SEMESTER- IV

<table>
<thead>
<tr>
<th>COURSE NO.</th>
<th>COURSE TITLE</th>
<th>CREDIT HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAN-221</td>
<td>Veterinary Splanchnology &amp; Applied Anatomy</td>
<td>1+1=2</td>
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<tr>
<td>VPB-221</td>
<td>Veterinary Physiology-III (Endocrinology, Reproduction Growth Environmental Physiology)</td>
<td>3+1=4</td>
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<tr>
<td>VPA-221</td>
<td>Veterinary Entomology &amp; Acarology</td>
<td>1+1=2</td>
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<tr>
<td>VPA-222</td>
<td>Veterinary Protozoology</td>
<td>2+1=3</td>
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<tr>
<td>VMC-221</td>
<td>Veterinary Immunology and Serology</td>
<td>1+1=2</td>
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<tr>
<td>VPP-221</td>
<td>Systemic Veterinary Pathology</td>
<td>2+1=3</td>
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<tr>
<td>LPM-221</td>
<td>Commercial Poultry Production and Hatchery Management</td>
<td>1+1=2</td>
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<tr>
<td>LPM-222</td>
<td>Livestock Production Management-III (Regional interest)</td>
<td>1+1=2</td>
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<tr>
<td>LFP-221</td>
<td>Livestock Farm Practice (Non-Credit)</td>
<td>0+1=1</td>
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Total Credits 12+9=21

VAN-221 : VETERINARY SPLANCHNOLOGY AND APPLIED ANATOMY Credit Hours 1+1=2

THEORY
Gross morphological and topographical study of various organs of digestive, respiratory, urinary, male and female reproductive, lymphatic and endocrine systems, Pleura and Peritoneum in Ox Buffalo as type and their comparison with that of Sheep/Goat, Pig, Horse, Dog and Fowl.

Different Terminology used in applied Anatomy. Palpable Anatomical body structures and their use in health and disease.

PRACTICAL
Demonstration and description of palpable anatomical structures on the body surface of live animal (head, neck, thorax, pectoral bones, pelvic bones, limbs).


Applied anatomy of sites for thoraco-centesis, auscultation, abdominocentesis, rumenotomy, laparotomy, splenectomy, enterotomy, palpation of anatomical structures in the abdominal and perineal regions. Radiographic visualisation of gross anatomical features of various regions of the body. (Note: Computer simulation model studies shall be used for better understanding of the subject.)

REFERENCE BOOKS

2. The Anatomy of the Domestic Animals-Septimius Sisson
3. Clinical Dissection Guide for Large Animals Horse and Large Ruminants- Georgehe M. Contantinescu, Ileana A. Contantinescu
27. Comparative anatomy of the Veterbrates-George C. Kent.
28. Miller's Anatomy of the Dog
29. A colour atlas of Anatomy of small laboratory animals-P. popesko, V. rajtova, J. Horak.
30. Comparative Veterinary Histology-Elizabeth Auhey, Fredric L. Frye.
34. Reproduction in Farm Animals-E. S. E. Hafez, B. Hafez.
35. Veterinary Obstetrics and Genital diseases-Stephen J. Roberts.
36. Veterinary Surgical Techniques-Amresh kumar
37. Congenital Malformations in Laboratory and Farm Animals-Kalman T. Szabo.
38. Vertebrate Embryology- Robert S. McKENZIE.
THEORY
Hormone cell interaction, sub-cellular mechanisms-metabolism of hormones-methods of study of endocrine system; Receptors- mechanism of regulation; Chemistry of hypothalano -hypophyseal hormones, target organ, pineal, thyroid, thymus, pancreas, adrenal, prostadiglands, hormones of calcium metabolism, disorders, rennin-angiotensin system, atrial natriuretic factors, erythropoietin, GI hormones, pheromones.

Genetic & 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 & parturition, immunology of gestation, preparturient endocrine events.


Functional and metabolic organization of mammary glands -structure and development; effect of estrogens and progesterone; hormonal control of mammary growth; lactogenesis and galctogenesis; biosynthesis of milk constituents- secretion of milk, mastitis and metabolism, prolactin and mammary tumours.-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 & birds, growth curves. Recombinant gene transfer technologies for growth manipulation- advantages and limitations. Protein deposition in animals and poultry.

Heat balance, heat tolerance, hyperthermia, 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, aclimatization -general adaptive syndrome. Clinical effect on endocrine -reproductive function, circadian rhythm.

Neurophysiology of behaviour, types of behaviour, communication, Learning and memory, behavioural plasticity.

PRACTICAL

REFERENCE BOOKS
1. Dukes Physiology of Domestic Animals - Edited by Melvin J Swenson.
4. Reproduction in Farm Animals - by E.S.E. Hafez.
5. Adaptation in Domestic animals - E.S.E. Hafez and B. Hafez.

VPA-221: VETERINARY ENTOMOLOGY AND ACAROLOGY

THEORY
General description of insecta and arachnida affecting domestic animals and birds. Arthropoda as direct/indirect parasites. Classification, Life Cycle and vector potentiality in relation to disease transmission, pathogenesis and control of following arthropods affecting animals and birds.

The biting midges (Culicoides), buffalo gnats /Black fly, (Simulium), sandflies (Phlebotomus). The mosquitoes (Culex, Anopheles and Aedes). Horse fly (Tabanus), Musca,

Stomoxys, Sarcophaga, Warbles (Hypoderma) and bots (Gasterophilus), Nasal bot (Oestrus ovis), Myiasis, Wingless flies (Hippobosca, Melophagius), bugs, lice (Haematopinus, Linognathus, Trichodectus, Damalinia, Menopon, Lipeurus, Menacanthus (Poultry lice), Fleas (Pulex, Ctenocephalides, Echidnophaga, Xenopsylla). Arachnids (Ticks and mites of Veterinary importance. Soft tick (Argasidae), (Argus, Onirhodoros and Otobius).

Hard ticks (Boophilus, Hyalomma, Rhipicephalas, Haemophysalis, Amblyomma, Ixodes). Mites (Demodex, Sarcoptes, Psoroptes, Notoedres, Choriopites). Anti-tick immunoprophylaxis Damages to hide and skins due to ectoparasitic infestation.

PRACTICAL
Demonstration of the type representatives of various groups of insects, ticks and mites through charts, specimen and mounted slides - Demonstration of different characters of Insecta and Arachnida (Ticks and mites), Procedure for diagnosis of arthropod infestation to hides and skin. Demonstration of enteric miyasis, Procedures for the collection, fixation, preservation and mounting of arthropod parasites.

REFERENCE BOOKS
2. Veterinary Parasitology - G.M. Ureghart et. al.
5. Veterinary Ectoparasites:Biology, Pathology & Control-Richard Wall & David Shearer
VPA-222: VETERINARYPROTOZOOLOGY

THEORY
Introduction and general description to protozoa and their development. Differentiation from protophyta, bacteria and rickettsia. Classification. Life cycle in relation to transmission, pathogenesis, diagnosis and control of protozoa of veterinary importance.

Kala azar (visceral) and cutaneous leishmaniasis, Animal trypanosomosis (Surra), trypanosomosis (due to African Trypanosoma) in cattle and man.

Bovine and avian trichomonosomosis, black head in turkeys (Histomonas), Bovine amoebae (Entamoeba) and Batantidium. Giardia sp. Coccidia and coccidiosis of poultry and animals. Cryptosporidiosis, Cyst forming coccidian (Toxoplasma, Sarcocystis), Neospora (Neospora caninum). Malaria parasite of animals and poultry (Plasmodium and Haemoproteus), Piroplasmosis (Babesia), Theilerosis (Theileria). Recent developments in protozoan vaccines for field use. International regulations for control of different protozoan diseases.

PRACTICAL

REFERENCE BOOKS
2. Veterinary Parasitology - G.M. Urquhart et. al.
4. Text Book of Veterinary Protozoology - B.B. Bhatia

VMC-221: VETERINARY IMMUNOLOGY AND SEROLOGY

THEORY

PRACTICAL
Preparation of antigen, Raising of antisera, Concentration of Immunoglobulins, Agglutination (plate, tube). Precipitation (Agar gel precipitation test (AGPT), Crossed immunoelectrophoresis (CIE), Rocket Immunoelectrophoresis (RIE), Indirect agglutination (Latex co-agglutination, Passive haemaggglutination (PHA), Reversed passive haemaggglutination (RPHA)), Haemaggglutination. Complement fixation test, immunoperoxidase test (IPT), Fluorescent antibody technique (FAT), Enzyme linked immunosorbent assay (ELISA), Cell mediated immune (CMI) response. Veterinary biologicals (visits and appraisal).

REFERENCE BOOKS
1. Veterinary Immunology - 7th ed. Tizard
2. Immunology - Janus Kuby
3. Immunology - Ivan Rott

VPP-221: SYSTEMATIC VETERINARY PATHOLOGY

THEORY
Pathological changes including neoplasms in non-infectious disease conditions affecting Digestive System (mouth, pharynx, salivary glands, oesophagus, stomach, intestines, liver, gall bladder, pancreas), Respiratory System (nasal cavity, larynx, bronchi, trachea, lungs and pleura), Musculoskeletal System (muscle, bone, joints, ligaments, tendons), Cardio-vascular System (pericardium, myocardium, epicardium, endocardium, arteries, veins), Haematopoietic System (bone marrow), Lymphoid System (lymph nodes, vessels and spleen), Urinary System (kidneys, ureter, bladder and urethra), Reproductive System (male and female genital organs), Nervous System (brain, spinal cord and peripheral nervous system), Endocrine System (adrenal, thyroid, thymus, pituitary, parathyroid and pancreas). Skin and Appendages (hoof and horn), Ear and Eye.

PRACTICAL
Post-mortem examination of large and small animals, recording of gross lesions and compiling the postmortem report (including vetero-legal cases), despatch of morbid material in vetero-legal cases, study of gross specimens and histopathological slides pertaining to systemic pathology. Collection and examination of clinico-pathological specimens (blood, urine, body fluids, etc.) for diagnosis of systemic affections.

LPM-221 : COMMERCIAL POULTRY PRODUCTION AND HATCHERY MANAGEMENT

THEORY
HOUSING - Location of poultry. Types of poultry houses. Different types of rearing-advantages and disadvantages. Space requirement for different age groups under different rearing systems. Environmentally controlled housing. BROODING MANAGEMENT-Brooding: Types of brooders; preparation of shed to receive chicks; importance of environment (temperature, humidity and ventilation). Feeding and vaccination in early stage of chicks.
REARING AND MANAGEMENT- Care and management of growing, laying/broiler birds of both breeders and commercial categories of poultry. Battery cage management different types and sizes. Poultry judging.

LITTER MANAGEMENT- Litter materials, litter-borne diseases and control; potential for poultry litter used as fertilizers; recycling for livestock feeding and power generation; Special management care in adverse weather conditions/ stress; summer management modification of housing light reflectors; insulators, sprinklers, loggers and other methods; dietary modification to minimize heat stress; special management during rainy and winter season; other stress management- vices in poultry and its remedial measures.

WATER MANAGEMENT- Standard for drinking water in terms of total solids, pH, minerals levels, sanitizers and water sanitations, diseases spread through water contamination-prevention.

BIOSECURITY - Proactive measures to minimize entry of infections in farm premises-farm fencing, disinfectant pits, personnel management restriction of movement etc. Poultry welfare and behaviour.


HEALTH CARE- Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies. Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care. Medication: Types of administration-general principles and precautions with emphasis on administering medication through water and feed; commonly used drugs in poultry diseases. Disinfection: Types of disinfectants; mode of action; recommended procedure; precautions and handling.

ECONOMICS - Economics of layer and broiler production; Projects reports layer in different systems of rearing. Projects reports for broilers.-Feasibility studies on poultry rearing- in context of small units and their profitability. Designer meat and egg production. Export/import of poultry and poultry products.


HATCHERY PRACTICES - Management principles of incubation. Factors affecting fertility and hatchability. selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene. Disposal of hatchery waste; Sexing, grading, packing and dispatch of day old chicks. Economics of hatchery business; Trouble shooting hatch failure: importance of hatchery records, break even analysis of unhatched eggs. Biosecurity in the hatchery. Computer applications for hatchery management

PRACTICAL

REFERENCE BOOKS (LPM 211 and LPM 221)

LPM- 222 :LIVESTOCK PRODUCTION MANAGEMENT (REGIONAL INTEREST) Credit Hours: 1+1=2

Course Contents to be developed by the University/Veterinary College on the basis of regional interest.