ACADEMIC REGULATIONS
FOR
B.V.Sc. & A.H. DEGREE PROGRAMME
AS PER VCI REGULATIONS-2016

IMPLEMENTED FROM
ACADEMIC SESSION 2017-18

Published By

Registrar
G.B. Pant University of Agriculture & Technology,
Pantnagar (U.S. Nagar) – 263 145, Uttarakhand
DEPARTMENT-WISE DESCRIPTION

DEPARTMENT OF VETERINARY ANATOMY

VETERINARY ANATOMY  Credit Hours: 4+3

Dissection will be carried out on cadavers procured by way of donation of animals or animals obtained from postmortem section and the donated animals should be either incurable or in terminal stages and prossected specimens should be used.

Within one year each college must setup a body donation programme or wild body programme.

Computer simulations software’s, models, mannequins, plastinated specimens, preserved body organs, models should be used for better understanding of the subject.

THEORY

UNIT 1

Introduction to anatomy and branches of anatomy and descriptive terms used in anatomy and study of anatomical planes.


(Note: Detailed description of muscles of different regions of the body will be studied in the respective practical).


Different surface regions, joint regions, Palpable Bony areas or prominences of the body of the animal. Palpable Lymph nodes and Arteries of the body and Surface veins for Venepuncture. Sites for collection of Bone marrow and Cerebrospinal fluid.

General Splanchnology: Introduction to splanchnology, boundaries of thoracic, abdominal and pelvic cavities, topography of different organs of digestive, respiratory, urinary, endocrine, male and female reproductive systems of domestic animals and fowl.

Principles and application of Radiography and Ultrasound for bones and soft tissues.

UNIT 2


UNIT 3

Head and neck: Study of cranial and facial bones, cervical vertebrae of ox and differences in horse, dog, pig and fowl. Boundaries of the oral, orbital, nasal and cranial cavities. Study of paranasal sinuses in ox, horse, dog and pig. Study of articulations and special ligaments of the head and neck. Muscles of face, mastication, eye, ear, tongue, pharynx, soft palate, hyoid and larynx. Study of teeth, hard and soft palate, tongue, pharynx, larynx, thyroid, parathyroid and salivary glands and differences in horse, dog, pig and fowl. Study of cranial nerves, blood vessels and lymph nodes of head and neck regions. Study of boundaries of jugular furrow and structures of carotid sheath along with neck muscles. Study of sense organs, trachea and oesophagus. Age determination by Dentition. Sites for Tracheotomy, Esophagotomy, Ligation of Stensons duct and Mental, Mandibular, Maxillary, Cornual, Infraorabital, Supraorbital...
(frontal), Orbital and Auriculopalpebral nerve blocks and surgical approach to guttural pouches in horse. Importance of Cornual nerve and superficial Temporal artery in Amputation of Horn in cattle.

UNIT-4

Thorax: Study of thoracic vertebrae, ribs and sternum of ox and differences in horse, dog, pig and fowl. Study of joints, special ligaments, blood vessels, nerves, lymph vessels and lymph nodes of thorax. Study of organs of thorax i.e. trachea, thymus, oesophagus, lungs and differences in horse, dog, pig and fowl. Study of pleura, its reflections and mediastinum. Areas of auscultation and percussion of heart and lungs and site for Paracentesis Thoracis.

UNIT-5


UNIT-6


UNIT-7

Cytology, cell junctions, study of basic tissues i.e epithelial, connective, muscular and nervous tissues, blood and bone marrow. Study of microscopic structures of digestive, circulatory, urinary, respiratory, nervous, lymphatic, endocrine, male and female genital systems and mammary glands of domestic animals. Study of microscopic structure of sense organs i.e. eye, ear and integument.

UNIT-8

Introduction to embryology, gametogenesis, fertilization, cleavage, types of eggs, morula, blastulation, gastrulation, types of implantation, twinning. Formation of foetal membranes in mammals and birds, Placenta and its classification. Different germ layers and their derivatives. Study of development of organs of digestive system including accessory structures i.e tongue, teeth, salivary glands, liver and pancreas. Study of development of organs of respiratory, urinary, circulatory, lymphatic, nervous, musculoskeletal, male and female reproductive systems. Development of endocrine glands, sense organs i.e eye and ear.

PRACTICAL

UNIT-1

Study of general terms used in anatomy, study of anatomical planes. Study of different parts of skeleton, different surface and joint regions. Study of boundaries of thoracic, abdominal and pelvic cavities. Demonstration of different types of joints, muscles tendons, ligaments, synovial bursa and synovial sheath. In situ demonstration of heart, meninges, brain and spinal cord. Boundaries of Thoracic, Abdominal and Pelvic Cavities and in situ demonstration of organs of digestive, respiratory, urinary, endocrine, male and female reproductive systems of domestic animals. Demonstration of Different surface regions, joint regions and Palpable Bony areas or prominences of the body of the animal , Common sites of fractures, Palpable Lymph nodes and Arteries of the body (ventral coccygeal artery in ox, femoral artery in dog and cat , facial artery in horse) and Surface veins for Venepuncture (cephalic vein and recurrent tarsal vein in dog and cat,
jugular vein in large animals.) and Sites for collection of Bone marrow and Cerebrospinal fluid. Visualization of Radiographs and ultrasound pictures of various organs and Fractures of various bones.

UNIT-2

Fore limb: Demonstration of different bones of fore limb of ox and comparison with horse, dog, pig and fowl. Dissection of the fore limb. Study of joints, ligaments, muscles, major blood vessels, lymph nodes and nerves of fore limb. Study of sites for different nerves blocksneurectomies in fore-limb. Study of suprascapular nerve paralysisshoulder plexus, radial nerve paralysis of elbow. Structure of the equine hoof and comparison with ox. Demonstration of radiographs of normal bones of fore limb. Clinical importance of cephalic vein for intravenous injections in dog.

UNIT-3


UNIT-4

Thorax: Demonstration of thoracic vertebrae, ribs and sternum of ox and comparison with horse, dog, pig and fowl. Dissection of muscles, blood vessels, nerves and lymph nodes of thorax. Demonstration of organs of thorax i.e. trachea, oesophagus, thymus, lungs and heart and differences in horse, dog, pig and fowl. Study of pleural reflections of thoracic cavity. Demonstration of sites for auscultation and percussion. Recurrent laryngeal nerve paralysis-roaring in horses. Choke or oesophageal obstruction. Demonstration of radiographs and videos of ultrasonography of organs of thorax.

UNIT-5


UNIT-6

UNIT-7
Microscopy and micrometry. Comparison of light and electron microscopy. Histological techniques, processing of tissues for paraffin sectioning and haematoxylin and eosin staining. Microscopic examination of epithelium, connective tissue, muscular tissue, nervous tissue and blood. Microscopic examination of organs of digestive, circulatory, urinary, respiratory, nervous, lymphatic, endocrine, male and female genital systems and sensory organs of domestic animals.

UNIT-8
Demonstration of Placenta, umbilical cord and foetal membranes of different domestic animals. Demonstration of congenital anomalies of domestic animals as per availability. Study of slides of developing organs of different systems as per the availability.
A embalmed cadaver of buffalo calf (procured through donated animals or cadevars obtained from post-mortem section) for every 24 students to be used for dissection purposes.

<table>
<thead>
<tr>
<th>ANNUAL EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPERS</td>
</tr>
<tr>
<td>THEORY</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
<tr>
<td>PRACTICAL</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
</tbody>
</table>

DEPARTMENT OF VETERINARY PHYSIOLOGY AND BIOCHEMISTRY
VETERINARY PHYSIOLOGY AND BIOCHEMISTRY
Credit Hours: 6+2

VETERINARY PHYSIOLOGY
Credit Hours: 4+1
VETERINARY BIOCHEMISTRY
Credit Hours: 2+1
VETERINARY PHYSIOLOGY

THEORY

UNIT- 1 (BLOOD, CARDIOVASCULAR, NERVOUS AND MUSCULAR SYSTEMS)
Introduction to Blood; Properties of blood as a body fluid, metabolism and fate of R.B.C; Hemoglobin-chemical structure, synthesis, physiological functions, derivatives of hemoglobin; Heart- morphological characteristic, systemic excitability conduction and transmission processes. Cardiac Cycle: Regulation of cardiac output; coronary circulation; properties of pulse; metabolism and energetic of working myocardial cell, extrinsic and intrinsic regulation; Electro Cardio Graph and its significance in Veterinary Sciences - Echocardiography. Haemorrhage haemostasis. Haemodynamics of circulation, circulatory mechanics, resistance to flow, vasoconstriction, nervous and circulating fluid volume controls of blood pressure, neurohormonal control of vascular smooth muscle. Circulatory controls- shock stresses, regional and fetal circulation. Capillary exchange, control of blood pressure. Adjustment of circulation during exercise. Muscle Physiology-basic muscle unit characteristic-electrical phenomenon in muscle cell - muscle action potential, excitation and propagation of impulse characteristics- latent period refractive ness, threshold level-all and none characteristics - contractile mechanism - excitation - contraction coupling-neuro-muscular transmission, types of muscle contraction, phenomenon of fatigue, rigor mortis. Organization of nervous system- Mechanism of information processing, hierarchical control. Major function system- sensory, consciousness, emotion, motor and visceral control and basic functional unit - neuron structure, type- functional characteristics of sub-units of neuron. Membrane potential - ionic basis of resting membrane potential (RMP) nerve action potential, excitation and propagation of impulse...

UNIT-2 (DIGESTIVE AND RESPIRATORY SYSTEMS)

Morphological characteristic of mono gastric and poly gastric digestive system. Prehension, rumination; defecation; vomition; regulation of secretory function of saliva, stomach, intestine, pancreas; bile secretion; hunger, appetite control, developmental aspects of digestion; luminous, membranous and microbial digestion in rumen and intestine; permeability characteristics of intestine, forces governing absorption, control intestinal transport of electrolyte and water, enzymatic digestion in monogastric and fermentative digestion in rumen, modification of toxic substances in rumen. Digestion in birds.


UNIT-3 (EXCRETORY AND ENDOCRINE SYSTEMS)


UNIT-4 (REPRODUCTION, LACTATION, GROWTH AND ENVIRONMENTAL PHYSIOLOGY)

Genetic and endocrine control of gonadal development, modification of gonadotrophin release, ovarian functions, follicular development, dynamics, endocrine and receptor profiles, sexual receptivity, ovarian cycle, post-partum ovarian activity, ovum transport, capacitation, fertilization, reproductive cycles in farm animals- hormones present in the biological fluids during pregnancy and their uses for the diagnosis of pregnancy- maternal foetal placental participation in pregnancy and parturition, immunology of gestation, preparturient endocrine status. Spermatogenic cycle and wave- function of sertoli cell-leydig cell-semen - composition- evaluation; Testosterone - function and regulation - cryptorchidism. Puberty - photoperiod - uses of androgens, progestogens, estrogens. Functional and metabolic organization of mammary glands - structure and development; effect of estrogens and progesterone; hormonal control of mammary growth; lactogenesis and galactogenesis; biosynthesis of milk constituents secretion of milk, and metabolism, prolactin and lactation cycle. Biochemical and genetic determinants of growth, regulation of growth, metabolic and hormone interactions, factors affecting efficiency of growth and production in ruminants and single stomach animals. Growth in meat producing animals and birds, growth curves. Recombinant gene transfer technologies for growth manipulation- advantages and limitations. Protein deposition in animals and poultry. Heat balance, heat tolerance, hypothermia, hyperthermia, thermo-regulation in farm animals, role of skin, responses of animals to heat and cold,
fever, body temperature and hibernation. Temperature regulation in birds. Climatology - various
parameters and their importance. Effect of different environmental variables like temperature, humidity,
light, radiation, altitude on animal performance. Acclimation, acclimatization - general adaptive
syndrome. Clinical aspects of endocrine - reproductive functions, circadian rhythm. Neurophysiology of
behaviours, types of behaviour, communication, Learning and memory behavioural plasticity.

PRACTICAL

UNIT- 1 (BLOOD, CARDIOVASCULAR, NERVOUS AND MUSCULAR SYSTEMS)

Collection of blood samples - Separation of serum and plasma - Preservation of de-fibrinated blood -
enumeration of erythrocytes, leucocytes - differential leucocytic count - platelet count - estimation of
hemoglobin - haematocrit - erythrocyte sedimentation rate - packed cell volume - coagulation time-
bleeding time -Erythrocyte fragility and viscosity - blood grouping - recording of ECG - measurement of
arterial blood pressure (Sphygmomanometry). Simulation experiments on Nerve- Muscle and heart
physiology.

UNIT-2 (DIGESTIVE AND RESPIRATORY SYSTEMS)

Counting of rumen motility, estimation of volatile fatty acids and ammonia nitrogen in rumen liquor.
Recording of respiration, spirometry. Recording of volume and capacities in different physiological states
including determination of vital capacities.

UNIT-3 (EXCRETORY AND ENDOCRINE SYSTEMS)

Urine analysis-physiological constituents, pathological determinates, determination of Glomerular
Filteration Rate. Titerable acidity, determination of inorganic phosphorus, urine ammonia nitrogen and
creatinine in urine. Recording of rumenorintestinal movements (Demonstration) and Bio assay for tropic
hormone. Demonstration of hormone estimation.

UNIT-4 (REPRODUCTION, LACTATION, GROWTH AND ENVIRONMENTAL
PHYSIOLOGY)

Oestrus and phases of oestrous cycle in animals (vaginal mucus). Behavioural signs of oestrus. Sperm
motility, sperm concentration -live and dead - abnormal sperm count. Measurement of growth in various
species. Measuring surface area of animals. Health parameters of animals- body temperature, pulse,
respiration and heart rate. Measurement of animal environmental conditions. Behaviour of animals-
mating behavior, feeding behaviour (liveorvideo graphicorcomputer simulated demonstration).

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 2</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>3 and 4</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRACTICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
</tbody>
</table>
VETERINARY BIOCHEMISTRY

Credit Hours: 2+1

THEORY

UNIT-1 (GENERAL VETERINARY BIOCHEMISTRY)


UNIT-2 (INTERMEDIARY METABOLISM)


UNIT-3 (VETERINARY ANALYTICAL BIOCHEMISTRY)

Disorders of Carbohydrate Metabolism: Diabetes mellitus, Ketosis, Bovine Ketosis, Pregnancy toxemia, hypoglycaemia in baby pigs, hyperinsulinism in Dogs. Hormonal control of carbohydrate metabolism and regulation of blood sugar.


PRACTICAL

UNIT-1 (GENERAL VETERINARY BIOCHEMISTRY)

Concentration of solutions and system International (S.I.) Units; Preparationor standardization of acids and alkalies; Preparation of Buffers; Titration curve of acid versus base; Qualitative test for
carbohydrates and identification of unknown carbohydrates; Determination of acid number of an oil; Color and precipitation reactions of proteins; Estimation of amino acids (Sorensen’s Method).

UNIT-2 (INTERMEDIARY METABOLISM)

Effect of temperature and pH on enzyme activity; Estimation of blood or plasma Glucose, Protein, Inorganic phosphate, Calcium, Magnesium; Estimation of ascorbic acid by Dichlorophenolindophenol (DCPIP) method; Estimation of milk lactose by Benedict’s quantitative method; Estimation of sodium and potassium by flame photometer; Paper or thin layer Chromatography of amino acids; Estimation of vitamin A by colorimetry.

UNIT-3 (VETERINARY ANALYTICAL BIOCHEMISTRY)

Detection of Pathological Constituents in Urine; Assays of ALT and AST in Serum; Acute phase proteins (AorG Ratio); Estimation of total serum cholesterol, Blood Urea Nitrogen, creatinine, serum bilirubin (Direct, Indirect and Total). Principles of various diagnostic tests, normal and abnormal values in different species, differential diagnosis, correlating with diseases and rationale of arriving at the conclusion need to be rediscussed in detail during Final Professional in the course VETERINARY CLINICAL PRACTICES-II, Diagnostic Laboratory Section.

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 3</td>
<td>100</td>
</tr>
<tr>
<td>Paper-II</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 3</td>
<td>60</td>
</tr>
<tr>
<td>Paper - II</td>
<td>2</td>
<td>60</td>
</tr>
</tbody>
</table>

DEPARTMENT OF LIVESTOCK PRODUCTION MANAGEMENT

LIVESTOCK PRODUCTION MANAGEMENT  
Credit Hours: 4+2

THEORY

UNIT-1 (GENERAL LIVESTOCK MANAGEMENT)


UNIT-2 (FODDER PRODUCTION AND CONSERVATION)


**UNIT-3 (LIVESTOCK PRODUCTION MANAGEMENT-RUMINANTS)**


**UNIT-4 (ZOO ANIMALS PRODUCTION MANAGEMENT)**

Taxonomy of important wild zoo animals. Status and conservation practices of wild life in India. Basic principles of habitat and housing of various classes of wild zoo animals. Size and space requirement (dimension) of cubicles, enclosures of important wild zoo animals. Management of livestock in fringe areas, in and surrounding the breeding areas. Feeding habits, feeds and feeding schedules of captive animals. Restraining, capture, handling, physical examination of captive animals. Classification of zoos, management of sanctuaries, national parks etc. Acts and Rules related to captive animals. National and international organization and institutions interlinked to captive animals role and functioning.

**UNIT-5 (ANIMAL WELFARE)**


**UNIT-6 (POULTRY PRODUCTION MANAGEMENT)**


**UNIT-7 (DIVERSIFIED POULTRY PRODUCTION AND HATCHERY MANAGEMENT)**


**UNIT-8 (LABORATORY OR RABBIT OR PET ANIMAL PRODUCTION MANAGEMENT)**

Importance and selection of laboratory animal, care and housing standards of mice, rats, hamster and guinea pigs. General considerations on feeding and breeding of laboratory animals. Concept of production of specific pathogen free and germ free laboratory animals. Scope of rabbit farming in the country, breeds and their distributions in India. Limitation of rabbit animal production, Selection, care and management of breeding stock for commercial purpose. Identification, care and management of kindling animals. Care of new born, growing stock. Breeding and selection techniques for optimal production of rabbit. Feeds and feeding for rabbit production. Hygienic care and Housing for rabbit production. Disposal, utilization and recycling of waste etc. Preparing projects for micro (Backyard), mini and major rabbit farms. Important breeds of dogs, cats and pet birds. Feeding of dogs, cats and pet birds. Dog show: preparation for show, kennel clubs, important characteristics for judgment. Utility of dogs- guarding, defense, patrolling, riot control, scouting, espionage, mine detection, tracking, guiding, hunting, races, retrieving rescue and other uses.

**UNIT-9 (SWINE OR EQUINE OR CAMEL, YAK AND MITHUN PRODUCTION MANAGEMENT)**


**PRACTICAL**

**UNIT-1 (GENERAL LIVESTOCK MANAGEMENT)**

General introduction of the Institute animal farm. Identification of common tools used on animal farm. Familiarization with body points of animals. Methods of identification (marking, tattooing, branding, tagging and electronic chip under pre emptive analgesia). Use of rope for knot and halter making. Dentition and ageing of animals. Preparation of animals for show and judging. Selection and culling of animals. Preparation of project proposal

**UNIT-2 (FODDER PRODUCTION AND CONSERVATION)**

Visit to the fodder farm. Familiarization with the various types of fodders in the state and India. Familiarization with various fertilizers and manures. Collection, preservation and storage of feed and
fodder; Damages or loss during transfer and storage; methods to prevent them. Cost of calculations of fodder production. Livestock waste utilization and recycling.

UNIT-3 (LIVESTOCK PRODUCTION MANAGEMENT-RUMINANTS)


UNIT-4 (ZOO ANIMALS PRODUCTION MANAGEMENT)

Visit to nearby wildlife sanctuary, captive animals centres to study care and management of these animals. To study housing of captive animals. To study feeds and feeding schedule of captive animals. Hygienic preparation, preservation and storage of feeds of captive animals. Familiarization about restraining, handling and physical examination of captive animals.

UNIT-5 (POULTRY PRODUCTION MANAGEMENT)


UNIT-6 (INCUBATION AND HATCHERY MANAGEMENT)

Hatchery layout and design. Project report for establishing a broiler farm. Project report for establishing a layer farm. Project report for establishing a breeder farm. Visit to commercial poultry farms or hatchery or feed mill. Visit to farms of other avian species.

UNIT-7 (LABORATORY OR RABBIT OR PET ANIMAL PRODUCTION MANAGEMENT)


UNIT-8 (SWINE OR EQUINE OR CAMEL, YAK AND MITHUN PRODUCTION MANAGEMENT)

Handling, restraining of swine, equines, camel. Identification of pregnant animals, care during pregnancy, isolation and care of farrowing sows and piglets. Preparation of swine, equine for show and judging. Economics of pig. Routine inspection, tooth care and vaccination schedule. Horse riding: walking, trotting, cantering and galloping. Layout plans for sty, stables
<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2, 3, 4 and 5</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>6, 7, 8 and 9</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2, 3 and 4</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper - II</td>
<td>5, 6, 7 and 8</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

DEPARTMENT OF VETERINARY MICROBIOLOGY

VETERINARY MICROBIOLOGY

Credit Hours: 3+2

THEORY

UNIT-1 (GENERAL & SYSTEMATIC VETERINARY BACTERIOLOGY)

Introduction and history of Microbiology; Classification and nomenclature of bacteria; Microscopy and Micrometry; Bacterial stains and techniques; Structure and morphology of bacteria; Growth and nutritional requirement of aerobic and anaerobic bacteria; Normal, opportunistic and saprophytic bacterial flora: Types and sources of infection, method of transmission of infection. Pathogenicity, virulence, determinants of virulence, Epizootic and enzootic diseases, bacteremia, septicaemia and toxaemia, endotoxins, exotoxins, antitoxins, toxoids; Bacterial genetics (Mutation, Transformation, Transduction and Conjugation), plasmids and antibiotic resistance.

Study of the following bacteria in relation to isolation, growth, cultural, morphological, biochemical and antigenic characteristics, epidemiology and pathogenesis, pathogenicity, diagnosis, prevention and control of bacterial diseases caused by following bacteria: *Staphylococcus*; *Streptococcus*; *Corynebacterium*, *Trueperella*, *Rhodococcus*; *Listeria* and *Eryepelotheirx*; *Bacillus*; *Mycobacterium*; *Clostridium*, *Actinomyces*, *Nocardia*, *Streptomycyes* and *Dermatophilus*; Family *Enterobacteriaceae* (E.coli, *Klebsiella*, *Salmonella*, *Yersinia*, *Proteus*); *Pseudomonas* and *Burkholderia*; *Pasteurella*, *Mannheimia*, *Actinobacillus* and *Haemophilus*, *Brucella*; *Vibrio*, *Campylobacter*; *Bordetella* and *Moraxella*; *Gram negative anaerobes*: *Bacteriodes*, *Dichlobacteria* and *Fusobacterium*; *Leptospira* and *other Spirochaetes*; *Mycoplasma*, *Coxiella*, *Neorickettsia*, *Ehrlichia*, *Anaplasma*, *Rickettsia*; *Chlamydia* and *Chlamydomphila* Emerging, re-emerging and transboundry bacterial pathogens.

UNIT-2 (VETERINARY MYCOLOGY)

Introduction, classification, general properties of fungi; Growth and Reproduction of fungi; Study of following important pathogenic fungi in relation to their isolation, growth, morphological, cultural, biochemical and antigenic characteristics, epidemiology, pathogenesis, diagnosis and control of fungal diseases caused by following genera: *Candida* and *Cryptococcus*; *Aspergillus*; *Penicillum*; *Dermatophytes* and *Malassezia*; Dimorphic fungi, *Rhinosporidium* and *Sporotrichum*; *Mycetoma* and *Zygomycetes*; Mycotic mastitis and mycotic abortion; Mycotoxicoses

UNIT-3 (MICROBIAL BIOTECHNOLOGY)

Basic concepts and scope of Recombinant DNA technology; Gene cloning, Cloning vectors and expression vectors; Transformation and transfection; Southern, Northern and Western blotting; Bioinformatics, Gene banks; Application of molecular and biotechnological techniques: Polymerase
chain reaction, Nucleic acid hybridization, DNA library, DNA sequencing and DNA fingerprinting; IPR. Ethics and regulatory issues in Animal Biotechnology.

UNIT-4 (VETERINARY IMMUNOLOGY AND SEROLOGY)

History of Immunology; Lymphoid organs, tissues and Cells: Types of Immunity; Antigens, hapten, epitope, Specificity, T dependent and T independent Antigens, heterophile Antigens, cross reacting Antigens, blood group Antigens, Mitogens and factors affecting immunogenicity; Adjuvants; Antibody: Structure, physiochemical properties and functions of various classes of immunoglobulins, Theories of antibody production; Hybridoma and monoclonal antibodies, Serological reactions. Major histocompatibility complex (MHC) structure, function and gene organization; Structure of BCR and TCR; Antigen processing and presentation; Complement system: activation pathways and biological consequences; Cytokines: general properties, major types and function; Hypersensitivity: classification and mechanism of induction; Autoimmunity; Immunotolerance; Concept of Immunity to Microbes, Vaccines and other biological.

UNIT-5 (GENERAL AND SYSTEMATIC VETERINARY VIROLOGY)


PRACTICAL

UNIT-1 (GENERAL AND SYSTEMATIC VETERINARY BACTERIOLOGY)

Orientation to bacteriology laboratory; Methods of sterilization and disinfection; Preparation of culture media for cultivation of aerobic and anaerobic bacteria; Methods of inoculation, Cultivation of aerobic and anaerobic bacteria; Isolation of bacteria in pure culture; Simple staining, Negative staining, Differential staining procedures of bacteria: Gram’s staining, Acid fast staining; Special staining procedures: Capsule and Spore staining; Bacterial motility: Culture sensitivity test; Outlines of collection, transportation and processing of samples for bacterial disease diagnosis.

Characterization of Staphylococcus; Streptococcus; E. coli Salmonella; Klebsiella and Proteus; Pseudomonas; Pasteurella; Clostridium; Isolation and identification of bacteria from clinical cases of Mastitis, Abortions, Enteric, Respiratory and Pyogenic infections.

UNIT-2 (VETERINARY MYCOLOGY)

Outline of collection, transportation and processing of samples for fungal disease diagnosis, Preparation of culture media, Cultivation and slide culture technique of fungi; Cultural characteristics of fungi; Lactophenol cotton blue staining to study morphology of fungi; Culture sensitivity test of fungi; Diagnosis of Aspergillosis and Candidiasis; Demonstration of other important yeast, moulds and Dermatophytes.
UNIT-3 (MICROBIAL BIOTECHNOLOGY)
Extraction and quantitation of nucleic acid; Plasmid isolation and plasmid profiling; Agarose gel electrophoresis for studying or diagnosis of nucleic acid of microbes; SDS PAGE electrophoresis for studying or diagnosis of proteins of microbes; Use of Multimedia and audio-visual aids for molecular biology aspects.

UNIT-4 (VETERINARY IMMUNOLOGY AND SEROLOGY)
Inoculations of lab animals, preparation of antigen, Raising of antisera, separation and preservation of serum, Concentration of Immunoglobulins, Agglutination tests: Plate, Tube, Haemagglutination, Precipitation test: Agar gel precipitation Test, Single radial immunodiffusion test, Immunoelectrophoresis, Cell mediated immune response (DTH), Enzyme linked immunosorbent assay (ELISA), Visit and appraisal of Veterinary biological institute.

UNIT-5 (GENERAL AND SYSTEMATIC VETERINARY VIROLOGY)
Orientation to a virology laboratory; Collection, preservation, transport of samples and their processing in virology laboratory; Isolation of viruses in laboratory animals or poultry or embryonated chicken eggs; Preparation of media and reagents for cell culture; Subculture and maintenance of continuous cell lines; Quantitation of cells by viable cell counts in a haemocytometer; Cryopreservation and recovery of cell cultures; Preparation of Primary cell culture (chicken embryo fibroblast or Lamb kidney); Demonstration of cytopathic effect by viruses in cell culture (Important virus isolates available in the department); Demonstration of Titration of virus by TCID50 and plaque assay in cell cultures*; Demonstration of neutralizing antibodies by serum neutralization test in cell cultures* ; Agar gel precipitation test for detection of virus infection*; Titration of Newcastle disease virus by haemagglutination test; Haemagglutination inhibition test for detection of antibodies to Newcastle disease virus; ELISA for detection of viral antigen and antibodies; Molecular techniques for viral disease diagnosis *Important virus isolates available in the department.

<table>
<thead>
<tr>
<th>ANNUAL EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PAPERS</strong></td>
</tr>
<tr>
<td><strong>THEORY</strong></td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
<tr>
<td><strong>PRACTICAL</strong></td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper - II</td>
</tr>
</tbody>
</table>

DEPARTMENT OF VETERINARY PATHOLOGY

VETERINARY PATHOLOGY Credit Hours: 4+2=6

THEORY

UNIT-1 (GENERAL VETERINARY PATHOLOGY)
mediators, cardinal signs and systemic effects. Wound healing by primary and secondary intention including growth factors. Immunopathology in brief (immunodeficiency, hypersensitivity and autoimmunity).

UNIT-2 (SYSTEMIC VETERINARY PATHOLOGY)
Pathological changes affecting Digestive, Respiratory, Musculoskeletal, Cardiovascular, Haematopoietic, Lymphoid, Urinary, Reproductive, Nervous, Endocrine systems, Skin and Appendages, Ear and Eye.

UNIT-3 (ANIMAL ONCOLOGY, VETERINARY CLINICAL PATHOLOGY AND NECROPSY)
Animal Oncology: Definitions, general characteristics and classification of neoplasms. Differences between benign and malignant tumours, aetiology, carcinogenesis and spread of neoplasms, tumour immunity, effects and diagnosis of tumours, staging and grading of neoplasms. Pathology of various types of tumours in domestic animals (epithelial, connective tissue, hematopoietic tissue etc.) Veterinary Clinical Pathology: Introduction, Haematology – Different anticoagulant used in haematology, interpretation of blood tests (haemoglobin, packed cell volume, total erythrocyte count, erythrocytic indices, erythrocytic sedimentation rate, total leucocyte count, absolute count of different leucocytes), blood smear examination and its interpretation.
Urinalysis- Interpretation of physical, chemical and microscopic examination of urine. Study of biopsy and cytology including exfoliative cytology as rapid diagnostic techniques.
Necropsy: Introduction, objectives, pre-necropsy guidelines, procedure for post mortem examination of various species of animals including wild animals, post mortem changes, collection, preservation and dispatch of specimens (morbid materials) for laboratory examination, writing of post mortem report, veterolegal necropsy, veterolegal wounds.

UNIT-4 (PATHOLOGY OF INFECTIOUS AND NON-INFECTIOUS DISEASES OF DOMESTIC ANIMALS)
Pathology of viral infections: Pathogenesis, gross and microscopic pathology of foot and mouth disease, Rinderpest, malignant catarrhal fever, blue tongue, infectious bovine rhinotracheitis, bovine viral diarrhoea, Peste des Petits (PPR), equine infectious anaemia, equine influenza, equine viral arteritis, equine rhinopneumonitis, classical swine fever, swine influenza, rabies, canine distemper, infectious canine hepatitis, canine parovirus infection, feline panleukopenia, maedi, jaagziekte, pox virus diseases in different animals. Vesicular stomatitis, vesicular exanthema, equine encephalomyelitis, diseases caused by rota and corona viruses.
Pathology of prion diseases (scrapie, bovine and feline spongiform encephalopathies).
Pathology of bacterial infections: Pathogenesis, gross and microscopic pathology of tuberculosis, Johne's disease, actinomycosis, actinobacillosis, anthrax, clostridial group of diseases (black quarter, black disease, enterotoxaemia, braxy, botulism tetanus), streptococcosis including strangles in horses, staphylococcosis, glanders, pasteurellosis, leptospirosis, listeriosis, swine erysipelas, brucellosis, corynebacterium infections (caseous lymphadenitis, pseudotuberculosis), campylobacteriosis, salmonellosis, and colibacillosis including oedema disease in pigs, and necrobacillosis).
Pathogenesis, gross and microscopic pathology of mycoplasma infection (contagious bovine pleuropneumonia, contagious caprine pleuropneumonia, porcine enzootic pneumonia), diseases of chlamydial group, Q-fever, anaplasmosis and ehrlichiosis.
Pathogenesis, gross and microscopic pathology of superficial and deep mycoses - ringworm (dermatophytosis), aspergillosis, zygomycosis, histoplasmosis, cryptococcosis, rhinosporidiosis and candidiasis. Pathogenesis, gross and microscopic pathology of aflatoxicosis, ochratoxicosis, trichothecosis, Degnala disease and ergotoxicosis.
Pathogenesis, gross and microscopic pathology of fasciolosis, babesiosis, theileriosis and trypanosomosis. Pathological changes (in brief) of amphiomiasis, ascariasis, strongylosis, haemonchosis, spirocercosis, filariasis, hookworm, tapeworm infections, coccidiosis, toxoplasmosis, cryptosporidiosis, Pathological changes of nutritional imbalances (in brief) due to carbohydrates, proteins, fats, minerals and vitamins and metabolic diseases (pregnancy toxaemia, post-parturient haemoglobinuria, hypomagnesemic tetany, azoturia, and sway backorenzootic ataxia, pica and Rheumatism like syndrome).
Gross and microscopic pathology in (brief) of toxicities like arsenic, copper, lead, mercury, cadmium, strychnine, nitrateornitrite, hydrocyanic acid, fluoride, selenium and oxalates; insecticide or pesticide poisoning, plant poisoning (braken fern, gossypol, ratti and lantana)

UNIT-5 (AVIAN PATHOLOGY)
Avian Inflammation, Viral Diseases: Pathogenesis, gross and microscopic pathology of Ranikhet disease, infectious bursal disease, infectious bronchitis, infectious laryngotracheitis, fowl pox, avian influenza, Marek's disease, leukosis or sarcoma group of diseases, reticuloendotheliosis, avian encephalomyelitis, inclusion body hepatitis, hydropericardium syndrome, chicken infectious anaemia, avian nephritis, egg drop syndrome, reovirus infections.

Bacterial Diseases: Pathogenesis, gross and microscopic pathology of colibacillosis, infectious coryza, clostridial diseases, salmonella infections, fowl cholera, tuberculosis and spirochaetosis. Pathogenesis, gross and microscopic pathology of *Mycoplasma* infections, chlamydiosis.

Pathogenesis, gross and microscopic pathology of aspergillosis, thrush, favus, aflatoxicosis, ochratoxicosis and trichothecosis.

Gross and microscopic pathology (in brief) of helminthic diseases (flukes, cestodes, nematodes), protozoal diseases (coccidiosis, histomoniasis), ectoparasites.

Gross and microscopic pathology of nutritional imbalances due to carbohydrates, proteins, minerals and vitamins.

Miscellaneous diseases (Heat stroke, vent gleet, internal layer, false layer, pendulous crop, breast blister, ascites syndrome, fatty liver and kidney syndrome, fatty liver syndrome, cage layer fatigue, gout, hemorrhagic syndrome, round heart disease, impaction of oviduct, egg bound condition, bumble foot) and common vices.

UNIT-6 (PATHOLOGY OF DISEASES OF LABORATORY AND WILD ANIMALS)
Pathology of important diseases of rats, mice, and guinea pigs (Tyzzer’s disease, Pseudotuberculosis, Salmonellosis, Infectious ectromelia, Infantile diarrhoea, Murine hepatitis virus, Lymphocytic choriomeningitis); Pathology of important diseases of rabbits (Pasteurellosis, Blue breast, Treponematosis, Enterotoxaemia, Rabbit pox, Infectious myxomatosis, Papillomatosis, Coccidiosis, Mite infestation). Gross and microscopic pathology of important diseases of wild animals (West Nile Fever, Rabies, FMD, Pox, Kyasanaur forest disease, Infectious hepatitis virus, Anthrax, Tuberculosis, Colibacillosis, Clostridial infections Trypanosomosis, Babesiosis, Theileriosis, Nutritional deficiency diseases)

PRACTICAL
UNIT-1 (GENERAL VETERINARY PATHOLOGY)
Study of gross pathological specimens and recognition of pathological lesions. Histopathological techniques- Processing of tissue for paraffin embedding technique, section cutting, staining and identification of microscopic lesions.

Examination of histopathological slides showing general pathological alterations.

UNIT-2 (SYSTEMIC VETERINARY PATHOLOGY)
Study of gross specimens and histopathological slides pertaining to systemic pathology.

UNIT-3 (ANIMAL ONCOLOGY, VETERINARY CLINICAL PATHOLOGY AND NECROPSY)
Macroscopic and microscopic examinations of various types of benign and malignant tumours. Examination of blood for routine haematological tests in domestic animals and poultry. Physical, chemical and microscopic examination of urine.

Post mortem examination of different species of animals including wild and laboratory animals.
UNIT-4 (PATHOLOGY OF INFECTIOUS AND NON-INFECTIONOUS DISEASES OF DOMESTIC ANIMALS)
Post mortem examination and its interpretations, Study of gross specimens and histopathological slides of various organs pertaining to infectious and non-infectious diseases of domestic animals. Demonstration of causative agents in tissue section by special staining methods and use of rapid diagnostic tests.

UNIT-5 (AVIAN PATHOLOGY)
Post mortem examination of poultry and writing of post mortem report. Collection, preservation and dispatch of morbid materials in poultry diseases. Study of gross specimens and histopathological slides of different diseases of poultry.

UNIT-6 (PATHOLOGY OF DISEASES OF LABORATORY AND WILD ANIMALS)
Post mortem examination of laboratory and wild animals. Study of gross specimen and histopathological slides of diseases affecting laboratory and wild animals.

<table>
<thead>
<tr>
<th>ANNUAL EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPERS</td>
</tr>
<tr>
<td>THEORY</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
<tr>
<td>PRACTICAL</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper - II</td>
</tr>
</tbody>
</table>

DEPARTMENT OF ANIMAL GENETICS AND BREEDING

ANIMAL GENETICS AND BREEDING Credit Hours: 3+1

THEORY

UNIT-1 (BIOSTATISTICS AND COMPUTER APPLICATION)
Tests of hypothesis- t and Z- tests. Chi-square test. Design of experiment- Completely randomized design (CRD).
Randomized block design (RBD). Analysis of variance and F-test of significance. Introduction to Non-parametric tests.

UNIT-2 (PRINCIPLES OF ANIMAL AND POPULATION GENETICS)

Molecular genetics, nucleic acids-structure and function. Gene concept, DNA and its replication. Introduction to molecular techniques.


UNIT-3 (PRINCIPLES OF ANIMAL BREEDING)


Breeding of pet, zoo and wild animals: Classification of dog and cat breeds. Pedigree sheet, selection of breeds and major breed traits. Breeding management of dogs and cats. Common pet birds seen in India and their breeding management.

Population dynamics and effective population size of wild animals in captivity or zoo or natural habitats. Planned breeding of wild animals. Controlled breeding and assisted reproduction. Breeding for conservation of wild animals.

PRACTICAL

UNIT-1 (BIOSTATISTICS AND COMPUTER APPLICATION)


UNIT-2 (PRINCIPLES OF ANIMAL AND POPULATION GENETICS)

Monohybrid, Dihybrid cross and Multiple alleles. Modified Mendelian inheritance and sex linked inheritance. Linkage and crossing over. Demonstration of Karyotyping in farm animals. Calculation of gene and genotypic frequencies, Testing a population for Hardy-Weinberg equilibrium. Calculation of effects of various forces that change gene frequencies. Computation of population mean, average effect
of gene and gene substitution and breeding value. Estimation of repeatability, heritability, genetic and phenotypic correlations.

**UNIT-3: (PRINCIPLES OF ANIMAL BREEDING)**


---

**DEPARTMENT OF ANIMAL NUTRITION**

**ANIMAL NUTRITION**

**THEORY**

**UNIT-1 (PRINCIPLES OF ANIMAL NUTRITION AND FEED TECHNOLOGY)**


**UNIT-2 (APPLIED RUMINANT NUTRITION-I)**

UNIT-3 (APPLIED RUMINANT NUTRITION-II)

Nutrient requirements and methods for assessing the energy and protein requirements for maintenance and production in terms of growth, reproduction, milk, meat, wool and draft purpose. General principles of computation of rations.

Formulation of rations and feeding of dairy cattle and buffaloes during different phases of growth and production (neonate, young, adult, pregnant, lactating and dry animals; breeding bull) and working animals. Formulation of ration and feeding of sheep and goat during different phases of growth and production (milk, meat and wool). Feeding of high yielding animals and role of bypass nutrients. Metabolic disorders and nutritional interventions. Use of NPN compound for ruminants.

UNIT-4 (APPLIED NON-RUMINANT NUTRITION)

Nutrient requirements in poultry, swine and equine - Energy and protein requirement for maintenance and production. Methods adopted for arriving at energy and protein requirements for maintenance and production in terms of growth, reproduction and production (egg, meat and work). Feeding standards for non-ruminants and poultry Formulation of rations as per Bureau of Indian Standards and Indian Council of Agricultural Research specifications. Feeding of swine (Piglets, Growers, Lactating and pregnant sows, Breeding boar, Fattening animals), equine (foal, yearling, broodmare, stallion and race horses) and poultry (Starter, Growers, Broilers, Layers) with conventional and unconventional feed ingredients. Feeding of ducks, quails, turkeys and laboratory animals. Nutrient requirements of mice, rat, rabbit and guinea pig. Diet formulation, preparation and feeding of rabbits and laboratory animals. Nutrient requirement and feeding of different categories of dogs and cats; peculiarities of feeding cats. Feeding of wild animals and birds in captivity. Metabolic disorders and nutritional intervention.

PRACTICAL

UNIT-1 (PRINCIPLES OF ANIMAL NUTRITION AND FEED TECHNOLOGY)


UNIT-2 (APPLIED RUMINANT NUTRITION-I)

Calculation of nutritive value of different feed stuffs in terms of digestible crude protein (DCP), total digestible nutrient (TDN), Nutritive ratio (NR) and balance of nutrients.

UNIT-3 (APPLIED RUMINANT NUTRITION-II)

Calculation of requirements of nutrients in terms of DCP, TDN and metabolisable energy (ME) for maintenance, growth, and other types of production like meat, milk, wool, reproduction and draft purpose. Formulation of rations for different categories of livestock under different conditions. Formulation of rations for feeding of livestock during scarcity periods. Visit to Animal Farm and Feed Mill.

UNIT-4 (APPLIED NON-RUMINANT NUTRITION)

## ANNUAL EXAMINATION

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 2</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>3 and 4</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 2</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper - II</td>
<td>3 and 4</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

### DEPARTMENT OF VETERINARY PHARMACOLOGY AND TOXICOLOGY

#### VETERINARY PHARMACOLOGY

**Credit Hours: 4+1**

#### THEORY

**UNIT-1 (GENERAL PHARMACOLOGY)**


**UNIT-2 (DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM)**

Neurohumoral transmission, Pharmacology of neurotransmitters. Adrenoceptors agonists and antagonists, adrenergic neuron blockers, cholinceptor agonists and antagonists.

Autacoids: Histamine, histamine analogues and antihistaminic agents, 5-Hydroxytryptamine and its agonists and antagonists, eicosanoids, platelet activating factors, angiotensin, bradykinin and kallidin.

**UNIT-3 (DRUGS ACTING ON CENTRAL NERVOUS SYSTEM)**

Classification of drugs acting on CNS. History, mechanism and stages of general anaesthesia. Inhalant, intravenous and dissociative anaesthetics. Hypnotics and sedatives; psychotropic drugs, anticonvulsants, opioid analgesics, non-steroidal anti-inflammatory drugs, analeptics and other CNS stimulants. Drugs acting on somatic nervous system: Local anaesthetics, muscle relaxants. Euthanizing agents.

**UNIT-4 (DRUGS ACTING ON DIFFERENT BODY SYSTEMS)**


**UNIT-5 (VETERINARY CHEMOTHERAPY)**

Introduction and historical developments of chemotherapy. Antimicrobial agents: Classification, general principles in antimicrobial chemotherapy, antimicrobial resistance, combined antimicrobial therapy. Sulphonamides and their combination with diaminopyrimidines. Penicillins, cephalosporins, cephemycins.
and other beta lactams, beta lactamase inhibitors. Aminoglycosides and aminocyclitols, tetracyclines, amphenicols (chloramphenicol, thiamphenicol, florfenicol), macrolides, quinolones and fluoroquinolones, polypeptides (polymyxins, bacitracin) and glycopeptides antibiotics, Miscellaneous agents: Lincosamides, novobiocin, virginiamycin, tiamulin, nitrofurans and methenamine, Antitubercular drugs. Antifungal agents: Topical and systemic agents including anti-fungal antibiotics. Antiviral and anticancer agents. Anthelmintics: Drugs used against nematodes, cestodes, trematodes. Antiprotozoal agents: Drugs used in trypanosomosis, theileriosis, babesiosis, coccidiosis, amoebiosis, giardiosis and trichomoniasis. Ectoparasiticides. Antiseptics and disinfectants. Pharmacology of drugs of abuse in animals. Pharmacology of indigenous medicinal plants: Scientific name, common name, active principles, pharmacological actions and therapeutic uses of Ginger, ocimum, neem, piper longum, withania, tinospora, emblica, eucalyptus, glycerrhiza, trichospermum, curcuma, adhantoda, butea, aloes, sena, rheubarb, catechu etc.

UNIT-6 (VETERINARY TOXICOLOGY)

General Toxicology: Definitions, history of toxicology, fundamentals and scope of toxicology. Sources and classification of toxicants, factors modifying toxicity, general approaches to diagnosis and treatment of poisoning. Toxicity caused by metals and non-metals: Arsenic, lead, mercury, copper, molybdenum, selenium, phosphorus, fluoride, nitrates or nitrites, chloride, common salt and urea. Poisonous plants: Cyanogenic plants, abrus, ipomoea, datura, nux vomica, castor, oxalate producing plants, plants causing thiamine deficiency, plants causing photosensitization and lathyrism, oleander, and cotton. Toxicity caused by Agrochemicals: Insecticides-Chlorinated hydrocarbons, organo-phosphates, carbamates, pyrethroids, newer insecticides. Herbicides, fungicides and rodenticides.


PRACTICAL

UNIT-1 (GENERAL PHARMACOLOGY)


UNIT-2 (ANS PHARMACOLOGY)

Demonstration of the action of autonomic agonists and antagonists on intact or isolated preparations of the laboratory animals. Simulated animal experiments should be preferred over use of live animals. The lab for simulated experiments should be established within a span of one year.

UNIT-3 (CNS PHARMACOLOGY)

Handling of lab animals. Regulatory guidelines for use of lab animals. Demonstration of the effect of CNS active drugs and local anaesthetics in laboratory animals. The lab for simulated experiments should be established within a span of one year.

UNIT-4 (VETERINARY CHEMOTHERAPY)

Demonstration of various chemotherapeutic agents and their dosage forms. Demonstration of antibiotic sensitivity test and its interpretation.

UNIT-5 (VETERINARY TOXICOLOGY)

Collection, preservation and dispatch of material for toxicological analysis. General principles for toxicological analysis. Detection of heavy metals or non-metals or plant poisons. Demonstration of agrochemical toxicity and its antidotal therapy via simulation methods. Demonstration of toxic weeds and plants of local area. Methods of calculation of median lethal dose (LD50) or maximum tolerated dose (MTD).
### ANNUAL EXAMINATION

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td>1, 2, 3 and 4</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-I</td>
<td>5 and 6</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>1 and 2</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper-I</td>
<td>3, 4 and 5</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

---

**DEPARTMENT OF VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY**

**VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY**  
Credit Hours: 3+1=4

**THEORY**

**UNIT-1 (VETERINARY PUBLIC HEALTH AND FOOD SAFETY)**


**UNIT-2 (VETERINARY EPIDEMIOLOGY)**

UNIT-3 (ZOONOTIC DISEASES)

Definition, history and socio-economic impact of zoonotic diseases. Classification of zoonoses and approaches to their management. Multisectoral approach for zoonoses prevention and control. Emerging, re-emerging and occupational zoonoses. Role of domestic, wild, pet and laboratory animals and birds in transmission of zoonoses. Zoonotic pathogens as agents of bioterrorism. Epidemiology, clinical manifestations and management of the following zoonoses: Rabies, Japanese encephalitis, influenza, Kyasanur forest disease, Crimean Congo haemorrhagic fever, Nipah encephalitis, Ebola virus infection, anthrax, brucellosis, tuberculosis, leptospirosis, listeriosis, plague, glanders, Q fever, rickettsiosis, chlamydiosis, taeniasis, cysticercosis, hydatidosis, larva migrans, diphyllobothriasis, trichinellosis, toxoplasmosis, fasciolosis, paragonimiasis, sarcocystosis, cryptosporidiosis, amoebiasis, giardiasis, leishmaniasis, superficial and systemic mycosis and prion diseases. Foodborne bacterial zoonoses: salmonellosis, E. coli infection, staphylococcal gastroenteritis, clostridial food poisoning, campylobacteriosis etc.

UNIT-4 (ENVIRONMENTAL HYGIENE)


PRACTICAL

UNIT-1 (VETERINARY PUBLIC HEALTH AND FOOD SAFETY)


UNIT-2 (VETERINARY EPIDEMIOLOGY)

UNIT-3 (ZOONOTIC DISEASES)
Detection, isolation and identification of important pathogens of zoonotic importance from animal, human and environmental sources including foods of animal origin. Detection of zoonotic diseases by serological, molecular and hypersensitivity tests. Study of probable association of human disease conditions with animal diseases present in an area. Study of rural environment and health status of rural community.

UNIT-4 (ENVIRONMENTAL HYGIENE)
Sampling methods for testing quality of air, water, soil and other environmental sources. Physical, chemical and microbiological examination of water. Estimation of residual chlorine and chlorine demand. Isolation & identification of pathogens from air, water and other environmental sources. Disinfection of animal houses. Determination of efficacy of disinfectants – Phenol coefficient, MIC and MBC. Demonstration or visit to water purification system. Demonstration of various ventilation systems in animal houses and specialized laboratories. Demonstration of toxic residues in water and other environmental sources. Visit to local polluted site and documentation of local environmental problems – like dumping grounds, local slum areas, crowded localities etc.

<table>
<thead>
<tr>
<th>ANNUAL EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPERS</td>
</tr>
<tr>
<td>THEORY</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper-II</td>
</tr>
<tr>
<td>PRACTICAL</td>
</tr>
<tr>
<td>Paper-I</td>
</tr>
<tr>
<td>Paper - II</td>
</tr>
</tbody>
</table>

DEPARTMENT OF VETERINARY PARASITOLOGY
VETERINARY PARASITOLOGY
Credit Hours: 3+2

THEORY
UNIT- 1 (GENERAL VETERINARY PARASITOLOGY)

UNIT-2 (TREMATODES AND CESTODES OF VETERINARY IMPORTANCE)
Trematodes: Introduction, general account and classification, general life cycle of trematodes with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and general control measures (including chemo-and
immuno-prophylaxis) of the following trematode parasites: Liver flukes (Fasciola, Dicrocoelium and Opisthorchis), intestinal flukes (Fasciolopsis), Blood flukes causing nasal schistosomosis (Schistosoma nasalis), visceral schistosomosis (S. spindale, S. indicum, S. incognito) and cercarial dermatitis. Paramphistomes (Paramphistomum, Cotylophoron, Calicophoron, Gigantocotyle, Gastrothylax, Fischoederius, Cormyerius, Gastrodiscus, Gastrodiscoides and Pseudodiscus). Paragonimus, Prosthogonimus and Echinostomes.

Cestodes: Introduction, general account and classification, general life cycle of cestodes with morphological features of their developmental stages (Metacestodes). Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and management of the following cestode parasites: Equine tape worms (Anoplocephala, Pararanoplocephala) and ruminant tape worms (Moniezia, Avitellina, Stilesia, Thysaniezia). Dog tape worms (Dipylidium, Taenia, Echinococcus). Poultry tape worms (Davainea, Cotugnia, Raillietinea, Amoebotaenia, Choanotaenia and Hymenolepis). Broad fish tapeworm (Diphyllobothrium) and Spirometra.

UNIT-3 (NEMATODES OF VETERINARY IMPORTANCE)

UNIT-4 (ARTHROPODS OF VETERINARY IMPORTANCE)

UNIT-5 (PROTOZOA OF VETERINARY IMPORTANCE)
Introduction, general account and classification, general life cycle of protozoa with morphological features of their developmental stages. Differentiation from bacteria and rickettsia. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and general control measures (including chemo- and immunoprophylaxis) of the following protozoan parasites of veterinary and zoonotic importance: Leishmania (Visceral and cutaneous leishmaniosis), Trypanosoma (T. evansi, T. theileri, T. equiperdum). Trichomonas (Bovine and avian trichomonosis). Histomonas (Black head in turkeys). Entamoeba, Giardia and Balantidium spp, Coccidia and coecidiosis of poultry and domestic animals. Cyst forming coccidia (Toxoplasma, Sarcocystis and Neospora caninum) and Cryptosporidium. Malarial parasites of animals and poultry (Plasmodium, Haemoproteus and Leucocytozoon). Pirolasms (Balbesia, Theileria) and Hepatozoon. Anaplasma and Ehrlichia. Resistance to antiprotozoals.
PRACTICAL

UNIT-1 (GENERAL VETERINARY PARASITOLOGY)
Demonstration of the types of final and intermediate hosts. Demonstration of different organs or tissues of the hosts affected with endo- and ectoparasites. Visit to Post Mortem Hall to acquaint with different organs of animals affected with parasites. Demonstration of specific parasitic lesions caused by endo- and ectoparasites. Faecal examination techniques, egg counts, examination of faecal samples for the trematode, cestode, nematode eggs and protozoan cysts or parasitic oocysts. Demonstration of faecal culturing techniques. Methods of collection, fixation, preservation, staining and mounting of various types of parasites. Blood smear preparation: Wet, thin and thick smears. Staining of blood smears for demonstration of microfilariae and haemoproteozoa. Collection and examination of skin scrapings for mites. Examination of urine samples and nasal washings for parasitic findings.

UNIT-2 (TREMATODES AND CESTODES OF VETERINARY IMPORTANCE)

UNIT-3 (NEMATODES OF VETERINARY IMPORTANCE)

UNIT-4 (ARTHROPODS OF VETERINARY IMPORTANCE)

UNIT-5 (PROTOZOA OF VETERINARY IMPORTANCE)
ANNUAL EXAMINATION

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2 and 3</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>4 and 5</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2 and 3</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper-I</td>
<td>4 and 5</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

DEPARTMENT OF LIVESTOCK PRODUCTS TECHNOLOGY

LIVESTOCK PRODUCTS TECHNOLOGY

Credit Hours: 2+1=3

THEORY

UNIT-1 (MILK AND MILK PRODUCTS TECHNOLOGY)

UNIT-2 (WOOL SCIENCE)
Introduction to wool, fur, pelt and specialty fibers with respect to processing industry. Glossary of terms of wool processing. Basic structure and development of wool follicle. Post shearing operations of wool, classification and grading of wool, physical and chemical properties of wool. Impurity of wool, factors influencing the quality of wool. Brief outline of processing of wool.

UNIT-3 (ABATTOIR PRACTICES AND ANIMAL BYPRODUCTS TECHNOLOGY)

UNIT-4 (MEAT SCIENCE)

PRACTICAL

UNIT-1 (MILK AND MILK PRODUCTS TECHNOLOGY)

UNIT-2 (WOOL SCIENCE)
Wool sampling techniques. Tests for identification of wool; determination of fleece density, fiber diameter, staple length, crimp and medulation percentage. Scouring or clean fleece yield.

UNIT-3 (ABATTOIR PRACTICES AND ANIMAL BYPRODUCTS TECHNOLOGY)
Methods of ritual and humane slaughter, flaying and dressing of food animals including poultry. Carcass evaluation. Determination of meat yield, dressing percentage, meat bone ratio and cut up parts. Preparation of different abattoir byproducts. Visit to slaughter houses or meat plants.

UNIT-4 (MEAT SCIENCE)

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>ANNUAL EXAMINATION</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td>PAPERS</td>
<td>UN I T S</td>
<td>WEIGHTAGE</td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 2</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>3 and 4</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1 and 2</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper - II</td>
<td>3 and 4</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

30
DEPARTMENT OF VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

Credit Hours: 3+1

THEORY

UNIT-1 (LIVESTOCK BASED LIVELIHOODS AND THEIR EVOLUTION)


UNIT-2 (EXTENSION EDUCATION AND DEVELOPMENT)


UNIT-3 (RURAL SOCIOLOGY IN VETERINARY EXTENSION)

Concept of sociology and rural sociology in animal husbandry extension. Culture: definition, elements, change, impact on production systems. Basic sociological concepts - society, community and association. Rural society: characteristics and differences among society, community and culture. Characteristics and differences among tribal, rural and urban communities. Social control: concept and means of social control (techniques, folkways, taboos, mores and laws). Social stratification: definition, forms and characteristics (caste system and class system). Social institutions in rural society: Social, economic, political, religious and educational (definition, composition and function). Social change: concept, importance and factors. Social groups: different groups, classification of social groups and their characteristics.

Leadership: definition, functions of leader, types of rural leaders, Key communicators and their role in the animal husbandry extension.

UNIT-4 (TRANSFER OF TECHNOLOGY FOR LIVESTOCK DEVELOPMENT)


UNIT-5 (COMMUNICATION AND EXTENSION TEACHING METHODS)

Communication and its functions. Basic concepts: communication fidelity, communication gap, time lag in communication, empathy, homophily and heterophily, propaganda, publicity, persuasion and development communication. Types of communication: Intrapersonal, interpersonal, verbal, non-verbal, vertical, horizontal, organizational communication etc. Elements of communication: Communicator, message, channel, treatment of message, audience, and audience response (feedback). Barriers of communication. Individual contact methods: Farm and home visit, farmer’s call, personal letter, adaptive or minikit trial, farm clinic etc. Group contact methods: Result demonstration, method demonstration,
group meeting, training, field day or farmers’ day, study tour etc. Mass contact methods: Farm publications (leaflet, folder, pamphlet, booklet, bulletin, farm magazine, newsletter etc.), mass meeting, campaign, exhibition, newspaper, radio, television, mobile short message service. Selection and use of extension teaching methods.

UNIT-6 (LIVESTOCK ECONOMICS AND MARKETING)
Introduction to Economics and Livestock Economics: definition and scope (production, consumption, exchange and distribution). Basic concepts- wants, goods, wealth, utility, price, value, assets, capital, money, income etc. Important features of land, labour, capital and organization. Theories of demand, supply and cost. Theories of production (law of diminishing return, increasing return, constant return and return to scale). Concept of market: market, market structure and classification of markets. Market price and normal price, price determination under perfect competition in short and long run. Marketing functions: meaning and their classification (packaging, transportation, grading, standardization, storage and warehousing, processing and value addition, buying and selling, market information, financing, risk bearing, minimization of risks (speculation and hedging). Marketing agencies, institutions and channels for livestock and livestock products. Government interventions and role in marketing of livestock and livestock products. External trade in livestock products, recent policies on trade and international trade agreements and their implications in livestock sector.

UNIT-7 (LIVESTOCK ENTREPRENEURSHIP)

UNIT-8 (INFORMATION AND COMMUNICATION TECHNOLOGY)
Strengths and limitations of ICTs application in livestock sector and farmers capacity building. Information kiosk, Elearning, CAD, virtual class room, virtual reality, multi-media etc. Cyber extension- problems and prospects in livestock extension. Computer networking: (LAN, MAN, WAN, Internet, tele-conferencing, tele-text, radio-text, video-text, interactive cable distribution system, satellite communication, internet, www, etc.).

UNIT-9 (CONTEMPORARY ISSUES IN LIVESTOCK ENTERPRISES)
Gender and animal husbandry- definition, difference between gender and sex, role of women in animal husbandry, gender sensitization, importance of gender sensitization in animal husbandry, need for gender analysis, gender budgeting and mainstreaming. Salient features of recent livestock census, livestock insurance scheme, national livestock mission. Sustainability-concept of sustainability of livestock production system (social, environmental and economic challenges faced). Introduction to environmental consequences of livestock rearing. Animal welfare: Introduction to animal welfare, ethics and rights. Importance of animal welfare in the contemporary society. Expectations from veterinary professionals.

PRACTICAL
UNIT-1 Tools of data collection: Preparation of instrument for conducting social survey; Visit to nearby village; Conducting social survey for assessment of farming system and constraints; Data analysis and reporting; Organizing demonstration for farmers; identification of key communicators by Socio-metric method; Familiarization with audiovisual aids; Principle and use of projectors; Preparation of Radio Script Preparation of Television script; Preparation and use of poster; Preparation and use of chart;
Preparation and use of flash cards; Preparation and use of farm publications for extension work; Planning and organizing an awareness campaign (Health and Production); Planning and organization of animal health camps; Exercise on rapid rural appraisal (RRA); Exercise on participatory rural appraisal (PRA) technique; Planning and organization of group discussion.

Diagnostic Laboratory Section:
Veterinary Clinical Diagnostic Laboratory will be an important component of Teaching Veterinary Clinical Complex that will impart training to students for laboratory evaluation and interpretation of clinical samples leading to definitive diagnosis of diseases. This activity will improve competence of students in examining clinical samples (biochemical, toxicological, pathological, parasitological and bacteriological) at the clinical complex, analyzing and correlating with clinical findings and interpreting the results. Collection labeling, transportation, and preservation of body fluid samples, writing results and report. Interpretation of data in relation to specific diseases. Clinical significance and interpretation of serum glucose, lipids, proteins, blood urea nitrogen, creatinine, uric acid, ketone bodies, bilirubin and electrolytes from samples. Clinical significance and interpretation of examination of urine samples. Clinical evaluation of blood (Haemoglobin, packed cell volume, total erythrocytic count, erythrocytic sedimentation rate, total leukocytic count and differential leukocytic count) from clinical samples. Evaluation of acid-base balance and interpretation. Biochemical aspects of digestive disorders, endocrine functions. Liver, kidney and pancreatic function tests. Role of enzymes for detection of tissue or organ affection. Preparation of microscopic slides from tissue collected for diagnosis and its histopathological interpretation. Examination of biopsy and morbid material for laboratory diagnosis. Laboratory evaluation and diagnosis of samples for parasitic diseases (routine faecal examinations- direct smear method, simple sedimentation and floatation methods, quantitative faecal examination, pastural larval counts). Examination of skin scrapings, examination of blood. Orientation to a clinical Microbiology laboratory, collection, transport and processing of specimens from clinical cases for diagnosis of important bacterial, fungal and viral diseases. Isolation of bacteria from clinical samples, identification of bacteria by Grams staining and cultural or biochemical characteristics. Drug sensitivity and rationale for therapy. Diagnosis of diseases by employing tests like Agar Gel precipitation Test, ELISA etc.

Note: The Laboratory shall run in collaboration with the Department of Pathology and Physiology and Biochemistry. Biochemist appointed in this section will be involved in teaching of students regarding principles of various diagnostic tests, normal and abnormal values in different species, differential diagnosis, correlating with diseases and rationale of arriving at the conclusion.

Medicine Section:
Orientation and understanding the working of Veterinary Clinics including hospital set up, administration and work force management. Understanding the different methods of record keeping, retrieval, processing, analysis and interpretation of data. Involvement in outpatient department (OPD). Indoor patient, Critical care or intensive care unit, sanitation, practice management etc. Doctor client interaction: Orientation to local language or dialect or local terminology of the diseases. Registration, filling up registration cards, clinical practice comprising of clinical examination of the patient, with emphasis on history taking, examination techniques- palpation, percussion and auscultation. Familiarization and practice of first aid procedures and emergency medicine. Practice of collection, labeling, packaging and evaluation of laboratory samples. Relating generic and trade names of drugs along with their doses, indications and contraindications to prescribed treatment regimens. Systematic examination of various systems, recording of clinical observations viz. temperature, respiration, pulse, cardiac sounds, cardiac function, pulmonary function, functional motility of digestive system, routes and techniques of administration of medicaments. Tentative and confirmatory diagnosis and treatment of common clinical cases like pharyngitis, laryngitis, stomatitis, indigestion, gastritis, ruminal impaction, tympany, enteritis, traumatic reticuloperitonitis, traumatic pericarditis, pneumonia, haemoglobin urea, haematuria. milk fever, ketosis, rickets, osteomalacia, common poisoning, and others clinical cases as reported in the section. Collection of materials like urine, faeces, skin scraping, blood, milk and other body fluids for laboratory tests. Preparation of case records; follow-up records etc. Readiness to treat and handle causalities and other emergencies in the clinics. Learning and practicing passing of stomach and nasogastric tube. Screening of livestock or poultry through tests, mass diagnostic campaigns. Vaccination and other disease prevention and control programmes in the field. Learning the use of various advance non invasive diagnostic aids like Ultrasonography, Ophthalmscope etc. Practice of feeding of sick animals. Acts and regulations pertaining to generation and disposal of biomedical wastes in veterinary institutions. Biomedical waste generation, handling, storage, sorting, coding, transportation and disposal. Hazards of biomedical waste, and impact of biomedical waste on the environment.
Gynecology and Obstetrics Section

Practice of artificial insemination, pregnancy diagnosis, clinical examination and management of cases of anoestrus, silent oestrus, infertility and conception failure. Treatment of cases of metritis, cervicitis, vaginitis etc. Handling and management of cases of retention of placentor fetal membranes, ante and post partum prolapse of vagina. Examination and handling of cases of dystocia, fetotomy, caesarian etc. Castration of male calves, breeding soundness, evaluation of bulls, ovariohysterectomy and collection of cervical and vaginal mucus for cytology. Rectal examination and vaginal examination of genitalia. Familiarization with common drugs and hormones used in reproductive disorders including infertility, epidural and local anaesthesia for gynaecological cases. Filling of clinical case records and their maintenance.

Surgery and Radiology Section


Pet Animal Section

Registration, filling up registration cards, history taking. Relating generic and trade names of drugs alongwith their doses, indications and contraindications to prescribed treatment regimens. Familiarization and practice of first aid procedures and emergency medicine. Practice of collection, labeling, packaging and evaluation of laboratory samples. Clinical examination techniques- palpation, percussion and auscultation, systematic examination of various systems, recording of clinical observations viz. temperature, respiration, pulse, cardiac sounds, cardiac function, pulmonary function, functional motility of digestive systems. Routes and techniques of administration of medicaments. Diagnosis and treatment of diseases. Collection of materials like urine, faeces, skin scraping, blood, milk and other body fluids for laboratory tests. Preparation of case records; follow-up records etc. Vaccination and other disease prevention and control programmes. Practice of pregnancy diagnosis, examination of cases of anoestrus, silent oestrus and conception failure. Rectal examination of genitalia, vaginal examination. Epidural and local anaesthesia for gynaecological cases. Restertaining and positioning techniques for examination, diagnosis and surgical treatment. Preparation of surgical packs, sterilization procedures for surgical instruments. Passing of stomach tube and gastric tube. Catheterization and urine collection. Familiarization with antiseptic dressing techniques. Topography anatomy of pet animals. Radiographic positioning and terminology. The practical component will be dealt with internally. The examination for VCP shall be conducted twice a year i.e. first practical exam after completion of 50% syllabus and the second one, when the course is completed but the second exam shall comprise of entire syllabus. Annual professional examination shall be held after the completion of 100% course content in each subject.
The examination should comprise of following components:

(i) Submission of 10 complete cases each of Surgery, Medicine, Gynaecology
(ii) Case presentation
(iii) Review of treatment of 5 cases
(iv) Written Objective Questions (Surgery, Medicine, Gynaecology
(v) and Lab diagnosis)
(vi) Viva

LIVESTOCK FARM COMPLEX

LIVESTOCK FARM PRACTICES (Third year) Cr. Hr. 0+2

Aim of Livestock farm practices is actual involvement of students in all aspects of animal rearing so that they can rear animals on their own. Hands on training of the students on the overall farm practices of livestock management including cleaning, feeding, watering, grooming, milking, routine health care, record keeping, sanitation, housing, fodder production, preparation of mineral mixture, cost economic of fodder production. Care of pregnant animals, management of parturition, care of neonatal and young stock. Management of broiler, layer farm and hatchery. One full day per week comprising of six contact hours will be kept entirely for LFP where the students should be divided into small batches on rotational basis wherein they should be actually involved in different activities such as milking, feeding etc. The practical component will be dealt with internally. The examination for LFC shall be conducted twice a year i.e. first practical exam after completion of 50% syllabus and the second one, when the course is completed but the second exam shall comprise of entire syllabus. Annual professional examination shall be held after the completion of 100% course content in each subject.

The examination should comprise of following components:

(i) Day to day activities
(ii) Record Book
(iii) Written Objective Questions
(iv) Viva Any other suitable component as per conditions

DEPARTMENT OF VETERINARY SURGERY AND RADIOLOGY

VETERINARY SURGERY AND RADIOLOGY Credit Hours:2+1

THEORY

UNIT-1(VETERINARY GENERAL SURGERY)

UNIT-2 (VETERINARY ANAESTHESIOLOGY)

Introduction: Development of anaesthesiology, Terminology, classification and indications. General considerations of anaesthesia: Factors affecting anaesthesia and selection of anaesthetic technique, factors modifying uptake, distribution and elimination, patient evaluation, categories of patients according to physical status, selection of anaesthetic agent and patient preparation. Pain and its management in animals: Local and regional anaesthesia: Definitions, local anaesthetics, mechanism of action. Premedication, properties and use of different preanaesthetics: Uses of premedication, Anticholinergic sedatives and tranquilizers (Phenothiazine derivatives, Benzodiazepines, Butyrophenones, Narcotic analgesics, Alpha-2 agonists, dosage chart of all the drugs. General anaesthesia: Definitions, methods of induction of anaesthesia, Intravenous anaesthetics (Total intravenous anaesthesia), monitoring of anaesthesia. Inhalation anaesthesia: Advantages of inhalant anaesthetics, types of inhalant anaesthetics, their properties and effect on various systems, methods of administration of inhalant anaesthesia. Dissociative anaesthesia: Definition, drugs, clinical application, properties and effect on various body systems. Avian, wild, zoo, exotics and lab animal anaesthesia and capture myopathy. Anaesthetic emergencies and management, Toxicity, antidote and reversal agents.

UNIT-3 (VETERINARY DIAGNOSTIC IMAGING TECHNIQUES)

Introduction to Radiology: General terminology of radiology, Physical properties of X-Rays, Scope and uses of Radiology, Directional terms for veterinary radiology. Production of X-rays and factors influencing production of X-rays. Radiation hazards and safety measures: Scattered radiation, Biological effects of radiation, Direct and indirect effects, Early and late effects, Radiation sensitivity of different body cells, Radiation protection, General principles of radiation safety, Radiation monitoring devices, Requirement of an ideal radiographic section. The statutory requirements of radiology set-up as per Atomic Energy Regulatory Board of India (AERB). Production of quality diagnostic radiograph. Recording of image: Manual and digital processing of X-ray films, storage and retrieval system. Radiographic Quality and faults: Radiographic detail, density and contrast and factors affecting them, Radiographic faults, their possible causes and prevention. Contrast radiography: Definition, indications, contraindications and types of contrast radiography, Different contrast materials and their use, Techniques of some selected contrast radiography in animals (Barium swallow, Retrograde urography etc) Diagnostic ultrasonography: Principles, indications, techniques and artifacts of ultrasonography. Advanced diagnostic imaging tools: The brief introduction to the use and limits of some advanced imaging techniques, Interventional radiology - CAT scanning, MRI, etc

UNIT-4: (REGIONAL SURGERY-I)


UNIT-5: (REGIONAL SURGERY-II)

UNIT-6 (ORTHOPEDICS AND LAMENESS)


Fracture: Definitions, classification, fracture healing and complications.

Fracture: The preliminary assessment and management of fractures.


Luxations: Definition, signs, diagnosis. Management of common joint luxations in animals.

Spinal trauma, diagnosis and its management

Rehabilitation and physiotherapy of orthopaedic patients

PRACTICAL

UNIT-1(VETERINARY GENERAL SURGERY)


UNIT-2 (VETERINARY ANAESTHESIOLOGY)
Familiarization with anaesthetic apparatus, monitoring equipment and accessories. Methods of local infiltration analgesia (Linear ring block, inverted L block etc.) Regional nerve block demonstration and practice (Auriculopalpebral block, Peterson block or 4 point retrobulbar nerve block, Paravertebral, epidural etc.) Intravenous regional anaesthesia in cattle. Administration of general anaesthesia in small and large animals. (Demonstration and practice). Administration of inhalant anaesthesia (Demonstration). Monitoring of general anaesthesia. Management of anaesthetic emergencies, use of artificial respirator and analeptics. Visit to a wild animal facility or audio-visual aids or both.

UNIT-3 (VETERINARY DIAGNOSTIC IMAGING TECHNIQUES)

Familiarization with the operation of the x-ray unit. Formulation of X-ray exposure technique charts. Adoption of safety measures and film processing. Positioning and radiography of different parts of the body in small and large animals. Handling, viewing and interpretation of radiograph. Familiarization with the film contrast, density and details, common radiographic artifacts. Radiographic pathology of the head, neck and thorax of large and small animals. Radiographic pathology of abdomen of large and small animals. Radiographic pathology of the bones and joints of large and small animals. Demonstration of contrast radiographic techniques in animals. Demonstration of ultrasonography in animals. Fluoroscopy or Image intensifier (familiarization).

UNIT-4: (REGIONAL SURGERY-I)

Demonstration or Audio visual aids: Amputation of horn and disbudding. Tooth rasping, dental scaling. Examination of ear (otoscopy). Examination of eye (General examination, Ophthalmoscopy, tonometry, fluorescein dye test, Scherimer tear test, test for blindness). Operation for aural haematoma. Protection and bandage of eyes, tarsorrhaphy, third eyelid flap, flushing of nasolacrimal duct

UNIT-5: (REGIONAL SURGERY-II)


UNIT-6 (ORTHOPEDICS AND LAMENESS)

Demonstration or Audio visual aids-Familiarization with various orthopaedic instruments and implants. Basic orthopaedic and neurological examination in small and large animals. Nerve blocks in equine. Application of basic physiotherapy techniques in animals. Basic limb stabilization techniques and splinting techniques. Application of cast in small and large animals. Internal fixation techniques in animals. Medial patellar desmotomy in bovines. Examination of animals for soundness and preparation of soundness certificate.

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td>Paper-I</td>
<td>1, 2, 3 and 4</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Paper-II</td>
<td>5 and 6</td>
<td>100</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td>Paper-I</td>
<td>1, 2, 3 and 4</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Paper-II</td>
<td>5 and 6</td>
<td>60</td>
</tr>
</tbody>
</table>
DEPARTMENT OF VETERINARY MEDICINE

VETERINARY MEDICINE

Credit Hours: 4+1

THEORY

UNIT-1 (GENERAL)


UNIT-2 (SYSTEMIC DISEASES)

Etiology, clinical manifestations, diagnosis, differential diagnosis, treatment, prevention and control of the following diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry: Diseases of digestive, respiratory, cardiovascular, urinary, nervous, musculoskeletal, haemopoietic, and lymphatic systems, skin, sense organs including affections of peritoneum, liver and pancreas. Emergency medicine and critical care.

UNIT-3 (METABOLIC AND DEFICIENCY DISORDERS)

Diagnosis and management of diseases caused by deficiency of iron, copper, cobalt, zinc, manganese, selenium, calcium, phosphorus, magnesium, iodine, vitamin A, D, E, B complex, K and C. Diseases of neonates, Alternative or integrated or ethno veterinary medicine in animal disease management. Aetiology, clinical manifestations, diagnosis, differential diagnosis, treatment prevention and control of metabolic or production and endocrine diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry i.e. Milk fever, eclampsia, osteodystrophy fibrosa, lactation tetany, downer cow syndrome, ketosis, fat cow syndrome, hypomagnesaemia, Nutritional haemoglobinuria, azoturia, diabetes, hypothyroidism, Cushing syndrome, Addison’s disease and Gout.

UNIT-4 (ZOO AND WILD ANIMAL MEDICINE)

Principles of zoo hygiene, public health problems arising from zoos. Prevention, control and treatment of infectious, parasitic and metabolic diseases in zoo and wild animals including exotic birds. Acts and Rules related to Zoo and wild animals. National and international organizations and institutions interlinked to wild and zoo animals – role and functioning.

UNIT-5 (BACTERIAL, FUNGAL AND RICKETTSIAL DISEASES)

Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of bacterial, fungal and rickettsial diseases of livestock: mastitis, hemorrhagic septicaemia, brucellosis, tuberculosis, Johne's disease, listeriosis, leptospirosis, campylobacteriosis, actinomycosis, actinobacillosis, bordetellosis, glands, strangles, ulcerative lymphangitis, colibacillosis, fowl typhoid, pullorum disease, fowl cholera, avian mycoplasmosis, spirochaetosis, salmonellosis, swine erysipelas, contagious caprine pleuropneumonia, contagious bovine pleuropneumonia, anthrax, clostridial infections, ehrlichiosis, chlamydiosis, Q fever, anaplasmosis, dermatophilosis, aspergillosis, candidiasis, histoplasmosis, sporotrichosis, coccidiodomycosis, mycotoxicosis and rhinosporidiosis.

UNIT-6 (VIRAL AND PARASITIC DISEASES)

Aetiology, epidemiology, clinical manifestations, diagnosis, treatment, prevention and control of viral and parasitic diseases of diseases of cattle, buffalo, sheep, goat, horse, pig, dog, cat and poultry: Foot and mouth disease, rinderpest, bovine viral diarrhoea, malignant catarrhal fever, infectious bovine rhinotracheitis, ephemeral fever, blue tongue, sheep pox, goat pox, PPR, classical swine fever, rabies, equine influenza, equine infectious anemia, equine rhinopneumonitis, canine distemper, infectious canine hepatitis, canine parvoviral disease, corona viral infection, adenovirus infection, feline rhinotracheitis, feline pan leucopenia, feline infectious peritonitis, avian influenza, New Castle disease, Marek's disease,
avian leucosis, infectious bronchitis, infectious laryngotracheitis, avian encephalomyelitis, chicken reovirus, fowl pox, infectious bursal disease, chicken infectious anemia, inclusion body hepatitis-hydropericardium syndrome, emerging and exotic viral diseases of global importance. Parasitic diseases: Trematodes, cestodes, nematodes, protozoan infections and external parasites of clinical importance.

UNIT-7 (JURISPRUDENCE, ETHICS, AND ANIMAL WELFARE)

PRACTICAL

UNIT-1 (GENERAL)

UNIT-2 (SYSTEMIC DISEASES)

UNIT-3 (ZOO AND WILD ANIMAL MEDICINE)
Management and restraint of zoo and exotic animals. Drug delivery in zoo and wild animals. Visit to Zooor Sanctuary. Examination of veterolegal cases.

UNIT-4 (BACTERIAL, FUNGAL AND RICKETTSIAL DISEASES)

UNIT-5 (VIRAL AND PARASITIC DISEASES)
Collection and examination of skin scrapings- Parasitic, fungal, bacterial. Examination of blood for parasites. Dark field microscopy. Application of Molecular and serological techniques or clinical samples for diagnosis of viral and parasitic diseases.
ANNUAL EXAMINATION

<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2, 3 and 4</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>5, 6 and 7</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1, 2 and 3</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper- II</td>
<td>4 and 5</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>

DEPARTMENT OF VETERINARY GYNAECOLOGY AND OBSTETRICS

VETERINARY GYNAECOLOGY AND OBSTETRICS

Credit Hours 2+1

THEORY

UNIT- 1 (VETERINARY GYNAEOCOLOGY)


UNIT-2 (VETERINARY OBSTETRICS)

Farm and pet animals - Maternal recognition of pregnancy – Applied Endocrinology of pregnancy – Pregnancy diagnosis- Duration of pregnancy -Factors affecting gestation length- Care and management of pregnant animals- Implantation, Placentation- Classification, functions –Wandering of ovum-
Telegony- Superfetation and Superfecundation – Clinical management of specific and non specific causes of abortion, extra uterine pregnancy, dropsey of fetal membranes and fetus, mummification, maceration, cervicovaginal prolapse, uterine torsion and hysterocele. Parturition- Signs of approaching parturition - Stages of parturition - Initiation and induction of parturition – lactational disorders - Puerrarium and factors affecting puerrarium - Postpartum care of the dam and neonate in different species of farm and pet animals - Dystocia – Classification - Clinical signs and diagnosis - Handling of Fetal and maternal dystocia – Obstetrical interventions - Mutation – Forced extraction – Fetiomy – Cesarean section in small and large animals – Maternal obstetrical paralysis - Retention of fetal membranes, Total uterine prolapse and common metabolic diseases of puerperal period – Post partum hemorrhage – Sub involution of placental sites - Injuries incidental to parturition - Post partum uterine infections – Post partum resumption of ovarian activity.

UNIT-3 (VETERINARY ANDROLOGY AND A.I.)

Farm and pet animals - Comparative clinical reproductive anatomy and endocrinology of the male reproduction - Common congenital and genetic defects of the male reproductive tract – Puberty and sexual maturity and factors affecting them - Sexual behaviour and libido - Sperm transport, erection and ejaculation - Coital injuries and vices in male animals - Semen and ejaculate – Semen collection techniques- Structure of Spermatozoa - Semen evaluation - Semen extenders, dilution, preservation and post thaw evaluation - Artificial insemination techniques in farm and pet animals - Forms of male infertility - Impotentia coeundi and impotentia generandi – Affections of the scrotum, testis, accessory sex glands, penis and prepuce - Breeding soundness evaluation of bull – In vitro tests for evaluation of male fertility - Medical and surgical techniques for population control of the male reproduction – Surgical procedure on the male reproductive tract in farm and pet animals.

PRACTICAL

UNIT- 1 (VETERINARY GYNAECOLOGY)

Study of female genital organs using slaughter house specimens- Oestrus detection aids - Techniques of rectal palpation of female reproductive tract - Gynaecological equipment and instruments -Vaginal exfoliative cytology and vaginoscopy- Ultrasonography of female reproductive tract - Surgical procedures on the vulva, vagina and uterus-Study of pathological specimens of female genital tract- Demonstration and practice of ovario-hysterectomy and panhysterectomy- Diagnostic procedures in investigation of infertility in female animals

UNIT-2 (VETERINARY OBSTETRICS)


UNIT–3 (VETERINARY ANDROLOGY, AI AND ASSISTED REPRODUCTIVE TECHNIQUES)

Study of male genital organs using slaughter house specimens- Techniques of rectal palpation of the male reproductive tract- Andrological and AI equipment -Vasectomy and castration-Surgical procedures on penis, prepuce and scrotum- Planning and organization of AI centre-Preparation of teaser animals - Selection, care, training and maintenance of male animal used for breeding purpose-Techniques of semen collection-Semen evaluation techniques -Sterilization, storage of equipment used for semen collection and Artificial insemination-Preparation of extenders and extension of semen- Preservation of semen-Thawing of semen and technique of AI-Handling and maintenance of LN2 containers. Diagnostic procedures in investigation of infertility in male animals-Breeding soundness evaluation of bulls- Oestrus synchronization procedures- Multiple Ovulation and Embryo Transfer- In Vitro Fertilization
<table>
<thead>
<tr>
<th>PAPERS</th>
<th>UNITS</th>
<th>MAXIMUM MARKS</th>
<th>WEIGHTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Paper-II</td>
<td>2 and 3</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I</td>
<td>1</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Paper - II</td>
<td>2 and 3</td>
<td>60</td>
<td>20</td>
</tr>
</tbody>
</table>