INSTITUTE OF PARA VETERINARY SCIENCES

Courses and Course Contents
of
Diploma in Veterinary Laboratory Technology (DVLT)

1st Semester

Sr.No.	Course No.	Deptt.	Course Title	Cr.Hrs.
1	DVLT-I	VAN	Techniques in Anatomy	1+1
2	DVLT-II	VPTX	Management and Diagnostic sampling of Laboratory Animals	1+1
3	DVLT-III	VPB	Techniques in Biochemistry and Biotechnology	0+2
4	DVLT-IV	VMI	Laboratory Management and Professional Ethics	1+1
5	DVLT-V	VPS	Techniques in Clinical Parasitology-I	1+1
6	DVLT-VI	VSR	Techniques in Surgery and Diagnostic Imaging-I	1+1
7	DVLT-VII	TVCC	Restraint and Handling of Domestic Animals and Diagnostic sampling	1+1
8	DVLT-VIII	VPHE	Occupational Hazards and Environmental Management	1+1
			Total	**7+9**

2nd Semester

Sr.No.	Course No.	Deptt.	Course Title	Cr.Hrs
1	DVLT-IX	VAN	Techniques in Histology	1+1
2	DVLT-X	VPTX	Techniques in Pharmacology	0+1
3	DVLT-XI	VPB	Techniques in Physiology	0+2
4	DVLT-XII	VMI	Techniques in Clinical Microbiology-I	1+1
5	DVLT-XIII	VPS	Techniques in Clinical Parasitology-II	1+1
6	DVLT-XIV	VSR	Techniques in Surgery and Diagnostic Imaging-II	1+1
7	DVLT-XV	TVCC	Collection, Processing and Analysis of Clinical Samples	0+4
8	DVLT-XVI	VPHE	Zoonosis, Public Health and Epidemiology	1+1
			Total	**5+12**

3rd Semester

Sr.No.	Course No.	Deptt.	Course Title	Cr.Hrs
1	DVLT-XVII	AN	Techniques in Feed Analysis	1+1
2	DVLT-XVIII	AGB	Basic Information Technology	1+1
3	DVLT-XIX	VMI	Techniques in Clinical Microbiology-II	1+1
4	DVLT-XX	LPT	Dairy and Meat Technology	0+2
5	DVLT-XXI	VPP	Techniques in Clinical Pathology	1+1
6	DVLT-XXII	TVCC	Collection, Processing and Analysis of Clinical Samples	0+4
			Total	**4+10**

4th Semester

Practical/ Professional Training in **Diagnostic laboratories** – **12 weeks**

DVLT-COURSE CONTENTS

DVLT-1 Techniques in Anatomy 1+1

(To be taught by Deptt. of VAN)

Theory

Introduction to gross anatomy of different organs of musculokeletal, cardiovascular, respiratory, digestive, urinary, genital, endocrine and central nervous system of animals.

Practical

Demonstration of various organs of musculoskeletal, cardiovascular, respiratory, digestive, urinary, genital, endocrine and central nervous system of animals.

DVLT-II Management and Diagnostic sampling of Laboratory Animals 1+1

(To be taught by Deptt. of VPTX)

Theory

Biology of different laboratory animals; feeding, watering and management of laboratory animals. Animal behavior, capture and restraint of laboratory animals.

Collection of blood, urine, faeces and other body fluid samples in different laboratory animals.

Anesthesia and Euthanasia of laboratory animals.

Practical

Capture and restraint of laboratory animals. Sexing, palpation, weaning, weighing and identification of laboratory animals.

Collection of blood, urine, faeces and other body fluid samples in different laboratory animals. Sterilization and disinfection of laboratory animal house.

DVLT-III Techniques in Biochemistry and Biotechnology 0+2

(To be taught by Deptt. of VPB)

Practical

Introduction to laboratory, glassware, plastic ware and instruments. Minimum requirements to start a laboratory. Hazards in clinical biochemical laboratory.Preparation and standardization of

acids and alkalies, concept of pH – preparation of buffer, colorimetric and electrometric determination of pH. Anti-coagulants and preservatives.
Sample collection: blood, urine, other sample types, dangerous samples, sampling errors etc. Sample processing and preservation. The use of biochemical tests, specialized tests, automation and computerization. Colorimetry and spectrophotometry. Centrifuges and centrifugation. Qualitative and quantitative tests and identification of carbohydrates, lipids and proteins.
Estimation of blood, urine, semen, saliva, milk and tissue biochemical constituents. Biotechnological/molecular biology techniques, ELISA, PCR etc. Nucleic acid and antibody based assays, isolation of RNA and DNA.Organ function tests. Concept of bar coding. Data entry and presentation of results. Reference ranges.

DVLT-IV Laboratory Management and Professional Ethics 1+1

(To be taught by Deptt. of VMI)

Theory

Laboratory epuipments and gadgets. Laboratory practices, glass and plastic wares. Various signs and labels, and their uses. Disposal of clinical waste. Laws and ethics governing clinical laboratories.

Practical

Acquaintance of various laboratory equipments and apparatus. Good laboratory practices, cleaning, storage and maintenance of glass and plastic wares. Sterilization of laboratory materials.
Labeling of various samples/containers. Preparation of sample date sheet, handling and preservation of various clinical samples. Safety cabinets, handling of hazardous materials.

DVLT-V Techniques in Clinical Parasitology-1 1+1

(To be taught by Deptt. of VPS)

Theory

Parasitology overview, Nematode parasites, Trematode parasites, Cestode parasites.

Practical

Collection and examination of faecal samples from animals: Direct smear examination, Floatation method, Sedimentation method, Sieving method, Quantitative fecal examination techniques for EPG like Stoll's egg counting method, modified McMaster techniques, Borey and Pearson technique, Macroscopic examination of faecal material for worms, segments of worms, Amphistome, etc. Faecal culture method for nematode larvae collection and identification. Identification of important Nematode eggs like Ascaris suum,Toxacara spp., Parascaris,

Oxyuris, Ascaridia galli, Dictycaulus, Strongyle, Trichuris; Storngyloides, Spirocerca etc.Identification of important Cestode eggs like: Moniezia spp., Dipylidium caninum, Taenia, Echinococcus, Hymenolepis spp. etc. Identification of important Trematode eggs like Fasciola, Amphistome, Dicrocoelium, Schistosoma indicum, Opisthorchis etc.Collection and preservation of important Nematode, Trematodes and Cestodes of domestic species Making permanent slides of Nematode, Trematodes and Cestodes affecting domestic animals.

DVLT-VI Techniques in Surgery and Diagnostic Imaging-1 1+1

(To be taught by Deptt. of VSR)

Theory

Introduction, general surgical principles, suture materials used in veterinary practice. Sterilization (asepsis-antisepsis, their application in veterinary surgery); disinfection; degermination.Definition of common terms in relation to anaesthesia. Injectable and inhalation anaesthetics. Preparation of the patient; and positioning. Local anaesthestics.

Practical

Introduction to the layout of operation theatres, common equipments. Surgical instruments metallurgy, care and storage, joints, locks, proper use and practice of technique of handling of commonly used surgical tools in surgery. Practice of common and humane methods of physical restraint and positioning for injections and operations. Operations theatre routines and etiquette practice of preparation of operative site of animal, preparation of surgeon for aseptic surgery. Suture materials commonly used in veterinary practice. Familiarization with different inhalant anaesthetic machines, oxygen administration and monitoring equipments. Local anaesthetic.

DVLT-VII Restraint and Handling of Domestic Animals and Diagnostic Sampling 1+1

(To be taught by Deptt. of TVCC)

Theory

Indications for restraint, animal behavior, capture and restraint of horse, cattle, buffalo, camel, sheep, goat, pig, dog, cat and birds. Collection of blood, urine, faeces and other body fluid samples in different animal species.

Practical

Capture and restraint of horse, cattle, buffalo, camel, sheep, goat, pig, dog, cat and birds. Collection of blood, urine, faeces and other body fluid samples in different animal species.

DVLT-VIII Occupational Hazards and Environmental Management 1+1

(To be taught by Deptt. of VPHE)

Theory

Basics of ecology and eco system, preservation of species. Biodiversity, nature and animal conservation. Forest conservation, water resource management. Soil, water air and noise pollution.Biosafety, climate change and global warming. Global warming and population. The Ozone Layer and Climate Change, Energy Security.Stress on the environment, society and resources. Natural Disasters. Emerging diseases and their management strategies.Solid waste management.Legislation to product environment.Role of non-conventional source of energy in environmental protection.

Practical

Occupational hazards in laboratories, general workplace hazards, medical and animal related hazards, objectives of safety programmes and safety measures.

DVLT-IX Techniques in Histology 1+1

(To be taught by Deptt. of VAN)

Theory

Introduction to cell, tissue, epithelium and glands. Basic histological arrangement of tunics of different visceral organs. Different types of fixatives for histology.

Practical

Collection and preservation of anatomical specimens and biopsy material for paraffin technique of light microsopy.Different types of fixatives for histology. Section cutting of paraffin blocks. Preparation of routine and different special stains to demonstrate different histological structures. Staining of paraffin sections by H&E stain and other special stains. Frozen sectioning.

DVLT-X Techniques in Pharmacology 0+1

(To be taught by Deptt. of VPT)

Practical

Introduction and classification of drugs and posions. Metrology, Pharmaceutical calculations and calculation of doses, route of drug administration, drug, and dosage forms. Safe storage of different class of drugs, pharmaceutical processes. Physicochemical properties of commonly used drugs, drug hazards and safety.

DVLT-XI Techniques in Physiology 0+2

(To be taught by Deptt. of VPB)

Practical

Collection of blood. Preservation of defibrinated blood. Enumeration of erythrocytes and leukocytes. Leukocytic differential count, Platelet count. Estimation of haemoglobin, haematocrit, erythrocyte sedimentation rate, coagulation time, bleeding time, erythrocyte fragility, blood grouping. Counting of rumen flora motility, estimation of volatile fatty acids and ammonia in rumen fluid. Bacterial and protozoal count in rumen fluid. Physical and chemical analysis of urine and its interpretation in health and disease condition. Estimation of titrable acidity in urine. Demonstration of various kidney function tests, creatinine clearance rate, urea clearance rate, glucose tolerance test. Sperm motility, sperm concentration, live and dead sperm count. Demonstration of estimation of progesterone and estrogen by radio immune assay.

DVLT-XII Techniques in Clinical Microbiology -1 1+1

(To be taught by Deptt. of VMI)

Theory

Introduction to microbiology. Collection transport, storage/preservation and processing of samples for microbiological work. Specimen collection from living and dead animals for important microbial diseases of livestock and poultry. Isolation and identification of bacteria fungi and handling of bacterial and funagal cultures. Cell culture and embryonated egg inoculation for virus isolation and other virological work. Handling of virus cultures.

Practical

Microscope: parts and its uses and maintenance. Preparation of culture media and sterilization. Preparation of glassware, reagents, buffers and stains used in microbiology. Procedures for Gram's staining, acid fast staining, capsular and spore staining.Isolation and identification of bacteria.Maintenance of bacterial cultures. Routine bacteriological examination: blood, pus, urine and milk culture, etc. Antibiotics sensitivity test.Cultivation, identification and sensitivity tests for fungi. Processing and preparation of various samples for virological examination. Setting up of cell cultures,cryopreservation cells,Isolation and cultivation of viruses in cell culture and embryonated eggs and harvesting of viruses from embryonated chicken egg. Virological techniques i.e.Virus neutralization, titration storage of viruses etc.

DVLT-XIII Techniques in Clinical Parasitology-II 1+1

(To be taught by Deptt. of VPS)

Theory

Parasitology overview, Protozoan parasites, arthropod parasites.

Practical

Collection, preparation and examination of blood samples from animals: Wet film examination, thin blood smear, thick blood smear, Giemsa stain, Leishman's stain and Wright's stain for haemoparasites, detection of microfilariae in blood, lymph node biopsy for theileriosis, identification of important haemoprozoan parasites like Trypanosoma, Theileria, Babesia, Anaplasma, Ehrlichia etc.Macroscopic examination of faecal material for Gastrophillus larvae etc. Faecal sample examination for cysts of Eimeria, Giardia, Balantidium, Entramoeba. Modified Ziehl-Nielsen stain for Cryptosporidium. Sporulation of coccidian oocytes for identification. Collection and examination of skin for ectoparasites.Collection and examination of skin scrapings for manage mites. Identification of Oestrus, Hypoderma, Gastrophilus larvae.Identificaion of myiasis causing larvae. Collection, preservation and identification of insects.

Collection, preservation and identification of ticks. Identification of mites like Sarcoptes, Psoroptes, Demodex etc.Techniques for making permanent wet and dry mounts of important arthropods.

DVLT-XIV Techniques in Surgery and Diagnostic Imaging-II 1+1

(To be taught by Deptt. of VSR)

Theory

Introduction to diagnostic imaging, production of X-rays, X-ray equipments, exposure factors, image formation, radiographic film quality, radiation safety, contrast radiography, diagnostic ultrasonography, nuclear medicine, computed tomography, magnetic resonance imaging.

Practical

Acquaintance with X-ray machine, X-ray accessories and dark room equipments. Dark room processing techniques and X-ray film handling, computer aided image acquisition and retrieval, radiographic positioning of different regions in domestic and laboratory animals. Radiation safety measures, handling radioactive material. Familiarization with contrast radiographic techniques, fluoroscopic examination, ultrasonography, computed tomography, magnetic resonance imaging.

DVLT-XV Collection Processing and Analysis of Clinical Samples 0+4

(To be taught by Deptt. of TVCC)

Practical

Hands on practice for collection of blood, urine, faeces, tissues and other body fluid samples in different animal species. Preservation and dispatch of specimen for laboratory diagnosis. Hematological examination; biochemical examination of blood, plasma/serum, urine and other body fluids. Blood and faecal examination for parasites, microbiological examination of milk, meat, water, air etc. All preparations of aseptic surgery. Analysis of feed for toxic compounds etc.

DVLT-XVI Zoonosis, Public Health and Epidemiology 1+1

(To be taught by Deptt. of VPHE)

Theory

Epidemiological terms, representation of data, collection, preservation and dispatch of specimens for laboratory examination.Animal associated injuries, bacterial zoonosis, mycotic zoonosis, parasitic zoonosis, viral diseases.Importance of safe water, hygienic milk and meat products, bacteriological examination of milk, meat, air and sewage.Cleaning, sterilization and disinfection in food establishements.

Practical

Maintenance of epidemiological data, allergic tests for diagnosis of TB, JD. Analysis of poultry and cattle feed for aflatoxin and ochratoxin.Collection of water and food samples, bacteriological examination of water, air and sewage, inspection of meat.

DVLT-XVII-Techniques in Feed Analysis 1+1

(To be taught by Deptt. of AN)

Theory

Different standard solutions used in nutritional evaluation. Different systems of feed evaluation, Proximate system of analysis and its limitations. Sampling Procedures.

Practical

Preparation of different solutions. Determination of dry matter/moisture content. Determination of total and acid insoluble ash. Determination of crude protein. Determination of ether extract. Determination of crude fiber content in feed samples and calculation of nitrogen free extract. Determination of calcium content in feed samples. Determination of phosphorus content in feed samples. Qualitative analysis for common feed adulterants.

DVLT-XVIII-Basic Information Technology 1+1

(To be taught by Deptt. of AGB)

Theory

Introduction, evolution of computers, components of a computer, hardware vs software, system vs applications software, bits and bytes, input and output devices, RAM/ROM, secondary storage devices.

Microsoft windows, windows desktop, working with windows, exploring the control panel, common accessory, applications, windows explorer, ms office, internet and its applications like: email and browsing, various browsers like WWW (WORLD WIDE WEB) ; hyperlinks; http(HYPER TEXT TRANSFER PROTOCOL); ftp (FILE TRANSFER PROTOCOL) basics of networking—LAN, WAN

Practical

Various components of a computer and peripherals and their functions. Installation of windows, features of Windows as an operating system working with windows, windows explorer entering text and data, working with MS-Office.

Internet and its Application: Browsing and down loading of information from internet, sending and receiving e-mail. Preparation of media and reagents for various type of cell cultures. Setting-up of various types of cell cultures. Cryopreservation and recovery of cell cultures.

Isolation and titration of virus in cell cultures. Identification of viruses by serological and molecular tests such as PCR, electropherotyping.

DVLT-XIX Techniques in Clinical Microbiology-II 1+1

(To be taught by Deptt. of VMI)

Theory

Introduction to immune system, immunity, antigen and antibody. Preparation of bio-reagents for immunological work. Serological immunological and molecular test for microbiological diseases. OIE prescribed tests for infectious disease. Methods of bacterial and viral vaccine production, formulation, and quality control testing of vaccines.

Practical

Collection and proper lebelling of blood specimens and preparation of sera. Preparation of antigens of bacteria, viruses and other pathogens. Immunization of animals for antisera production. Agar gel immunodiffusion test for virus detection. HA and HI for New Castle disease virus detection. Bacterial agglutination tests for brucellosis/other agents. ELISA for antigen and antibodies of FMD virus and other diseases.

DVLT-XX Dairy and Meat Technology 0+2

(To be taught by Deptt. of LPT)

Practical

Sampling of milk, estimation of fat, solid not fat and total solids, COB, alcohol, acidity, pH, specific gravity, sediments and dye tests, detection of adulteration and preservatives in milk. Microbiological examination of milk and its products, pasteurization of milk, preparation of milk products. Methods of humane slaughter of animals, preparation of abattoir byproducts. Wool sampling and its evaluation.

Preservation and evaluation of meat and its products, preparation of meat and poultry products.

Candling, evaluation and preservation of shelled eggs and its products. Slaughtering techniques used for various types of birds. Slaughtering and evisceration of different kinds of birds. Estimation of dressing percentage and yield. Grading of dressed chicken / poultry. Microbiological sampling of meat, poultry products and eggs.

DVLT-XXI Techniques in Clinical Pathology 1+1

(To be taught by Deptt. of VPP)

Theory

Introduction and Importance of clinical pathology. Introduction to fundamentals of blood and urine analysis. Introduction: Objectives, definition, requirements, steps in post-mortem technique. Technique of post-mortem examination for various species of animals including poultry. Post-mortem changes and post-mortem lesions of important diseases. Writing of post-mortem report. Collection, preservation and dispatch of specimens for laboratory diagnosis. Post mortem examination of veterolegal cases. Brief introduction of processing of tissues for histopathological examination: Grossing, paraffin wax embedding, blocking, cutting and staining.

Practical

Collection, labeling, transportation and preservation of different body fluids. Introduction to the techniques and methodology of the various haematological parameters (Hb, PCV, TEC, ESR, TLC and DLC). Demonstration of common staining of blood smear, its examination and interpretation of data. To acquaint methodology of urine analysis (Physical, chemical and microscopic examination). Demonstration of various equipments/ instruments/ materials required for post-mortem examination. Demonstration of technique of post-mortem examination of large and small animals including bovine, equine, swine, sheep, goat and canine. Demonstration of technique of post mortem examination of poultry. Study of post-mortem changes and lesions in various disease conditions.

Practice of writing post-mortem report. Collection, preservation and dispatch of specimen for laboratory diagnosis. Demonstration of technique of post-mortem examination of wild birds, wild animals and laboratory animals. Brief introduction of processing of tissues for histopathological examination: Grossing, paraffin wax embedding, blocking, cutting and staining.

DVLT-XXII Collection processing and analysis of clinical samples 0+4

(To be taught by Deptt. of TVCC)

Practical

Hands on practice for collection of blood, urine, faeces, tissues and other body fluid samples in different animal species. Preservation and dispatch of specimen for laboratory diagnosis. Hematological examination; biochemical examination of blood, plasma/serum, urine and other body fluids. Blood and faecal examination for parasites, microbiological examination of milk, meat, water, air etc. All preparations of aseptic surgery. Analysis of feed for toxic compounds etc.

DVLT Practical/Professional Training

(Training to be imparted as per schedule)

Practical

The students will undergo 12 weeks practical training in laboratory technology in different departments including Teaching Veterinary Clinical Complex on rotation basis to expose the students in different laboratory technologies. To build necessary understanding regarding use of various types of diagnostic equipments used in various laboratory technology. To develop practical skills pertaining to laboratory management and diagnostic skills in the various fields of clinical medicine and ensuring laboratory safety and quality assurance.

Dr.Diwakar Sharma
Member

Dr.Nirmal Sangwan
Member

Dr.D.K.Thukral
Member

Dr.R.A.Luthra
Chairman