

- (4) Grade Point Average shall be the sum of the total credit points earned divided by the sum of credit hours.
- (5) Overall Grade Point Average shall be the sum of the grand total of credit points earned divided by the grand sum of credit hours.
- (6) The corresponding ranking of Overall Grade Point Average with respect to traditional scoring system of division ranking shall be as follows, namely:-

8.000 and above	-	First Division with Distinction
7.000 -7.999	-	First Division
6.000 - 6.999	-	Second Division
5.000 - 5.999	-	Pass

- (7) The formats of detailed mark certificate and degree transcript are annexed at **Annexure I and II** to these regulation.

## **PART V**

### **COURSES AND COURSE CONTENTS**

#### **20. PROFESSIONAL YEAR WISE DISTRIBUTION OF COURSES**

##### **(1) FIRST PROFESSIONAL**

Veterinary Anatomy	4+3=7
Veterinary Physiology	4+1=5
Livestock Production Management	4+2=6
<b>Total</b>	<b>12+6=18</b>

##### **(2) SECOND PROFESSIONAL**

Veterinary Biochemistry	2+1=3
Veterinary Microbiology	3+2=5
Veterinary Pathology	4+2=6
Animal Genetics and Breeding	3+1=4
Animal Nutrition	3+1=4
<b>Total</b>	<b>15+7=22</b>

##### **(3) THIRD PROFESSIONAL**

Veterinary Pharmacology and Toxicology	4+1=5
Veterinary Public Health and Epidemiology	3+1=4
Veterinary Parasitology	3+2=5
Livestock Products Technology	2+1=3
Veterinary and Animal Husbandry Extension Education	3+1=4
Veterinary Clinical Practices – I	0+1=1
Livestock Farm Practices	0+2=2
<b>Total</b>	<b>15+9=24</b>

##### **(4) FOURTH PROFESSIONAL**

Veterinary Surgery and Radiology	2+1=3
Veterinary Medicine	4+1=5
Veterinary Gynaecology and Obstetrics	2+1=3
Veterinary Clinical Practices –II	0+6=6
<b>Total</b>	<b>8+9=17</b>

## ANNUAL EXAMINATION

PAPERS	UNITS	MAXIMUM MARKS	WEIGHTAGE
THEORY			
Paper-I	1 and 2	100	20
Paper-II	3 and 4	100	20
PRACTICAL			
Paper-I	1 and 2	60	20
Paper - II	3 and 4	60	20

### (viii) DEPARTMENT OF VETERINARY PHARMACOLOGY AND TOXICOLOGY

#### VETERINARY PHARMACOLOGY

**Credit Hours: 4+1**

#### THEORY

##### UNIT-1 (GENERAL PHARMACOLOGY)

Introduction, historical development, branches and scope of Pharmacology. Sources and nature of drugs. Pharmacological terms and definitions, nomenclature of drugs. Principles of drug activity: Pharmacokinetics - Routes of drug administration, absorption, distribution, biotransformation and excretion of drugs. Pharmacodynamics - Concept of drug and receptor, dose-response relationship, terms related to drug activity and factors modifying the drug effect and dosage. Adverse drug reactions, drug interactions.

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

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

Drugs acting on digestive system: Stomachics, antacids and antiulcers, prokinetics, carminatives, antizymotics, emetics, antiemetics, purgatives, antidiarrhoeals, cholagogues and choleretics. Rumen pharmacology. Drugs acting on cardiovascular system: Cardiotonics and cardiac stimulants, antiarrhythmic drugs, vasodilators and antihypertensive agents, haematopoietic drugs, coagulants and anticoagulants. Drugs acting on respiratory system: Expectorants and antitussives, respiratory stimulants, bronchodilators and mucolytics. Drugs acting on urogenital system: Diuretics, drugs

affecting urinary pH and tubular transport of drugs, ecobolics and tocolytics.

Pharmacological basis of fluid therapy. Pharmacotherapeutics of hormones. Drugs acting on skin and mucous membranes: Emollients, demulcents and counter irritants.

### **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, cephamycins and other beta lactams, beta lactamase inhibitors. Aminoglycosides and aminocyclitols, tetracyclines, amphenicols (chloramphenicol, thiamphenicol, florfenicol), macrolides, quinolones and fluoroquinolones, polypeptides (polymixins, bacitracin) and glycopeptide 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, amoebiasis, giardiasis 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, leptadenia, tinospora, embilica, eucalyptus, glycyrrhiza, trichospermum, curcuma, adiantum, 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, chlorate, common salt and urea. Poisonous plants: Cyanogenetic 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, organophosphates, carbamates, pyrethroids, newer insecticides. Herbicides, fungicides and rodenticides.

Fungal and bacterial toxins: Aflatoxins, rubratoxin, ochratoxin, sporidesmin, citrinin, F-2 toxin, trichothecenes, ergot, fescue, botulinum toxin and tetanus toxin. Venomous bites and stings: Snake, scorpion, spider, bees and wasp, toad and fishes (puffer fish, shellfish). Toxicity caused by food additives and preservatives. Drug and pesticide residue toxicology. Environmental pollutants: Air and water pollutants. Concept of radiation hazards.

## **PRACTICAL**

### **UNIT-1 (GENERAL PHARMACOLOGY)**

Handling and washing of laboratory wares. Handling and operation of commonly used laboratory instruments. Concept of good laboratory practices (GLP). Pharmacy appliances. Principles of compounding and dispensing. Metrology, systems of weights and measures, pharmacy calculations.

Pharmaceutical processes. Pharmaceutical dosage forms. Prescription writing, incompatibilities. Drug standards and regulations, custody of poisons. Compounding and dispensing of powders, ointments, mixtures, liniments, lotions, liquors, tinctures, emulsions, and electuaries.

#### **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 ( $LD_{50}$ ) or maximum tolerated dose (MTD).

#### **ANNUAL EXAMINATION**

<b>PAPERS</b>	<b>UNITS</b>	<b>MAXIMUM MARKS</b>	<b>WEIGHTAGE</b>
<b>THEORY</b>			
Paper-I	1, 2, 3 and 4	100	20
Paper-II	5 and 6	100	20
<b>PRACTICAL</b>			
Paper-I	1 and 2	60	20
Paper - II	3, 4 and 5	60	20

**THEORY**

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

Aims and scope of Veterinary Public Health. Role of veterinarians in public health. One Health concept and initiatives. Veterinary Public Health administration. Sources of contamination. Principles and concepts of food hygiene and safety. Milk hygiene in relation to public health. Hygienic and safe milk production practices including steps for prevention and control of milk contamination, adulterants, antimicrobial residues, agrochemicals, subclinical mastitis orudder infections etc.. Microbial flora of milk and milk products. Milk plant and dairy equipment hygiene. Quality control of milk and milk products. Milk hygiene practices in India and other countries. Elements of meat inspection and meat hygiene practices. Pathological conditions associated with the transport of food animals. Hygiene in abattoirs and meat plants. Detection of conditions or diseases and judgements during ante mortem and post mortem inspection. Examination of lymph nodes. Meat as a source of disease transmission. Sources of contamination of meat and methods of carcass decontamination. Speciation of meat. Animal welfare and public health issues. Classification of low risk and high risk material generated in an abattoir and its hygienic disposal. Inspection of poultry for human consumption. Occupational health hazards in abattoir and meat plants. Foodborne infections and intoxications associated with foods of animal origin. Toxic residues (pesticides, antibiotics, metals and hormones) in foods and associated health hazards. Types of biohazards. Hazard analysis and critical control points (HACCP) system. Importance of ISO 9000 and 14000 series in meat industry. Risk analysis, assessment and management. International food safety standards: World Organisation for Animal Health (OIE), World Trade Organization (WTO) agreements and Codex Alimentarius Commission. Sanitary and phytosanitary measures in relation to foods of animal origin. Food Safety and Standards Act and Regulations. Role of Food Safety and Standards Authority of India (FSSAI), Bureau of Indian Standards (BIS) and other national agencies.

**UNIT-2 (VETERINARY EPIDEMIOLOGY)**

Definitions, components and aims of epidemiology. Factors influencing occurrence of livestock diseases and animal production. Determinants of disease. Transmission and maintenance of infections. Ecology of disease. Measures and patterns of disease occurrence. Survey and surveillance of animal diseases and related parameters. Epidemiological methods- Descriptive, analytical, experimental, theoretical, serological and molecular. Animal disease forecasting. Strategies of disease management: prevention, control and biosecurity. Economics of animal diseases. National and international regulations on livestock diseases. Role of OIE and laws on international trade of animals and animal products.

**UNIT-3 (ZOO NOTIC 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, iphylobothriasis, 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)**

Scope and importance. Ecosystem: Components structure and functions. Biodiversity: uses, threats and conservation. Natural resources: types, uses and abuses. Environmental contaminants in food chain- bioaccumulation, biomagnification and persistent organic pollutants. Environmental pollution: Sources, nature of pollutants, effects on animal and human health. Rural and urban pollution. Air pollution, sources and hazard. Air pollution in animal houses, effect on health and productivity. Airborne diseases – Classification, health hazard, prevention and control. Water-Sources, contamination & their prevention. Water qualities- Physical, chemical, bacteriological and radiological. Water purification methods for community water supplies. Waterborne diseases – Classification, health hazard, prevention and control. Soil, marine and thermal pollution- Classification, sources, hazard, prevention and control. Noise pollution – Sources, hazards, prevention and control. Nuclear hazards or radiological hazard-Types, hazards and radiation protection. National rules and legislations related to environmental pollution and role of pollution control board in India. Biosafety: Importance, classification and biosafety measures for prevention of risk hazards. Disaster management and mitigation. Solid and liquid waste management at farms and biomedical waste management. Sanitation and disinfection of farm and hospital environment in veterinary public practice for infection control. Global warming and greenhouse effect- Definition, greenhouse gases, impact of climate change and international treaties or protocols. Management of waste from animal industries. Stray and fallen animal management and carcass disposal. Vector and reservoir control.

#### **PRACTICAL**

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

Collection of samples for chemical and bacteriological examination. Grading of milk by dye reduction test, direct microscopic examination and standard plate count. Quality assurance tests for processed milk and milk products. Tests for plant sanitation-Air, water and equipment. Microbiological examination of raw milk, pasteurized milk, milk products, meat, meat products and eggs-standard plate count, coliform count, enterococcal count, psychrophilic and psychrotrophic organisms, thermophilic bacteria and yeast and mold count. Detection of organisms of public health significance from food products by techniques. Tests for detection of mastitic milk. Ante-mortem and post-mortem inspection of food animals. Demonstration or detection of toxic chemicals and contaminants of public significance from milk and meat. Detection of antimicrobial residues in milk and meat by

microbiological and analytical techniques. Demonstration of speciation of meat.

## **UNIT-2 (VETERINARY EPIDEMIOLOGY)**

Sampling methods for epidemiological studies. Measurement of disease frequencies. Sources, storage, retrieval and representation of disease information or data. Demonstration of selected software programmes or models. Evaluation of sensitivity and specificity of diagnostic tests by epidemiological methods. Determination of associations of disease and hypothesized causal factors. Survey of an animal disease on a farm. Epidemiological investigation of disease outbreaks.

## **UNIT-3 (ZOO NOTIC 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.

<b>ANNUAL EXAMINATION</b>			
<b>PAPERS</b>	<b>UNITS</b>	<b>MAXIMUM MARKS</b>	<b>WEIGHTAGE</b>
<b>THEORY</b>			
Paper-I	1 and 2	100	20
Paper-II	3 and 4	100	20
<b>PRACTICAL</b>			
Paper-I	1 and 2	60	20
Paper - II	3 and 4	60	20

## **(x) DEPARTMENT OF VETERINARY PARASITOLOGY**

### **VETERINARY PARASITOLOGY**

**Credit Hours: 3+2**

#### **THEORY**

#### **UNIT- 1 (GENERAL VETERINARY PARASITOLOGY)**

Parasitology: Introduction, Important historical landmarks, importance of parasitology in veterinary curriculum. Types of parasites (ecto, endo, hyper, obligatory, facultative, stenoxenous, euryxenous, monoxenous, heteroxenous, histozoic, coelozoic, temporary, permanent, pseudo, aberrant, incidental, opportunistic, zoonotic, protelean etc.). Types of hosts (definitive, intermediate, reservoir, paratenic, natural, unnatural, etc.) and vectors. Types of animal associations (symbiosis, phoresy, commensalism, parasitism, mutualism and predatorism). Modes of transmission of parasites and methods of dissemination of the infective stages of the parasites. International Code of Zoological Nomenclature: Rules and regulations, Standard Nomenclature of Animal Parasitic Diseases (SNOAPAD). Immunity against parasitic infections or infestations, natural and acquired immunity, premunity, sterile immunity, autoimmunity, passive immunity, concomitant immunity and immune evasion by parasites. General harmful effects of parasites including various tissue reactions caused by parasites. General control measures against parasites. Characters of various phyla of parasites.

#### **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 schistosomiasis (*Schistosoma nasalis*), visceral schistosomiasis (*S. spindale*, *S. indicum*, *S. incognitum*) and cercarial dermatitis. Paramphistomes (*Paramphistomum*, *Cotylophoron*, *Calicophoron*, *Gigantocotyle*, *Gastrothylax*, *Fischoederius*, *Carmyerius*, *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 tapeworms (*Anoplocephala*, *Paranoplocephala*) and ruminant tapeworms (*Moniezia*, *Avitellina*, *Stilesia*, *Thysaniezia*). Dog tapeworms (*Dipylidium*, *Taenia*, *Echinococcus*). Poultry tapeworms (*Davainea*, *Cotugnia*, *Raillietina*, *Amoebotaenia*, *Choanotaenia* and *Hymenolepis*). Broad fish tapeworm (*Diphyllbothrium*) and *Spirometra*.

#### **UNIT-3 (NEMATODES OF VETERINARY IMPORTANCE)**

Nematodes: Introduction, general account and classification, general life cycle of nematodes with morphological features of their developmental stages. Important morphological features, life cycles, modes of transmission, pathogenesis, epidemiology, diagnosis and management of the following nematode parasites: *Ascaris*, *Parascaris*, *Toxocara*, *Toxascaris*, *Ascaridia*, *Heterakis* and *Oxyuris*.



*Strongyloides, Strongylus, Chabertia, Syngamus* and *Oesophagostomum*.

Kidney worms (*Stephanurus* and *Diectophyma*), hook worms (*Ancylostoma* and *Bunostomum*).

*Trichostrongylus, Ostertagia, Cooperia, Nematodirus, Haemonchus* and *Mecistocirrus. Habronema, Draschia, Thelazia, Spirocerca, Gongylonema, Physaloptera* and *Gnathostoma. Dirofilaria, Parafilaria, Onchocerca, Setaria* and *Stephanofilaria*. Lung worms (*Dictyocaulus, Muellerius, Protostrongylus* and *Metastrongylus*). Guinea worm (*Dracunculus*), *Trichinella, Trichuris, Capillaria. Acanthocephala (Macracanthorhynchus)*. Study of anthelmintic resistance and its types.

#### **UNIT-4 (ARTHROPODS OF VETERINARY IMPORTANCE)**

Arthropods: Introduction, general account and classification, general life cycle of arthropods with morphological features of their developmental stages. Important morphological features, general bionomics, life cycle, vector potentiality, pathogenesis and control of following arthropods affecting animals and birds: Bugs (*Cimex*). Biting midges (*Culicoides*), black flies (*Simulium*), sandflies (*Phlebotomus*), mosquitoes (*Culex, Anopheles* and *Aedes*). Horse flies (*Tabanus*), *Haematopota* and *Chrysops. Musca, Stomoxys, Haematobia* and *Sarcophaga*. Warbles (*Hypoderma*), stomach bots (*Gasterophilus, Cobboldia*), nasal bots (*Oestrus ovis, Cephalopina*), Bottle flies (*Calliphora, Lucilia, Chrysomya*), myiasis. *Hippobosca, Melophagus, Pseudolynchia*. Lice (*Haematopinus, Linognathus, Trichodectes, Damalinia, Menopon, Lipeurus, Menacanthus* and *Heterodoxus*). Fleas (*Ctenocephalides, Echidnophaga, Xenopsylla, Pulex*). Arachnids : General account, soft ticks (*Argas, Ornithodoros* and *Otobius*). Hard ticks (*Hyalomma, Haemaphysalis, Rhipicephalus (Boophilus), Dermacentor, Ixodes* and *Amblyomma*). Mites (*Dermanyssus, Ornithonyssus, Demodex, Notoedres, Sarcoptes, Psoroptes, Chorioptes, Cnemidocoptes* and *Otodectes*). Pentasomida (*Linguatula*). Study of insecticide or acaricide resistance.

#### **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 immuno-prophylaxis) of the following protozoan parasites of veterinary and zoonotic importance : *Leishmania* (Visceral and cutaneous leishmanosis), *Trypanosoma (T. evansi, T. theileri, T. equiperdum)*. *Trichomonas* (Bovine and avian trichomonosis). *Histomonas* (Black head in turkeys). *Entamoeba, Giardia* and *Balantidium* spp, Coccidia and coccidiosis 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*). Piroplasms (*Babesia, 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/oocysts/ortrophozoites. 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 haemoprotozoan parasites. 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)**

Study of morphological characters of adults and developmental stages of the following trematodes and cestodes: *Fasciola*, *Fasciolopsis*, *Dicrocoelium*, *Opisthorchis*, *Schistosoma*, *Paragonimus*, *Prosthogonimus*, Echinostomes, Paramphistomes (*Paramphistomum*, *Cotylophoron*, *Gigantocotyle*, *Gastrothylax*, *Fischoederius*, *Gastrodiscus*, *Gastrodiscoides* and *Pseudodiscus*). *Anoplocephala*, *Paranoplocephala*, *Moniezia*, *Avitellina*, *Stilesia*, *Davainea*, *Cotugnia*, *Railletina*, *Amoebotaenia*, *Choanotaenia*, *Hymenolepis*, *Dipylidium*, *Taenia*, *Echinococcus*, *Diphyllbothrium* and *Spirometra*. Demonstration of gross and microscopic lesions of parasites.

## **UNIT-3 (NEMATODES OF VETERINARY IMPORTANCE)**

Study of morphological characters of adults and developmental stages of the following nematodes : *Ascaris*, *Parascaris*, *Toxocara*, *Toxascaris*, *Ascaridia*, *Heterakis*, *Oxyuris*, *Strongyloides*, *Strongylus*, *Chabertia*, *Syngamus* and *Oesophagostomum*. *Stephanurus*, *Diectophyma*, *Ancylostoma*, *Bunostomum*, *Ostertagia*, *Trichostrongylus*, *Cooperia*, *Nematodirus*, *Haemonchus* and *Mecistocirrus*. *Habronema*, *Draschia*, *Thelazia*, *Spirocerca*, *Gongylonema*, *Physaloptera*, *Gnathostoma*, *Dirofilaria*, *Parafilaria*, *Onchocerca*, *Setaria*, *Stephanofilaria*, *Dictyocaulus*, *Muellerius*, *Protostrongylus*, *Metastrongylus*, *Dracunculus*, *Trichinella*, *Trichuris*, *Capillaria* and *Macracanthorhynchus*. Demonstration of gross and microscopic lesions of parasites.

## **UNIT-4 (ARTHROPODS OF VETERINARY IMPORTANCE)**

Study of morphological characters of adults and life cycle stages of the following arthropods : *Culicoides*, *Simulium*, *Phlebotomus*, *Cimex*, *Culex*, *Anopheles*, *Aedes*, *Tabanus*, *Haematopota* and *Chrysops*. *Musca*, *Stomoxys*, *Haematobia*, *Gasterophilus*, *Hypoderma*, *Oestrus ovis*, bottle flies, *Sarcophaga*, *Hippobosca*, *Melophagus* and *Pseudolynchia*. *Trichodectes*, *Menopon*, *Menacanthus*, *Lipeurus*, *Haematopinus*, *Linognathus* and *Damalinia*. *Xenopsylla*, *Ctenocephalides* and *Echidnophaga*. *Argas*, *Ornithodoros*, *Otobius*, *Ixodes*, *Hyalomma*, *Rhipicephalus* (*Boophilus*), *Haemaphysalis*, *Dermacentor* and *Amblyomma*. *Dermanyssus*, *Ornithonyssus*, *Demodex*, *Notoedres*, *Sarcoptes*, *Psoroptes*, *Chorioptes*, *Cnemidocoptes*, *Otodectes* and *Pentastomida*. Demonstration of gross and microscopic lesions of parasites.

## **UNIT-5 (PROTOZOA OF VETERINARY IMPORTANCE)**

Study of morphological characters of different stages of following protozoan parasites: *Leishmania*, *Trypanosoma*, *Trichomonas*, *Histomonas*, *Entamoeba*, *Balantidium*, *Giardia*, *Eimeria*, *Isospora*,

*Sarcocystis*, *Toxoplasma* and *Cryptosporidium*.

*Plasmodium*, *Haemoproteus* and *Leucocytozoon*. *Babesia*, *Theileria* and *Hepatozoon*, Rickettsial organism *Anaplasma* and *Ehrlichia*. Demonstration of formol ether and Ziehl-Neelson's staining techniques and other faecal examination techniques. Diagnosis of intestinal protozoan infections by iodine and eosin stain methods. Demonstration of gross and microscopic lesions due to protozoan parasites. Demonstration of *Haemoproteus columbae* in the blood. Demonstration of sporulation for diagnosis of coccidian parasites.

#### ANNUAL EXAMINATION

PAPERS	UNITS	MAXIMUM MARKS	WEIGHTAGE
THEORY			
Paper-I	1, 2 and 3	100	20
Paper-II	4 and 5	100	20
PRACTICAL			
Paper-I	1, 2 and 3	60	20
Paper - II	4 and 5	60	20

#### (xi) DEPARTMENT OF LIVESTOCK PRODUCTS TECHNOLOGY

##### LIVESTOCK PRODUCTS TECHNOLOGY

**Credit Hours: 2+1=3**

##### THEORY

##### UNIT-1 (MILK AND MILK PRODUCTS TECHNOLOGY)

Retrospect and prospects of milk industry in India. Layout of milk processing plant and its management. Composition and nutritive value of milk and factors affecting composition of milk. Physico-chemical properties of milk. Microbiological deterioration of milk and milk products. Collection, chilling, standardization, pasteurization, UHT treatment, homogenization, bacteriophage. Dried, dehydrated and fermented milk. Introduction to functional milk products. Preparation of cream, butter, paneer or channa, ghee, khoa, lassi, dahi, ice-cream, mozzarella cheese and dairy byproducts. Common defects of milk products and their remedial measures. Packaging, transportation, storage and distribution of milk and milk products. Good manufacturing practices and implementation of HACCP in milk plant. Organic milk products. Food safety standards for milk and milk products. Cleaning and sanitation in milk plant. Dairy effluent management

##### 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)

Layout and management of rural, urban and modern abattoirs. HACCP concepts in abattoir management. FSSAI standards on organization and layout of abattoirs. Animal welfare and pre-slaughter

care, handling and transport of meat animals including poultry.

Procedures of Ante-mortem and post mortem examination of meat animals. Slaughtering and dressing of meat animals and birds. Emergency and casualty slaughter. Evaluation, grading and fabrication of dressed carcasses including poultry. Abattoir byproducts; rendering, meat, bone, glue, gelatin, fat and byproducts of pharmaceutical value. Skin and hides; methods of flaying, defects, preservation and tanning. Treatment of condemned meat and carcasses. Management of effluent emanating from abattoir.

#### **UNIT-4 (MEAT SCIENCE)**

Prospect of meat industry in India. Structure and composition of muscle (including poultry muscle). Conversion of muscle to meat. Nutritive value of meat. Fraudulent substitution of meat. Preservation of meat and poultry; drying, salting, curing, smoking, chilling, freezing, canning, irradiation and chemicals. Ageing of meat. Modern processing technologies of meat and meat products. Packaging of meat and meat products. Formulation and development of meat; kabab, sausages, meat balls or patties, tandoori chicken, soup, pickles. Fermentation of meat products. Physico-chemical and microbiological quality of meat and their products. Basics of sensory evaluation of meat products. Nutritive value, preservation, packaging of egg and egg products. Laws governing national or international trade in meat and meat products. Organic and genetically modified meat and poultry products.

#### **PRACTICAL**

#### **UNIT-1 (MILK AND MILK PRODUCTS TECHNOLOGY)**

Sampling of milk. Estimation of fat, solid not fat (SNF) and total solids. Platform tests. Cream separation. Detection of adulteration of milk. Determination of efficiency of pasteurization. Preparation of milk products like ghee, paneer or channa, khoa, ice-cream or kulfi, milk beverages. Visit to modern milk processing and milk products manufacturing plants.

#### **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 slaughterhouses or meat plants.

#### **UNIT-4 (MEAT SCIENCE)**

Packaging of meat, poultry and shell eggs and their products. Estimation of deteriorative changes in meat and meat products. Preparation of comminuted and non comminuted meat and poultry products. Evaluation of external and internal egg quality and preservation technique of eggs

<b>ANNUAL EXAMINATION</b>			
<b>PAPERS</b>	<b>UNITS</b>	<b>MAXIMUM MARKS</b>	<b>WEIGHTAGE</b>
<b>THEORY</b>			
Paper-I	1 and 2	100	20
Paper-II	3 and 4	100	20
<b>PRACTICAL</b>			
Paper-I	1 and 2	60	20
Paper-II	3 and 4	60	20

**(xii) 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)**

History of domestication and their social dimensions. Evolution and relationship between agriculture and animal husbandry. Farming and characteristics of farming in India. Classification of farming, types and systems. Peasant farming, cooperative farming, collective farming, contract farming, estate farming, organic farming, capitalistic farming, small-scale farming, large-scale farming, intensive, extensive farming, specialized, diversified, mixed, integrated and dry land farming. Role of animals in the contemporary society.

**UNIT-2 (EXTENSION EDUCATION AND DEVELOPMENT)**

Early extension efforts in India. Types of education: Formal, non-formal and informal education. Extension education: Concept, levels, objectives and dimensions. Principles, philosophy and functions of extension education. Teaching-learning process and steps in extension teaching. Concept of need and its types. Rural development - Concept, significance and importance of rural development programmes for poverty alleviation. Problems and Issues in development. Panchayati Raj System.

**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)**

Technology- Concept, generation process, application, merits and de-merits. Adoption and diffusion of innovations, stages of adoption, adopter categories, innovation decision process, attributes of innovations, diffusion process, factors affecting adoption and diffusion processes. Programme planning- principles, objectives and steps. Evaluation of extension programme, constraints in the adoption of scientific animal husbandry practices. Role of extension agents in diffusion of livestock innovations. Cattle and buffalo improvement programmes: Key Village Scheme, Intensive Cattle Development Project, Gosadan and Gaushala. Dairy development programmes: concept of cooperation, Rochdale principles of cooperation, objectives of cooperative, Amul pattern of dairy cooperative system and Operation Flood. Transfer of technology projects of Indian Council of Agricultural Research (ICAR): Krishi Vigyan Kendra (KVK), Agricultural Technology Information Centre (ATIC), Agricultural Technology Management Agency (ATMA), National Agricultural Innovation Project (NAIP), Rashtriya Krishi Vikas Yojana (RKVY) etc. Different ongoing central and state government animal husbandry development programmes being run related to sheep, goat, poultry, piggyery, fodder production etc.

#### **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)**

Definition of entrepreneur, entrepreneurship, enterprise and manager. Difference between entrepreneur and entrepreneurship, entrepreneur and enterprise, entrepreneur and manager. Theories of entrepreneurship: Sociological theory, economic theory, cultural theory, psychological theory. Types, characteristics and functions of an entrepreneur. Forms of entrepreneurship: (Sole proprietorship, partnership, corporation, cooperative, joint stock company, Private and Public Limited Company). Introduction to financial management: concept, function, analysis of financial statement, sources of capital (banks, venture capitals, etc.). Project appraisal- Introduction, importance, techno-economic feasibility, criteria of project evaluation (discounted and non-discounted), capital budgeting, etc. Business plan for enterprise. Institutions promoting entrepreneurship in India. Entrepreneurship development programmes. Accounting: objectives, common terms. Personnel management-identification of work, job analysis, division of labour etc. Resource management- organization aspect of livestock farms, resources and procurement of inputs and financial resources, break-even- analysis etc.

### **UNIT-8 (INFORMATION AND COMMUNICATION TECHNOLOGY)**

Strengths and limitations of ICTs application in livestock sector and farmers capacity building. Information kiosk, E-learning, 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 audio-visual 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.

**UNIT-2** Rules of debit and credit in livestock business transactions. Journal Entry and Ledger Posting.

Writing of Cash Book. Balancing and preparation of final accounts. Exercise on calculation of depreciation. Visit to commercial enterprises of livestock production. Preparation of dairy entrepreneurial project report. Preparation of sheep and goat entrepreneurial project report. Preparation of poultry entrepreneurial project report. Preparation of piggery or rabbit entrepreneurial project report. Techno-economic feasibility report. Exercise on Break-even analysis. Exercise on BCR, IRR and NPW. Case study of successful entrepreneurial project. Visit to livestock market. Visit to livestock fair. Exercise on economics of diseases

#### **ANNUAL EXAMINATION**

<b>PAPERS</b>	<b>UNITS</b>	<b>MAXIMUM MARKS</b>	<b>WEIGHTAGE</b>
<b>THEORY</b>			
Paper-I	1, 2, 3, 4 and 5	100	20
Paper-II	6, 7, 8 and 9	100	20
<b>PRACTICAL</b>			
Paper-I	1	60	20
Paper - II	2	60	20

#### **(xiii) VETERINARY CLINICAL COMPLEX (VCC)**

##### **VETERINARY CLINICAL PRACTICES-I (Third year)**

**Credit Hours: 0+1**

Orientation and understanding the working of Veterinary Clinics including hospital set up, administration and work force management. Doctor client interaction, Orientation to local language or dialect or local terminology of the diseases. Registration, filling up registration cards, history taking, handling and restraining of animals. Preliminary clinical examination such as recording of temperature, respiration, pulse, motility of digestive system etc. Familiarization and practice of first aid procedures. Practice of collection, labeling, packaging and storage of laboratory samples. Preparation and sterilization of surgical packs, instruments, drapes and operation theaters. Familiarisation with antiseptic dressing techniques and bandaging.

##### **VETERINARY CLINICAL PRACTICES-II (Fourth year)**

**Credit Hours: 0+6**

The students shall be Imparted the trainings on rotation basis in the following sections of Veterinary Clinical Complex (VCC):

##### **Ambulatory Section:**

Each Veterinary college should adopt five villages where in the health, production and treatment part should be taken care of in a holistic manner. Handling, examination, diagnosis and treatment of sick animals



in the field conditions under the supervision of faculty.

Ambulatory Clinics shall be operated by small groups of students and faculty of clinical departments through an equipped ambulatory mobile unit.

### **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 reticulo-peritonitis, traumatic pericarditis, pneumonia, haemoglobinuria, 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 casualties and other emergencies in the clinics. Learning and practicing passing of stomach and naso-gastric 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, Ophthalmoscope 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 placenta or 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**

Familiarization and understanding the use of equipments used in surgical sections of the VCC. Restraining and positioning of different species of animals for examinations, diagnosis and surgical treatment. Prescription of common drugs, their doses and uses in clinical surgical practice. Filling of clinical case records and their maintenance. Preparation and sterilization of surgical packs, instruments, drapes and operation theaters. Passing of stomach tube and gastric tube. Catheterization and urine collection. Techniques of examination of neuromuscular and skeletal functions, Familiarisation with antiseptic dressing techniques, bandaging, abdomino-centesis, thoracocentesis. Topography anatomy of animals. Radiographic positioning, terminology and interpretation. Treatment and Management of various surgical conditions including inflammation, wounds, abscess, cysts, tumors, hernia, haematoma, hemorrhage, sinus, fistula, necrosis, gangrene, burn, sprain, tendinitis etc. Management and treatment of fractures, dislocations and other affections

of joints, facial paralysis, Eye worm and other affections of Eye.

Irregular teeth and their rasping, tail amputation, knuckling, upward fixation of patella (medical patellar desmotomy) etc. Familiarisation with the landmarks for the approach to various visceral organs, thoraco-centesis, abdominocentesis. Rumenotomy, laparotomy, palpation and visualisation of viscera, urethrotomy, castration, vasectomy, caudectomy, thoracotomy, cystotomy, cystorraphy and splenectomy. Examination of horse for soundness, lameness and preparation of certificate for soundness. Tenotomies, suturing of tendon, shortening of tendon.

### **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. Restraining 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

(xiv) **LIVESTOCK FARM COMPLEX**

**LIVESTOCK FARM PRACTICES – (Third year)**

**Credit hours : 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

(xv) **DEPARTMENT OF VETERINARY SURGERY AND RADIOLOGY**

**VETERINARY SURGERY AND RADIOLOGY**

**Credit Hours: 2+1**

**THEORY - UNIT-1 (VETERINARY GENERAL SURGERY)**

Introduction: Historical perspective, Definitions, classification of surgery, tenets of Halsted. Pre-operative, intra-operative and post-operative considerations: History taking, physical examination, clinico-pathological testing, intra-operative and postoperative care. Sterilization and disinfection: Definitions, surgical sterilization, various methods of sterilization (Heat, chemical and radiations etc.), disinfections. Sutures: Definitions, suturing, factors influencing suturing, characteristics of an ideal suture material, types of suture material-absorbable and non-absorbable, surgical knots, various suture patterns-apposition, eversion, inversion and special. Treatment of acute and chronic inflammation: Use of anti-inflammatory drugs and proteolytic enzymes. Haemostasis (physical and chemical methods, systemic haemostats, surgical diathermy) Basic surgical affections: Definitions, classification, diagnosis and treatment of abscess, tumour, cyst, hernia, haematoma, necrosis, gangrene, burn and scald, frost bite and surgical affections of muscles, artery and vein, sinus and fistula. Wounds: Definition, classification, examination and diagnosis, general principles for treatment of aseptic, contaminated and septic wounds, healing and factors affecting wound healing, complications of wounds and their remedies. Surgical infection; their prevention and management: Classification of infection, Introduction to biomaterials and stem cell therapy in wound management Management of surgical shock. Principles of fluid therapy in surgical