jamilu	Sector Skill Council for Agriculture, Abuja	Abdulmalikjamilu05@gmail.com
8.	Dr. Akintule O. Alexander	Olam Diagnostic Lab, Barnawa, Kaduna	Alexanderakintule2020@gmail.com
9.	Engr. Dr. O.O Bello	National Board For Technical Education, Kaduna	Engroobello@gmail.com
10.	Mr. Ayo Aroge	National Board For Technical Education, Kaduna	Ayoaroge2@gmail.com
11.	Dr. Kubra Jauro Danlawan	National Board For Technical Education, Kaduna	Kuburagombe@yahoo.com
12.	Jamila Jibrin	National Board For Technical Education, Kaduna	Jibrinjamila@gmail.com
13.	Muhammad Umar Auna	National Board For Technical Education, Kaduna	Muhammadauna.mu@gmail.com
14.	Usman Sabo	National Board For Technical Education, Kaduna	Usmansabo42@gmail.com
15.	Zainab Ibrahim	National Board For Technical Education, Kaduna	Zainabibrahim179@gmail.com