VETERINARY ANATOMY AND HISTOLOGY
Course Structure - at a Glance

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VAN 601: COMPARATIVE OSTEOMETRY AND ARTHROLOGY  

Objective: To make a student well versed with the bones and joints of different domestic animals.

Theory

UNIT I
Technical terms, structure, chemical composition and classification of bones.

UNIT II
Bones of appendicular skeleton of ox as a type and their comparison with those of horse, dog, pig and poultry.

UNIT III
Bones of axial skeleton of ox as a type and their comparison with those of horse, dog, pig and poultry.

UNIT IV
Classification and detailed study of different joints of the body.

UNIT V
Study the various indices for estimating race, sex and age of different animals. Basics of biomechanics of the locomotor system. Radiography of normal and developing bones.

Practical
Demonstration of all bones and dissection of joints of buffalo/Cattle.

Suggested Readings

VAN 602: COMPARATIVE SPLANCHNOLOGY  

Objective: To give a detailed overview of different systems constituting splanchnology.

Theory

UNIT I
Descriptive anatomy of various organs of digestive system and associated glands of ox and their comparison with those of horse, dog, pig and poultry. Study of formation of thoracic, abdominal and pelvic cavities; reflection of these cavities.

UNIT II
Study of various organs/structures and associated glands constituting the respiratory system of ox and their comparison with those of horse, dog, pig and poultry.
UNIT III
Detailed study of organs and associated glands comprising the urinary system of ox as a type and their comparison with those of horse, dog, pig and poultry.

UNIT IV
Complete study of various organs and associated glands of male and female genital systems.

UNIT V
Surgical sites for various operations and clinically significant areas for performing auscultation, percussion and for carrying out surgical procedures such as laryngotomy, oesophagotomy, gastrostomy, rumenotomy, cystotomy, urethrotomy, caesarian section, exploratory laparotomy, mammectomy, thoracotomy, thoracocentesis etc.

Practical
Demonstration of structure and placement of organs in body cavities of all the animals.

Suggested Readings

VAN 603: MYOLOGY, ANGIOLOGY, NEUROLOGY AND AESTHESIOLOGY OF OX

Objective: To give a thorough knowledge about the muscles, course of blood vessels and nerves of the body in addition to various organs of circulatory, nervous and sensory systems of ox as a type animal.

Theory

UNIT I
Classification of muscle fibres. Origin, insertion and relations of muscles of different body parts.

UNIT II
Topographic anatomy of the vascular system comprising of heart, arteries, veins and lymphatics.

UNIT III
Study of various components of central nervous system, peripheral nervous system and autonomic nervous system.

UNIT IV
Complete study of the gross anatomy of various sense organs.

UNIT V
Study of different nerve blocks, intravenous sites and enucleation of eye ball.

Practical
Dissection of heart, different vessels, brain, cranial nerves, brachial plexuses and lumbo-sacral plexus. Dissection of eye, ear, hoof and horn of buffalo/cattle.

Suggested Readings

VAN 604: GROSS ANATOMICAL TECHNIQUES

Objective: Hands-on training for preparation of gross anatomical specimens.

Practical
Embalmig fluids, embalming of animals, maceration and preparation of skeletons. Gross staining of brain sections. Demonstration of sites of ossifications. Preparation of transparent specimens, preparation of casts of various organs, blood vessels and ducts etc.

Suggested Readings
VAN 605: THEORY AND PRACTICE OF HISTOLOGICAL AND HISTOCHEMICAL TECHNIQUES  

Objective: To give exposure to methods of processing the tissues for research and teaching purposes.

Theory

UNIT I
Preparation of tissues for light microscopy using different fixatives.

UNIT II
Different staining methods for routine light microscopy.

UNIT III
Frozen sectioning techniques and staining methods for enzymes, carbohydrates, lipids, proteins, pigments etc.

UNIT IV
Silver staining techniques for nervous tissue.

Practical
Study of different techniques for collection, fixation and processing of animal tissues; preparation of paraffin and frozen sections; handling and care of microtomes. Demonstration of staining of carbohydrates, lipids, proteins, nucleic acids and enzymes.

Suggested Readings

VAN 606: GENERAL HISTOLOGY AND ULTRASTRUCTURE

Objective: To understand basic principles of light microscopy and light and ultrastructure of four basic tissues.

Theory

UNIT I
Light and ultrastructural details of animal cell.

UNIT II
Light and ultrastructural details of epithelial tissue.

UNIT III
Light and ultrastructural details of muscular tissue.

UNIT IV
Light and ultrastructural details of connective tissue.

UNIT V
Light and ultrastructural details of nervous tissue.

Practical
Demonstration of different components of cells and intercellular substances of the above referred tissues by special staining through the use of light, phase contrast, dark field, fluorescent and electron microscopes.

Suggested Readings

VAN 607: SYSTEMIC HISTOLOGY AND ULTRASTRUCTURE

Objective: To understand and identify arrangement of four basic tissues in organs of different body systems.

Theory

UNIT I
Light and ultrastructure of different organs of digestive system of ruminants with differential features among domestic animals.

UNIT II
Light and ultrastructure of different organs of respiratory, lymphoid and cardiovascular systems.
UNIT III
Light and ultrastructure of different organs of urino-genital systems.

UNIT IV
Light and ultrastructure of different sense organs and nervous system.

Practical
Study of histological structure of organs of digestive, respiratory, urinary, genital and cardiovascular systems of buffalo, horse and dog/cat.

Suggested Readings

VAN 608: DEVELOPMENTAL ANATOMY

Objective: To understand the developmental processes of different body systems at various stages of pregnancy.

Theory
UNIT I
Gametogenesis, fertilization, cleavage and gastrulation.

UNIT II
Development of foetal membranes and placenta in domestic animals.

UNIT III
Histogenesis of nervous system, sense organs, endocrine organs and cardiovascular system.

UNIT IV
Embryonic development of digestive, respiratory, uro-genital and musculoskeletal system.

Practical
Study of serial sections of the chick and pig embryos at different stages of development.

Suggested Readings

VAN 701: MYOLOGY, ANGIOLOGY, NEUROLOGY AND AESTHESIOLOGY OF EQUINE, CANINE AND PORCINE

Objective: To teach students about anatomy of muscles, blood vessels, nervous tissue and sense organs in equine, canine and porcine.

Practical
Dissection of different body regions with respect to muscles, blood vessels and nerves; and see the topographic positioning of different organs in different body cavities in equine, canine and porcine.

Suggested Readings
Selected articles from journals.

VAN 702: PRINCIPLES AND APPLICATIONS OF BIOMECHANICS

Objective: To sensitize the student about the importance of biomechanics.

Theory
UNIT I
Biomechanics, its definition and scope with reference to anatomy and physiology of domestic animals and musculo-skeletal dynamics.

UNIT II
Locomotion and clinical applications. Biomechanics of cortical and trabecular bones.
UNIT III
Biomechanics of fracture fixation. Instrumentation and techniques in locomotion and their applications in lameness.

Suggested Readings
Selected articles from journals.

VAN 703: AVIAN ANATOMY 1+2

Objective: To give detailed overview of poultry anatomy.

Theory

UNIT I
The study of the gross features of different body systems of domestic fowl.

UNIT II
The study of microscopic features of different body systems of domestic fowl.

Practical
Dissection and demonstration of various body systems of fowl and turkey. Microscopic examination of slides of various organ systems of fowl.

Suggested Readings
Selected articles from journals.

VAN 704: NEUROANATOMY 3+1

Objective: To provide in-depth knowledge of nervous system.

Theory

UNIT I
The gross and microscopic anatomy of the brain and spinal cord.

UNIT II
Study of various cranial and spinal nerves along with their associated nuclei and ganglia.
Motor and sensory pathways, different ascending and descending tracts of brain and spinal cord and autonomic nervous system.

Practical
Gross dissection and microscopic examination of the brain and spinal cord; demonstration of the nerves, nerve plexuses, ganglia of cranial importance, study of the serial sections of the brain and spinal cord in domestic animals.

Suggested Readings
Selected articles from journals.

VAN 705: ENDOCRINE ANATOMY 2+1

Objective: To project the importance and details of endocrine glands.

Theory

UNIT I
Advanced gross and microscopic anatomy of the hypothalamus and pituitary gland.

UNIT II
Advanced gross and microscopic anatomy of the thyroid, parathyroid and thymus.

UNIT III
Advanced gross and microscopic anatomy of the adrenal glands, islets of Langerhans, pineal body and other tissues associated with endocrine secretions.

Practical
Demonstration of the topographic anatomy in the embalmed specimens and microscopic examination of the endocrine glands of ruminants.

Suggested Readings
Selected articles from journals.
VAN 706  THEORY AND APPLICATIONS OF ELECTRON MICROSCOPE  2+1

**Objective:** To give an overview of the electron microscope.

**Theory**

**UNIT I**  
Introduction and principles of electron microscopy.

**UNIT II**  
Methods for transmission electron microscopy.

**UNIT III**  
Methods for scanning electron microscopy.

**Practical**

Preparation of blocks and demonstration of various techniques used for carrying out TEM and SEM.

**Suggested Readings**

Selected articles from journals.

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VAN 707: HISTOENZYMOLGY AND IMMUNOCYTOCHEMISTRY  2+1

**Objective:** To give a student hands-on practice for various advanced histoenzymic and histochemical techniques.

**Theory**

**UNIT I**  
Classification of enzymes - Principles of enzymes histochemistry methods.

**UNIT II**  
Substrates -combination-coupling azo-dye methods -capture reagents.

**UNIT III**  
Localization of enzymes and controls in enzyme histochemistry.

**UNIT IV**  
Fluorescence microscopy in enzyme histochemistry. Immunohistochemistry - principles and techniques.

**Practical**

Preparation of fixatives and buffers used in histochemistry. Methods of preparations and microscopical examination of routine and special preparations showing different cell organelles and inclusions. Methods for tryptophan-SS, SH groups; Glycogen-glycoproteins; Mucopolysaccharides and lipids. Methods and identification of alkaline and acid phosphatases -succinic dehydrogenase, cytochrome- oxidase, choline-esterase, catecholamines by fluorescence microscopy. Immunohistochemistry -principles and techniques.

**Suggested Readings**

Selected articles from journals.

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VAN 708: APPLIED EMBRYOLOGY AND TERATOLOGY  1+2

**Objective:** To apprise the students about the current trends in developmental processes.

**Theory**

**UNIT I**  
Principles of experimental embryology and teratology.

**UNIT II**  
Factors affecting the developmental mechanisms of embryo.

**UNIT III**  
Use of organizers implants, chemical and hormonal preparations in the developmental models and available literature on teratogenic experimentation.

**Practical**

Collection and study of various teratological specimens from domestic animals. Class discussions on experimental models and available literature on teratogenic experimentation.

**Suggested Readings**

Selected articles from journals.
VAN 709: FUNCTIONAL VETERINARY ANATOMY  

Objective: To make the student understand the functional anatomy of various organs/systems in relation to structure.

Theory

UNIT I
The relationship of structure to form and function.

UNIT II
The relationship of structure for adaptation and behaviour.

UNIT III
Relationship of structure in relation to clinical conditions/applications.

Suggested Readings
Selected articles from journals.

VAN 710: GROSS ANATOMY OF LABORATORY ANIMALS  

Objective: To give an overview of different body systems of laboratory animals.

Theory

UNIT I
Study of different organs of digestive system of different laboratory animals.

UNIT II
Detailed study of urinary, male and female reproductive systems of different laboratory animals.

UNIT III
Complete study of respiratory system of different laboratory animals

UNIT IV
Study of organs of circulation and nervous system of different laboratory animals.

UNIT V
Descriptive anatomy of endocrine glands of different laboratory animals.

Practical
Demonstration of placement and relations of different organs in the body cavities of different laboratory animals.

Suggested Readings

VAN 790: SPECIAL PROBLEM

Objective: To provide expertise in handling practical research problem(s).

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

VETERINARY ANATOMY AND HISTOLOGY

List of Journals
* Acta Anatomica
* American Journal of Anatomy
* Anatomia Histologia and Embryologia
* Anatomical Record
* Anatomy and Embryology
* Indian Journal of Veterinary Anatomy
* Journal of Anatomy
e-Resources


**Suggested Broad Topics for Master’s and Doctoral Research**

* Gross anatomical disposition of various organs of animals of local interest
* Light and ultra-structural studies of important organs and systems of animals of local importance
* Developmental studies of different body systems