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VETERINARY PATHOLOGY

Course Contents

VPP 601  GENERAL PATHOLOGY  2+1  SEM - I

Objective
To acquaint students with different types of degenerations, cell injuries caused by different
types of irritants and inflammation.

Theory
UNIT-I: Introduction and history of pathology, principles of pathology including etiology,
course and termination of disease.
UNIT-II: Advanced study of various degenerations, infiltrations, necrosis, endogenous
and exogenous pigmention.
UNIT-IV: Inflammation including vascular and cellular alterations with emphasis on
chemical mediators. Hypersentivity and immune mediated mechanisms, Mechanism of
healing and fever.

Practical
To study the gross and microscopic changes in degenerations, infiltrations,
pigmentation, circulatory and growth disturbances and different types of necrosis in
different tissues of domestic animals. Study of gross and histopathological features of
different types of inflammation.

Suggested Readings
McGavin MD & Zachary JF. 2006. Pathologic Basis of Veterinary Diseases. 4th Ed.
Elsevier.
Distr.

VPP 602  TECHNIQUES IN PATHOLOGY  1+1  SEM - I

Objective
To acquaint students with different techniques used frequently in Veterinary Pathology.

Theory
UNIT-I: Basic histopathological techniques, collection of tissues, fixation, processing and
section cutting, staining by routine and special methods.
UNIT-II: Principles of dark ground, phase contrast and fluorescent microscopy and
micrometry.
UNIT-III: Histochemical techniques for demonstration of fat, glycogen and fibrous
connective tissue, mucopolysaccharides and common enzymes.

Practical
Collection of tissues for histopathological, histochemical, toxic, bacterial and viral
examination. Use of different fixatives for preservation of museum specimens.
Application of different techniques- histopathological, cryosectioning, micrometry,
routine and special staining. Demonstration of different inclusions, bacteria and fungi in
tissues. Histochemical techniques to demonstrate different tissue constituents.

Suggested Readings
Lillie RD. 1965. Histopathologic Techniques and Practical Histo-chemistry. 3rd Ed.
McGraw-Hill.

VPP 603  ANIMAL ONCOLOGY  1+1  SEM - I

Objective
To acquaint students with different types of neoplasms of domestic animals, their nature,
cause, pathology and diagnosis.

Theory
UNIT-I: Study of different neoplasms of animals including their identification, and
epidemiology.
UNIT-II: Etiology, histogenesis and experimental production.
UNIT-III: Tumour immunology, cell cultures, transplantation and biological behaviour.

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Practical
To study the gross and microscopic changes in different types of neoplasms.

Suggested Readings

VPP 604 CLINICAL PATHOLOGY 1+2 SEM - I
Objective
To acquaint students with clinical alterations in blood, urine, CSF and other body fluids due to different diseases.

Theory
UNIT-I: Study of changes in blood, urine, faeces, cerebrospinal fluid and biopsy specimens and their interpretation.
UNIT-II: Exfoliative cytology, organ function tests and their interpretation.
UNIT-III: Biochemical profile of blood/plasma/serum and its correlation with disease conditions in domestic animals.

Practical
Evaluation of laboratory investigations on blood, urine, faeces and biopsy specimens from natural and experimentally produced disease conditions.

Suggested Readings

VPP 605 NECROPSY PROCEDURES AND INTERPRETATIONS - I 0+1 SEM - I
Objective
To acquaint students with different Post-mortem procedures in large animals and study of PM lesions in different diseases.

Practical
Detailed necropsy examination of various species of farm animals, laboratory animals and wildlife. Necropsy case presentation and report writing/protocol preparation. Collection of specimens for diagnosis of viral, bacterial, protozoan, parasitic diseases, toxic/poisoning and for histochemistry/histopathology. Systemic examination of brain, lungs, heart, endocrine glands, lymph nodes, liver, Gastro Intestinal tract, urinary and genital systems for gross pathological and histopathological studies and correlation of the observations to diagnose the disease conditions.

Suggested Readings

VPP 606 NECROPSY PROCEDURES AND INTERPRETATIONS - II 0+1 SEM - II
Objective
To acquaint students with different Post-mortem procedures in small animals and poultry and study of PM lesions in different diseases.

Practical
Detailed necropsy examination of various species of small animals, poultry, laboratory animals and wildlife. Necropsy case presentation and report writing/protocol preparation. Collection of specimens for diagnosis of viral, bacterial, protozoan, parasitic diseases, toxic/poisoning and for histochemistry/histopathology. Systemic examination of brain, lungs, heart, endocrine glands, lymph nodes, liver, Gastro Intestinal tract, urinary and genital systems for gross pathological and histopathological studies and correlation of the observations to diagnose the disease conditions.

Suggested Readings

VPP 607 SYSTEMIC PATHOLOGY 2+1 SEM - II
Objective
To teach the students about the different disease conditions of haemopoietic, circulatory, respiratory, digestive, urinary and genital systems, nervous, musculoskeletal, endocrine, glands and special senses.
Theory
UNIT-I: Advanced study of pathological conditions affecting different organs of haemopoietic (bone marrow, blood, spleen, lymph node), circulatory (heart, blood vessels and lymph vessels). Respiratory (nasal cavity, larynx, trachea, bronchi, lung and pleura) systems. Study of etiology, pathology and pathogenesis of specific infectious and non-infectious diseases of domestic animals related to the above mentioned systems.
UNIT-II: Advanced study of pathological conditions affecting different organs of digestive (buccal cavity, pharynx, oesophagus, stomach and intestines) urinary (kidneys, ureter, urinary bladder and urethra) and genital (male and female organs including mammary gland) systems. Study of etiology, pathology and pathogenesis of specific infectious and non-infectious diseases of domestic animals related to the above mentioned systems.
UNIT-III: Advanced study of pathological conditions affecting different organs of nervous (brain and spinal cord), endocrine (pituitary, thyroid, parathyroid, pancreas), musculoskeletal systems (muscles and bones), and organs of special senses (eye, ear), skin and its appendages (hoof, tail). Study of etiology, pathology and pathogenesis of specific infectious and non-infectious diseases of domestic animals related to the above mentioned systems/organs.
Practical
To study the gross and histopathological changes in important conditions affecting various systems. Study of gross and microscopic lesions in specific diseases pertaining to above said systems.

Suggested Readings

VPP 608 PATHOLOGY OF INFECTIOUS DISEASES 2+1 SEM - II OF DOMESTIC ANIMALS

Objective
To teach the students about the important infectious disease conditions of domestic animals.

Theory
UNIT-I: Pathology of various viral diseases of domestic animals.
UNIT-II: Pathology of various bacterial and fungal diseases of domestic animals.
UNIT-III: Pathology of various rickettsial and parasitic diseases of domestic animals.

Practical
To study the slides, museum specimens including autopsy specimens concerned with specific diseases.

Suggested Readings

VPP 609 TOXICOPATHOLOGY 2+1 SEM - II

Objective
To teach students about toxicity in livestock due to plants and extraneous poisons.

Theory
UNIT-I: Introduction, mode of action, diagnosis and treatment of different poisons and their classification.
UNIT-II: Pathogenesis, gross and microscopic pathology of diseases caused by toxic plants, organic and inorganic poisons commonly taken or administered maliciously to different species of domestic animals.

Practical
To study gross and histopathological alterations as a result of ingestion of toxic plants and extraneous poisons in domestic animals.

Suggested Readings

VPP 610 AVIAN PATHOLOGY 2+1 SEM - I

Objective
To teach the students about the different disease conditions of poultry including pathology and diagnosis.
Theory
UNIT-I: Pathology of infectious diseases of chickens, turkeys, ducks and other birds.
UNIT-II: Pathology of non-infectious diseases of chickens, turkeys, ducks and other birds.

Practical
Necropsy examination of the different species of poultry; study of gross and histopathological lesions in naturally occurring and artificially produced diseases of birds.

Suggested Readings

VPP 611 PATHOLOGY OF LABORATORY ANIMALS, FISH AND WILD ANIMALS

Objective
To teach the pathology and diagnosis of different disease conditions of laboratory animals, fish and wild animals.

Theory
UNIT-I: Introduction, disease transmission and inter-phase.
UNIT-II: Pathology of important infectious diseases (viz. bacterial, viral, fungal and parasitic) of fish, laboratory and wild/zoo animals.
UNIT-III: Pathology of non-infectious diseases of fish, lab/wild/zoo animals.

Practical
Post-mortem examination of wild animals including wild birds. Study of gross and microscopic lesions of important infectious and non-infectious diseases of fish and laboratory animals.

Suggested Readings

VPP 612 VETEROLEGAL PATHOLOGY

Objective
To educate the students about common veterolegal problems and legal writing of PM report.

Theory
UNIT-I: General knowledge about the laws relating to veterinary practice, professional discipline and professional etiquettes.
UNIT-II: Regulations dealing with diseases of animals in India regarding epidemiology, quarantine certificate, issue of soundness certificate etc.
UNIT-III: Common causes of violent death, criminal assault, cruelty to animals, malicious poisoning, snake bite, electrocution, gun shot wounds, automobile accidents, doping etc.

Suggested Readings

VPP 701 PATHOLOGY OF NUTRITIONAL AND METABOLIC DISTURBANCES

Objective
To teach students about nutritional and metabolic disorders of livestock.

Theory
UNIT-I: Pathogenesis, gross and microscopic pathology of nutritional deficiencies viz. carbohydrate, protein, fats, vitamins and macro and microelements and their imbalances.
UNIT-II: Different metabolic diseases namely milk fever, ketosis, tetany, azoturia. Downer's cow syndrome and post parturient hemoglobinuria in domestic animals.
Practical
Estimation of certain minerals in sera of natural and experimentally induced deficiencies in domestic animals. To study the haematological, gross and microscopic pathological alterations caused by nutritional and metabolic disorders.

Suggested Readings
Selected articles from journals.

VPP 702 ADVANCES IN TOXICOPATHOLOGY 2+1 SEM - I
Objective
To teach students about toxicity in livestock due to plants and extraneous poisons.

Theory
UNIT-I: Introduction, mode of action, diagnosis and treatment of different poisons and their classification. Experimental animal models for toxicity studies and evaluation of parameters.
UNIT-II: Pathogenesis, gross and microscopic pathology of diseases caused by toxic plants, organic and inorganic poisons commonly taken or administered maliciously to different species of domestic animals.

Practical
Clinico-pathological studies on natural or experimentally induced toxicity /poisoning in domestic animals. To study gross and histopathological alterations as a result of ingestion of toxic plants and extraneous poisons in domestic animals.

Suggested Readings
Selected articles from journals.

VPP 703 ADVANCES IN DIAGNOSTIC PATHOLOGY 1+2 SEM - I
Objective
To teach current diagnostic techniques for diagnosis of different diseases.

Theory
UNIT-I: Study of the principles of biopsy techniques and electron microscopy.
UNIT-II: Current techniques for diagnosis of diseases.

Practical
Principles and practice of fluorescent and phase contrast microscopy, chromatography, spectrophotometry and immunodiffusion technique, use of laboratory animals, chick embryos etc. for the diagnosis of animal diseases.

Suggested Readings
Selected articles from journals.

VPP 704 ULTRASTRUCTURAL PATHOLOGY 1+1 SEM - II
Objective
To study the significance of ultra-structural changes in organelles.

Theory
UNIT-I: Study of cells- cell morphology, interpretation of normal and abnormal cells.
UNIT-II: Study of cell organelles, degenerations, infiltrations, viral inclusions.

Practical
Study of EM photographs, collection and preparation of specimens for EM studies.

Suggested Readings
Selected articles from journals.

VPP 705 IMMUNOPATHOLOGY 2+1 SEM - II
Objective
To teach students immunologically mediated and autoimmune diseases of livestock.

Theory
UNIT-I: Principles of immunopathology, hypersensitivity status, pathology of immune complex diseases.
UNIT-II: Immunoproliferative disorders, autoimmune diseases and immune deficiencies in man and domestic animals.

Practical
Immune complexes, quantification and determination by various techniques, enumeration of various populations of lymphocytes by different techniques, determination of C3 levels, autoimmune reaction by demonstrating autoantibodies, hypersensitivity reactions
Suggested Readings
Selected articles from journals.

VPP 706 PATHOLOGY OF IMPORTANT AND EMERGING DISEASES OF PETS AND LIVESTOCK

Objective
To teach students important and emerging diseases of pets and livestock.

Theory
UNIT-I: Introduction to emerging diseases, foot and mouth disease, vesicular stomatitis, vesicular exanthema, rinderpest/Peste des petits ruminants, para influenza -3, infectious bovine rhinotracheitis/infectious pustular vulvovaginitis, bovine spongiform encephalopathy, scrapie, blue tongue, malignant catarrhal fever, mucosal disease/bovine viral diarrhoea, bovine leucosis.
UNIT-II: Tuberculosis/Johnes disease, brucellosis, listeriosis, caprine arthritis, campylobacteriosis, encephalitis, parvovirus infection, emerging diseases of pets.

Practical
Study of clinical and gross alterations and histopathology of some important emerging and enzootic diseases.

Suggested Readings
Selected articles from journals.

VPP 707 ADVANCES IN AVIAN PATHOLOGY

Objective
To teach different diagnostic techniques for diagnosis of different avian diseases.

Theory
UNIT-I: Advances in pathogenesis and pathology including molecular basis of important infections (bacterial, viral, fungal and parasitic).
UNIT-II: Non-infectious diseases with particular emphasis on emerging diseases of chickens, turkeys, ducks and other birds.

Practical
Necropsy examination of different species of poultry. Study of gross and microscopic lesions in natural and experimentally produced diseases in different species of birds. Diagnosis of different diseases of poultry.

Suggested Readings
Selected articles from journals.

VPP 708 PATHOLOGY OF FUNGAL DISEASES

Objective
To teach the diseases caused by different fungi and mycotoxins in animals.

Theory
UNIT-I: Pathology of diseases associated with pathogenic fungi like aspergillosis, candidiasis, epizootic lymphangitis, histoplasmosis, coccidiodomycosis, cryptococcosis, bovine abortions, dermatophytomycosis etc.
UNIT-II: Diseases associated with mycotoxins like aflatoxins, rubratoxin, T2 toxin, ochratoxin etc. Metabolism of toxins and their effect in man, domestic and laboratory animals, poultry and aquatic species.

Practical
Demonstration of pathogenic mycotoxic fungi, chemistry of toxic compounds, physical and chemical properties, methods of extraction, isolation and identification of mycotoxins.

Suggested Readings
Selected articles from journals.

VPP 709 MOLECULAR PATHOLOGY OF CELL INJURY

Objective
To acquaint the students about the molecular basis of cell injury and inflammation.
Theory
UNIT-I: Causes of cell injury - Ischemic, Hypoxic, Free radicals, virus and chemical cell injury - Chemical Mediators - Cytoskeletal and biochemical changes in cell injury.

Practical
Gross and histopathological studies pertaining to above conditions.

Suggested Readings
Selected articles from journals.

VPP 710 EXPERIMENTAL PATHOLOGY 1+1 SEM - I
Objective
To provide expertise in designing the experiments and handling of animals.

Theory
UNIT-I: Need for experimentation in research, animal experimentation techniques, preparation of experimental protocols, biochemical studies, pathological examination of clinical samples.
UNIT-II: Transplantation techniques, immune regulation, tissue culture, blood cell separation protocols, electrophoresis and chromatography, study of animal model and designing of experiment.

Practical
Short research problems involving contemporary issues and research techniques.

Suggested Readings
Selected articles from journals.

VPP 790 SPECIAL PROBLEM 0+2 SEM - I, II
Objective
To provide expertise in handling practical research problem(s).

Practical
Short research problem(s) involving contemporary issues and research techniques.
VETERINARY PATHOLOGY

List of Journals

- Advances in Veterinary Sciences
- American Journal of Veterinary Medical Association
- Avian Diseases
- Current Contents
- Indian Journal of Animal Sciences
- Indian Journal of Poultry Science
- Indian Journal of Veterinary Pathology
- Journal of Immunology and Immunopathology
- Veterinary Bulletin
- Veterinary Pathology

e-Resources

- www.iavp.org (Indian Journal of Veterinary Pathology)
- www.vetpathology.org (Veterinary Pathology)
- www.tandf.co.uk (Avian Pathology)
- www.avdi.allenpress.com (Avian Diseases)
- www.elsevier.com/locate/vetimm (Veterinary Immunology and Immunopathology)

Suggested Broad Topics for Master’s and Doctoral Research

- Effect of probiotics on pathogenesis and pathology of bacterial diseases
- Effect of antioxidants on pathogenesis and pathology of bacterial diseases
- Pathology of mixed infections in domestic animals
- Role of stress in pathogenesis and pathology of animal diseases