

Syllabus

1.1 ANIMAL BREEDING AND GENETICS

Aids to selection. Methods of selection. Sire index. Classification of mating systems. Breeding methods. Inbreeding and outbreeding - types, merits, demerits, genetics consequences and their application in animal improvement. Importance of breeding records in farm animals and their standardization. Analysis of breeding records of different livestock and poultry farms and their maintenance. Herd registration. Use of computer in handling and presenting veterinary and livestock data.

1.2 ANIMAL NUTRITION

Importance of grasslands and fodders in livestock production. Various types of fodder crops utilized in the state. Preparation and conservation of green-fodders. Rations for scarcity periods. Anti-nutritional components of feeds and fodders. Requirements and recommended allowances of protein, energy and minerals for maintenance, production and reproduction and feeding schedule for cattle, buffalo, sheep, goat, pig, poultry and dog. Formulation of rations. Balanced and total mixed rations. Therapeutic nutrition.

1.3 LIVESTOCK PRODUCTION AND MANAGEMENT

Role of dairying in India. Dairy development schemes in the country. Common animal husbandry terms. Body conformation and methods of identification. Breeds and economic traits of cattle, buffalo, horse, pig, and camel. Colour and markings (as per RWTCl) of horses. Common vices of cattle, buffalo, sheep, goat, horse, pig, poultry, camel and dogs; their prevention and care. Dentition and ageing of animals. Feeding, care and management of new born, young stock, dry, pregnant and milking cattle, buffalo, horse and pig. Calving, foaling, farrowing and whelping. Castration and dehorning of cattle and buffaloes. Routine dairy farm operations. Dairy farm accounts and records. Rules and regulations regarding transport of livestock by rail, road, air and on foot. Management of animals during transport by different means. Preparation of animals and birds for show. General principles affecting the design and construction of building for housing livestock. Various types of animal houses. Different systems of ventilations, drainages, sewerage disposal techniques, waste diversion for liquid manure, compost, cow dung, gas unit, etc. Importance of sheep and goat production in national and state economy. Different indigenous and exotic breeds of sheep and goats. Feeding, management and breeding of sheep and goat. Ram and buck management. Care of sheep and goat in pregnancy and parturition. Rearing of lambs and kids. Weaning, fattening. Sheep and goat housing. Wool grading. Different breeds and varieties of chicken. Formation, structure and nutritive value of egg. Culling of poultry and effect of culling on egg production. Incubation and hatching of eggs, selection of hatching eggs, handling and care of hatching eggs. Natural and artificial brooding. Different systems of housing of poultry. Floor space requirements, constructional details of poultry houses. Care and Management of chicks, pullets, layers and broilers. Feeds and feeding of broilers and layers. Poultry farm records. Commercial hatcheries and its role in poultry development. Disinfection of farm equipments and poultry houses. Types of common fresh and saline water fish, their collection. Care and breeding, egg and spawn management.

1.4 LIVESTOCK PRODUCTS TECHNOLOGY

Composition of milk. Factors affecting yield and quality of milk. Physical and chemical properties of milk. Principles involved in pasteurization, homogenization and dehydration. Preparation of various concentrated and dehydrated milk products. Preparation of butter, ghee, khoa, lassi,

curd, ice-cream and cheese. Legal and ISI standard of milk and milk products. Detection of adulterants and preservatives in milk and milk products through various tests. Estimation of efficiency of pasteurization through different tests. Bacteriological examination of milk and products for their wholesomeness. Ante-mortem and post-mortem examination of buffalo, sheep, goat, pig and poultry. Utilization of slaughter house by-products, organic wastes available through animal industries, fallen and slaughtered effluent and glandular by-products. Structure, composition, nutritive value, post-mortem changes and eating quality of meat tissues. Fraudulent substitution of meat and its recognition. Principle of various preservation techniques like chilling, freezing curing, smoking, thermal processing, canning and irradiation. Meat cutting, packaging. Microbial and other deteriorative changes in meat and their identification. Standards and quality control measures adopted for meat and meat products in India. Meat food products order. Microbial spoilage of eggs, preservation and maintenance of eggs.

1.5 VETERINARY ANATOMY

Topographic anatomy and gross anatomical structures involved in the clinical examination and surgical interferences of importance in large and small animals. Radiographic anatomy of various regions of domestic animals.

1.6 VETERINARY PHYSIOLOGY AND BIOCHEMISTRY

Physiology of digestion, circulation, respiration and excretion in ruminants and simple stomach animals. Endocrine glands and their hormones –classification. general mode of action and regulation of hormones. Structural and functional organization of mammary glands, hormonal control of mammary growth, lactogenesis and galactopoiesis. Reaction of animals to different environmental variations and temperature. Central control of heat regulation. Temperature regulation in birds. Metabolism of carbohydrates, lipids and proteins in ruminants and nonruminants. Biochemistry of renal function, acid base balance, stress, shock and digestive disorders. Role of blood sugar, ketone bodies, blood urea nitrogen, proteins, macrominerals and electrolytes as an aid to diagnosis. Role of enzymes for detection of tissue affections/organ affections (scope and limitations).

1.7 VETERINARY MICROBIOLOGY

Development of immune system, humoral and cellular immune responses. Antigens: Definition, specificity, azoprotein, heterophil and blood group antigens. Antibodies: Chemical and physical properties, electrophoresis, structure and function of immunoglobulins. Serological reactions: Introduction to principles and diagnostic applications of agglutination, precipitation, isohaemagglutination, phagocytosis, complement fixation, neutralization, toxin and antitoxin reaction, immunofluorescence. Hypersensitivity-allergy, classification, anaphylaxis and delayed type hypersensitivity, auto-immunity. Disease diagnosis –Polymerase chain reaction (P.C.R.). hybridoma technique, monoclonal antibody and DNA probes. Staining, special staining, cultural characters, aerobic and anaerobic cultivation, biochemical characters, pathogenicity test and antibiogram of bacteria and fungi. Sterilization, disinfection and asepsis.

1.8 VETERINARY PHARMACOLOGY AND TOXICOLOGY

Anticonvulsants, opioid agonists and antagonists, antipyretics, steroids and non-steroidal antiinflammatory drugs. Commonly used emollients, demulcents, stomachics, prokinetics, antiemetics, antiulcer, carminatives, antizymotics, purgatives, antidiarrhoeals, antihypertensives, diuretics, urinary acidifiers, urinary alkalizers, ecboics, cardiac glycosides, vasodilators, coagulants, anticoagulants, antihistaminics, expectorants, mucolytics, antitussives drugs. General approaches to diagnosis and treatment of poisoning. Clinical signs, diagnosis and treatment of toxicities caused by commonly used organophosphates, carbamates, chlorinated hydrocarbons, pyrethroids, herbicides, fungicides, rodenticides, arsenic, lead, fluoride, nitrates,

nitrites, urea, snake venom. Introduction and basic principles of antimicrobial therapy. Classification of antimicrobial drugs, development of resistance and interaction of antibacterials. Sulphonamides, quinolones, beta- lactam antibiotics, aminoglycosides, tetracyclines, amphenicols, macrolides, nitrofurans and other antibacterials. Antifungal, antiviral and antitubercular drugs. Chemotherapy of helminthic and protozoan infections. Antiseptics and disinfectants. Ectoparasiticides and antineoplastic drugs.

1.9 VETERINARY PARASITOLOGY

Classification (names only) of common parasites and parasitic diseases of domestic animals in Punjab. Common diagnostic techniques for different parasitic diseases. Chemoprophylaxis against parasites. Acaricide resistance.

1.10 VETERINARY PATHOLOGY

Etiology, epidemiology, transmission, pathogenesis, clinical findings, clinical pathology, diagnosis, treatment, prevention and control of the following diseases of poultry: Respiratory disease complex, New castle disease, Infectious bronchitis, Infectious laryngotracheitis, Influenza, Duck virus hepatitis, Egg drop syndrome, Fowl pox, Coryza. Avian encephaloemyelitis. Infectious bursal disease, Neoplastic diseases – Mareks disease and Avian leucosis, etc. Salmonellosis- Pullorum disease, Typhoid and Paratyphoid, Pasteurellosis-Fowl cholera, Avian Mycoplasmosis, Chlamydiosis. Coli bacillosis, Spirochaetosis, Fungal infections –Aflatoxicosis, Aspergillosis and Favus. Parasitic infestation caused by Nematodes, Cestodes and Protozoa (blood and gastrointestinal). Nutritional deficiency diseases. Post mortem examination of large animals, small animals and poultry.

1.11 VETERINARY PUBLIC HEALTH

Sources of bacterial contamination of raw milk and method of control. Clean milk production; sources of contamination during collection, transport and processing of milk and methods of control. Milk borne diseases and methods of control. Toxic residues in milk and their health hazards. General principles and elements of meat inspection. Methods of slaughter. Conditions detected at meat inspection and their judgement; characteristics of meats of different food animals; composition, rigor mortis. Differentiation of meat of different food animals. Inspection of poultry, eggs, fish and game animals. Meat borne diseases and methods of control. Examination of lymph nodes and their importance in meat inspection. Role of livestock, pets, various wild and cold blooded animals in transmission of zoonotic diseases. Study of the important zoonotic diseases of the region. Methods of prevention, control and eradication of zoonotic diseases, Method of prevention and control of air and water borne diseases of animals. Stray animal control, fallen animals and environment: radiation, drugs, etc. as source of pollution.

1.12 VETERINARY AND ANIMAL HUSBANDRY EXTENSION

Steps of extension teaching. Classification of extension teaching methods, their selection and use. Client dealing: Communication with rural and urban public for data collection, history taking, follow up, appraisal on prognosis, announcing death of animal to the owner, etc. Various kinds of farming e.g. large and small scale farming, mixed farming, co-operative and collective farming. Economic principles underlying co-operative societies, cooperative milk activities in India. Animal Husbandry planning and programmes, Animal Husbandry administration, Key village scheme, ICDP, Gosadan/Gosala, Panchayati Raj, Integrated Rural Development Programme in Animal Husbandry. Calculation of economics of livestock and poultry farming to know the profitability of the enterprise.

1.13 ANIMAL REPRODUCTION, GYNAECOLOGY AND OBSTETRICS

Development of female genitalia and description of pelvis in domestic animals. Sexual maturity in relation to reproduction. Role of hormones in various phases of reproduction. Oestrous cycle in domestic animals and factors affecting it. Synchronization of oestrous cycle. Ovulation. Transportation of sperms, fertilization and attachment. Development of foetus and foetal membranes. Types and functions of placenta. Gestation, duration and stages of gestation in domestic animals. Superfetation and Superfecundation. Superovulation and embryo transfer. Differential diagnosis of pregnancy. Disease and accidents during gestation. Prolonged gestation. Premature birth. Early embryonic mortality. Abortion in domestic animals. Fetal mummification, maceration, pyometra. Fertility, infertility and sterility. Functional infertility – anoestrus, ovarian hypoplasia, cystic ovary. Fertilization failure and repeat breeding. Infectious infertility – specific and nonspecific infections affecting genital organs. Sexual health control and herd reproductive health programme. Parturition in domestic animals including stages of parturition. Expulsion and retention of after birth. Postpartum diseases and complications (cervicovaginal prolapse, uterine prolapse, vaginitis, cervicitis, metritis, pyometra, postpartum paraplegia). Clinical use of hormones and prostaglandins. Intrauterine presentation of fetus, eutocia, dystokia. Types of dystokia. General handling of dystokia. Diagnosis and treatment of dystokia cases. Obstetrical operations. Mutation and forced extraction. Fetotomy and Caesarean section. Mismating, transmissible venereal tumor and pyometra in bitches. Development and comparative study of male genitalia and gonads. Growth, puberty, sexual maturity, libido. Endocrine control of reproduction in male domestic animals. Factors affecting maturity and sex drive in bulls. Sexual behaviour in males. Forms of male infertility and factors affecting infertility, its diagnosis and treatment. Diseases, abnormalities and malformations of male genitalia, their diagnosis and treatment of coital injury and infections. Testicular hypoplasia and degeneration. Disease of the accessory sex glands. Advantages and limitations of A.I. Methods of semen collection in various species. Technique of A.I. Factors affecting quality and quantity of semen. Tests for evaluation of semen, extension of semen, preservation of semen at different temperatures. Storage and shipment of semen. Semen metabolism. Biochemistry of semen.

1.14 VETERINARY MEDICINE

Etiology, epidemiology, pathogenesis, clinical symptoms, clinical pathology, diagnosis and treatment, prevention and control of the following diseases of cattle, buffaloes, equine, sheep, goat, pigs and pet animals: (A) General systemic states-hyperthermia, hypothermia, fever, septicaemia, toxemia, shock and dehydration; (B) Diseases of (i) digestive system with special reference to rumen dysfunction and diseases of stomach in ruminants and simple stomach animals; (ii) peritoneum, liver and pancreas; (iii) respiratory system; (iv) cardiovascular system including blood and blood forming organs; (v) urinary system; (vi) nervous system; (vii) skin; (viii) musculo-skeletal system; (ix) eye; (x) ear; (xi) neonates: (C) Common neoplasms. Etiology, epidemiology, pathogenesis, clinical symptoms, clinical biochemistry, clinical pathology, diagnosis, treatment, prevention and control of : (A) Metabolic diseases – Milk fever; acute parturient hypocalcaemia in goats, sows and bitches; lactation tetany in mares; downer cow syndrome; ketosis; hypomagnesaemia; nutritional haemoglobinuria in cattle and buffalo; osteodystrophia fibrosa; azoturia in equines; hypothyroidism and diabetes in dogs. (B) Diseases caused due to deficiency of iron, copper, cobalt, zinc, selenium, manganese, calcium, phosphorus, magnesium, vitamins A, B complex, C, D, E and K in domestic animals. Legal duties of veterinarians. Evidence procedure in court Code of conduct and ethics for veterinarians. Common offences against animals and laws related to these offences. Detection

of frauds-doping, alteration of description, bishoping, etc. Legal aspects of: examination of animals for soundness, examination of injuries. Animal insurance. Prevention of Cruelty to Animals Act, 1960 (59 of 1960) and various rules on animal welfare under this Act. The Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009 (salient features). Law relating to generation and disposal of biomedical waste. Causes of sudden death in animals. Signs of death. Post mortem examination of Vetro-legal cases, writing report, collection and despatch of morbid materials to forensic laboratory. Pattern of disease distribution in the community. Periodicity of diseases, occurrence and dynamics of disease transmission. Surveillance and monitoring and forecasting of animal diseases. Investigation of an epidemic, prevention, control and eradication of diseases. Office Internationale Des Epizootics (OIE), its functions, its categorisation of diseases that are transmissible. Etiology, epidemiology, transmission, pathogenesis, clinical findings, clinical pathology, diagnosis, treatment, prevention and control of the following diseases of cattle, horse, pigs, sheep, goats and pet animals: (i) Bacterial diseases- mastitis, joint ill, anthrax, ulcerative lymphangitis, glanders, strangles, black quarter, braxy, tetanus, enterotoxemia, bacillary haemoglobinuria, botulism, colibacillosis, salmonellosis, pasteurellosis, brucellosis, listeriosis, campylobacteriosis (vibriosis), tuberculosis, paratuberculosis, actinomycosis, actinobacillosis, erysipelosis, leptospirosis. Common diseases caused by Ricketts, Pseudomonas, Yersinia, Haemophilus, Bordetella, Moraxella, Mycoplasmas (ii) Viral diseases- Foot and mouth disease, vesicular stomatitis, vesicular exanthema, pox, rinderpest, mucosal disease, malignant head catarrh, ephemeral fever, infectious bovine rhinotracheitis, leucosis, viral pneumonia, calf diarrhoea virus, African horse sickness, African swine fever, rabies, ephemeral fever, pseudorabies, equine encephalomyelitis, infectious equine anemia, equine influenza, papillomatosis, equine abortions, swine & equine influenza, infectious canine hepatitis, parvovirus infection of dogs, canine distemper, transmissible gastroenteritis, sheep pulmonary adenomatosis, Maedi/visna (iii) fungal diseases- ringworm, histoplasmosis, sporotrichosis, candidiasis, cryptococcosis, coccidioidomycosis and mycotoxicosis; (iv) Parasitic diseases of economic importance- amphistomiasis, schistosomiasis, nematodiasis (round worms), verminous bronchitis, echinococcosis, coenurosis, other tapeworm infestations, visceral & cutaneous leishmaniasis, trypanosomiasis, bovine sarcocystosis, toxoplasmosis, babesiosis, theileriasis, anaplasmosis, ectoparasitic infestations (ticks, mange, fleas allergies, myasis).

1.15 VETERINARY SURGERY AND RADIOLOGY

General Surgery: General surgical principles, pre- operative and post operative considerations, Importance of sutures, suturing materials and different knots. Asepsis/antisepsis, their application in veterinary surgery, sterilization of surgical material and instruments. Inflammation, abscess, tumors, cysts, hernia, etc. and their treatments. Wound classification, symptoms, diagnosis, treatments, complication and their prevention and remedies. Hemorrhage and haemostasis, shock, haematoma, necrosis, gangrene, burn and scald, frost bite. Surgical infections their preventions and management. Surgical affections of muscles, artery and vein. Fracture and dislocation and other affections of joints. Anaesthesiology: General considerations, types of anaesthesia, definition and selection of anaesthetics and methods of administration. Local and regional analgesia. Narcosis and premedication in domestic animals. Intravenous anaesthesia, dissociative anaesthesia. Preparation of the patient for anaesthesia. Preparation, evaluation of dose and induction of anaesthesia. General anaesthesia, anesthetic drugs, inhalation anaesthesia, its method of administration in horse, cattle and dog and gadgets for monitoring. Anaesthetic emergencies and remedies. Chemical restraint of wild /zoo animals. CNS stimulants and central muscle relaxants. Radiology: Production and properties of X-rays. Factors influencing production of radiograph (radiographic factors, geometric factors,

photographic factors). Density, detail and contrast. X-ray accessories filters, restrictors, collimator, grid, etc. X-ray film and its processing. Intensifying screen, its use, advantages and disadvantage. Fluoroscopy. Principle of viewing and interpreting X-ray films. Classification and interpretation of radiographic lesions. Contrast radiography: classification, materials used, indications and contra indications. Biological effects of radiation. Radiation hazards and safety measures. Principles of ultrasonography, radiation therapy and physical therapy in veterinary practice. Positioning and radiography of different parts of the body in small and large animals. Surgery: Affections of the lips and cheek, tongue, palate, nose, sinuses, guttural pouch, horn, teeth and salivary glands and their treatment. Affections of neck, esophagus, trachea, pharynx and larynx. Congenital affections of lower jaw and their treatment. Affections of the ear and their treatment. Anatomical considerations and examination of the eye. Surgical affections of conjunctiva, cornea, ciliary's apparatus, lens, traumatic affections of the eye lids, eye, tumors of eye, retinal detachment. Injuries and infections of anterior and posterior chambers. Surgical approaches and general consideration for thoracic surgery. Contusions and fracture of rib, injuries of costal cartilage, fracture of sternum, perforated wounds, sternal fistula, pneumocoele. Surgical approaches to traumatic pericarditis of cattle, heart worm disease in dogs and abdomen in various species of animals. Hernia and its treatment in various species. Surgical affections of the stomach (in dogs and ruminants), intestine, rectum, anal glands, liver, spleen, pancreas, kidney, ureters, urinary bladder, urethra, penis, sheath, testicle, scrotum, udder and tail. Spaying in various species. Lameness, its definition and classifications. Body conformation in relation to lameness, diagnosis of lameness. General methods of therapy. Specific joint diseases in dogs and large animals and their treatment. Application of external and internal immobilization for fracture. Rehabilitation. Shoulder slip (Sweeny), bicipital, bursitis, arthritis, capped elbow, radial paralysis, carpalitis, bent knee, knock knee, hygroma of knee, open knee joint and blemished knee. Fracture of carpal bone and fracture of accessory carpal. Contraction of digital flexors. Splints and sore shin. Tendinitis, wind puffs and seasmoditis. Osslets, ring bones, quittor, side bones, navicular disease, pyramidal disease and fracture of extensor process. Laminitis, sand crack, seedy toe, fracture of third phalanx and pedal osetitis. Canker, thrush and corn. Cording up, myostitis of psosas, iliac thrombosis, crural paralysis, sub luxation of sacro-iliac ligament, rupture of round ligament and trochantric bursitis. Femoral nerve paralysis, upward luxation of patella, stringhalt, gonitis, chondromalacia of patella, fracture of fibula, rupture of tendo achilles and rupture of peroneus tertus. Fibrotic and ossifying myopathy. Thorough pin, bog spavin and curb. Bovine lameness: contusions of sole, ulceration of sole, septic, laminitis, avulsion of hoof and declawing. Interdigital fibroma, cyst, sand crack and hoof deformities. Therapeutic shoes and corrective shoeing. Examination of animals for soundness and preparation of soundness certificate.