Course Curriculum
of

Diploma in Veterinary Pharmacy

College of Veterinary and Animal Sciences
G.B. Pant University of Agriculture and Technology
Pantnagar, Distt- Udham Singh Nagar (Uttarakhand-263145)

Course Curriculum

Semester wise Course Curriculum for Diploma in Veterinary Pharmacy

Semester I

Course No.	Name of the course	Credit Hours
DVP-111	Introduction to Anatomy of Livestock and Poultry	2+1
DVP-112	Introduction to Livestock Management	1+1
DVP-113	Introduction to Livestock Breeds	1+1
DVP-114	Elements of Animal Nutrition and Health	2+1
DVP-115	Basics of Animal Physiology	1+1
DVP-116	Elementary Microbiology	1+1
DVP-117	Introduction to Veterinary Public Health	1+1
	Credit Hours	**9+7**

Semester II

DVP-121	Introduction to Computer and its Application	1+1
DVP-122	Elementary Veterinary Pathology	2+1
DVP-123	Elementary Parasitology	2+1
DVP-124	Elementary Pharmacology	2+1
DVP-125	Introduction to Clinical Biochemistry	1+1
DVP-126	Introduction to Animal Husbandry Extension	1+1
	Credit Hours	**9+6**

Semester III

DVP-211	Introduction to Gynaecology and Obstetrics	1+1
DVP-212	Basic concept of Milk and Meat Products	1+1
DVP-213	Basics of Surgical Procedures and Soundness	2+1
DVP-214	Practice of Veterinary Pharmacy	1+1
DVP-215	Basic Concepts of Pharmacy and Toxicology	2+1
DVP-216	Basics of Veterinary Medicine	2+1
	Credit Hours	**9+6**

Semester IV

DVP-221	Veterinary Pharmacy Jurisprudence	1+0
DVP-222	Practice of Laboratory Diagnosis	1+1
DVP-223	Practice of Ayurvedic Pharmacy	1+1
DVP-224	Practice of Veterinary Hospital Pharmacy	1+1
DVP-225	Basics of Poultry Production	1+1
DVP-226	Acquaintance to Veterinary Hospital and Polyclinics	1+1
DVP-227	Acquaintance to Dairy Operations	1+1
DVP-228	Introduction to Andrology and Artificial Insemination	1+1
Credit Hours		**8+7**

Total Credit Hours **35+26=61**

Internship Programme

1. Students who have passed all the courses of I,II,III and IV semesters and have secured an OGPA of 5.000 or more out of 10.0 will be registered for a 60 calendar days compulsory internship programme.
2. The students shall be engaged at different government hospitals, dairy and poultry farms, zoo and other units of Department of Animal Husbandry, Uttarakhand Government on a rotation basis during the internship programme.
3. The students will be assessed after completion of internship programme by a committee constituted by the Dean, College of Veterinary & Animal Sciences, Pantnagar on the recommendation of the coordinator of the programme.
4. The duration of internship of any student may extend wholly or partially once only for a maximum duration of another 60 days in case of unsatisfactory performance in a component or whole of the internship programme.
5. The student declared pass will be eligible for award of Diploma in Veterinary Pharmacy.

course Syllabus details for the Diploma in Veterinary Pharmacy

Semester I

Introduction to Anatomy of Livestock and Poultry (DVP-111) (2+1)

Theory

Introduction to the structures of musckuloskeletal system, digestive system, respiratory system, uro-genital system, circulatory system and superficial lymph nodes, nervous system including the sense organs of livestock and poultry.

Practical

Demonstration of structures of musculoskeletal system, digestive system, respiratory system, uro-genital system, circulatory system and superficial lymph nodes, nervous system including the sense organs of livestock and poultry.

Introduction to Livestock Management (DVP-112) (1+1)

Theory

Terminology related to Cattle, Buffalo, Sheep, Goat, Equine, Camel and pig management, their classification based on utility. Knowledge about exotic and cross bred cows. Care of animals during and after parturition, housing of animals, calf rearing, care of new born calf, routine management practices like grooming, washing, dipping, casting and shearing, exercising, castration, dehorning and debudding. Raising and feeding of farm animals. Signs of health in different animals. Care of sick animals. Milking management. Control of animal vices. Importance of poultry farming and backyard poultry in rural India. Elementary knowledge of incubation and hatchery management, Management of chicks, growers and layers. Poultry housing and feeding. Vaccination against livestock and poultry diseases.

Practical

External body parts of different animals. Methods of approaching and handling of animals. Milking farm animals. Methods of age judging, grooming, identification, debudding, drenching of animals, casting and restraining of farm animals. Feeding of dairy animals. Methods of recording temperature, pulse and respiration, Record keeping and routine farm operations like incubation and hatching, fumigation, candling, wing banding, leg banding, brooding of chicks; litter management, feed mixing cavitations, debeaking and record keeping. Bio-security measures to prevent the contagious diseases in poultry farming, compost making, cleaning and disinfection of animal house.

Introduction to Livestock Breeds (DVP-113) (1+1)

Theory

Introduction to various breeds of cattle, buffalo, sheep, goat, horse, camel, pigs and poultry. Concepts of their classification with economic characters. Various types of livestock records with their importance. Procedures and objectives of culling. Schemes of livestock improvement in country. Breeding – definition and importance. Variation, sources of variation, implication. System of breeding, in-breeding, close breeding, line breeding, out breeding and cross breeding.

Practical

Identification of breed characters. Maintenance of records including breeding records related to farm and dairy animals. Judging of animals. Procedures for the culling of livestock and poultry. Visit to cattle breeding farms. Analysis of breeding records of different livestock farms. Procedures for the culling of livestock and poultry. Methods of selection of dairy animals and breeding bulls.

Elements of Animal Nutrition and Health (DVP-114) (2+1)

Theory

Composition of animal body and Plants. Nutritional terms and definitions. Carbohydrates their digestion, absorption and metabolism in ruminants. Protein and amino acids, their digestion, absorption and metabolism in ruminants. Lipids and their importance. Importance of vitamins, their deficiency symptoms. Feed additives and probiotics, their uses and abuses. Mineral elements- their functions and deficiency symptoms. Toxic plants. Elementary description of nutrients and their requirements for maintenance, growth, reproduction, lactation, egg production, wool production and work production. General principles of feeding and common practices for different categories of livestock. Preparation, preservation and storage of hay and silage. Common feed and fodder, their classification and identification. Introduction to nutritional deficiency diseases and feeding schedules for farm animals, pets and poultry under stress/ diseases/ deficiency conditions.

Practical

Elementary knowledge of computation of ration for different types of livestock and poultry. Familiarization of various feed stuff, fodder and their selection. Silage and hay making. Elementary knowledge about common nutritional deficiency diseases

Basics of Animal Physiology (DVP-115) (1+1)

Theory

Elementary knowledge of physiological functions of various organs of livestock and poultry. Clinical relevance of physiological parameters. Functional anatomy of digestive tract of monogastric and ruminant animals, prehension, mastication, deglutition, movements of stomach, small intestine and large intestine. Rumination. Defecation. Physiological functions of various organs of animals and poultry. General

function of blood, blood cells, plasma and serum. General physiology of urinary system, general physiology of male and female reproductive system, let down of milk.

Practical

Recording of various physiological parameters of domestic animals and poultry . Estimation of haemoglobin. Counting of RBC, WBC and ESR in blood. Interpretation of physiological parameters. Collection of blood samples from various animals and poultry. Preservation of defibrinated blood. Counting of rumen motility. Physiological constituents of urine - estimation of titrable acidity in urine.

Elementary Microbiology (DVP-116) (1+1)

Theory

Microscopy. Morphology and structure of bacteria, shape, size and arrangement of bacteria, morphological variations. Cultivation of bacteria, Isolation of bacteria in pure culture, cultural characteristics on solid medium, aerobic and anaerobic cultivation and identification of bacteria. Sources of infections. Methods of transmission of infections. Sterilization, disinfection, Introduction to fungi. General properties of virus, source of infection, methods of transmission of infection. Bacterial, fungal and viral diseases.

Practical

Microscopy and routines slide preparation and staining, Preparation and Sterilization of reagents and media. Cultural and morphological characteristics of bacteria and fungi, Sterilization, disinfection, evaluation of disinfectants, asepsis, etc., Equipment and its sterilization. Antibiotic sensitivity test. Sterility testing of pharmaceuticals.

Introduction of Veterinary Public Health (DVP-217) (1+1)

Theory

Definition and terms related to Veterinary Public Health one Health concept and initiatives Sources of Contamination introduction to food hygiene, safety and milk hygiene hygienic and safe milk production practices including steps for prevention and control of milk contamination. Quality control of milk products. Milk hygiene practices in India. Introduction to disaster and biological wastes management.

Practical

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 detection of mastitis milk. Ante-mortem and post-mortem inspection of food animals. Sampling methods for epidemiological studies. Measurement of disease frequencies. 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.

Semester II

Introduction to Computer and its Application (DVP-121) (1+1)

Theory

Basics of computer including components of a computer. Types of computers, Hard ware and soft ware. Types of memories, control units. Inputs and outputs. Execution of a Programme; data types, simple programmes, Use of computer in Epidemiology, use of computer in farm, use of computer in Veterinary Hospital. Graphics.

Practical

Computer basics- key board, function keys, escape key, control key, shift key, underscore key, enter key, cursor, backspace, end, home, Pg up, Pg dn etc. Simple operations/programmes. Saving of data. Entering biological data into computer. Access data, analysis using data base, Retrieving data for printing, print controls. Anova formulation, Basics of networking.

Elementary Veterinary Pathology (DVP-122) (2+1)

Theory

Introduction to Pathology-definitions. Common terminologies of Pathology-health, disease, etiology, pathogenesis, symptoms, sign lesions, diagnosis, incubation period, prognosis morbidity, mortality, autopsy and biopsy. Causes of diseases. Developmental disturbances, anomalies and monsters. Disturbances of circulation. Disturbances of cell metabolism, necrosis, gangrene and post-mortem changes. Disturbances in growth. Inflammation: definition, etiology, classification and cardinal signs. Clinical signs and Pathological lesions of pneumonia, TRP, bloat, diarrhoea, abortions, mastitis; Important bacterial, viral, fungal, parasitic, and toxic disease conditions of animals.

Practical

Gross study of pathological specimens and recognition of gross pathological lesions. Preliminary exposure to post-mortem techniques and collection of morbid materials, techniques of preservation and dispatch. Preparation for post-mortem examination of large animals and small animals. Handling of carcass for post-mortem examination of legal cases. Diagnosis on the basis of post-mortem lesions. Blood collection; Smear making and staining; Basic microscopy. Complete blood count.

Elementary Parasitology (DVP-123) (2+1)

Theory

Introduction of Parasitology, Classification of Parasitology, Types of parasites, Introduction of endo- and ecto -parasites. Economic importance of parasitic diseases of livestock and poultry.; Introduction of diseases caused by protozoa, trematodes, cestodes, nematodes and arthropods in livestock; Parasites of zoonotic importance and

their control. Important insects, Ticks and Mites of Livestock, their life cycle, mode of transmission and control measures.

Practical

Identification and Demonstration of endo-and ecto-parasites; Collection of samples, Preparation of slides from skin, faeces and blood. Faecal examination and demonstration of eggs/oocysts of parasites. Blood and skin scrapping examination. Preparation of blood smears, their staining and examination of slides for haemoprotozoan parasites. Methods of collection, fixation, preservation and mounting of protozoan parasites.

Elementary Pharmacology (DVP-124) (2+1)

Theory

Definitions of Pharmacology, Pharmacy, Chemotherapy, Therapeutics, Toxicology, Posology, Metrology etc. Sources and nature of drugs. Routine Pharmaceutical processes. Various dosage forms with suitable examples. Principles of compounding and dispensing of drugs preparations. Different methods of administration of drugs. Pharmacy-Weights and measures, Apothecary and metric system ; Household measures ; Prescription reading – parts of prescription and commonly used Latin abbreviations in prescription writing ; Therapeutic classification of Indigenous formulations (country medicine), antiseptics and

disinfectants in Veterinary Practice – Definition, examples and therapeutic uses in animals. Antibacterial, antifungal, anthelmintics, antiprotozoal agents their classification and uses.

Practical

Identification of common drugs. Labeling and storage of common drugs. Compounding and dispensing of pharmacy preparations.

Introduction to Clinical Biochemistry (DVP-125) (1+1)

Theory

Basic knowledge of biochemistry of carbohydrates, lipids and proteins and their classification, structure, function and properties. Introduction to biochemical processes in conditions of health and disease as respiration, renal function, stress, shock and digestive disorders. Diagnostic biochemistry- role of blood sugar, ketone bodies, blood urea nitrogen, uric acid in disease diagnosis and enzymes for detection of tissue affections/organ affections.

Practical

Preparation and standardization of acids and alkalis. Determination of pH, preparation of buffers. Basic concepts of spectrophotometry and its application. Qualitative and quantitative tests for identification of carbohydrates, proteins and lipids. Various tests to be conducted on clinical samples viz. urine analysis, estimation of blood sugar, total proteins, cholesterol, bilirubin, blood urea nitrogen, glucose tolerance test and any other relevant tests.

Introduction to Animal Husbandry Extension (DVP- 126) (1+1)

THEORY

Animal Husbandry Extension and rural welfare. Community development and rural sociology. Principle and objectives of veterinary and animal husbandry extension. Qualities of extension workers. Extension teaching methods. Extension programmes. Motivation in extension. Scope of animal husbandry extension. Dairying as an instrument of change in rural India. Communication process. Concept of communication response, empathy, homophily, heterophily, fidelity, perception, communication system.

PRACTICAL

Uses and principles of various audio visual equipments. Use of written literatures. Group discussion and methods of demonstrating various animal husbandry techniques to livestock owners. Need analysis and awareness campaign on different animal husbandry practices. Identification of key communicators. Methods of motivating individuals for various programmes. Principles and uses of LCD, projector and preparation PPT presentation. Organizing vaccination camps, farmers' meets, exhibition at village level. Report writing.

Semester III

Introduction to Gynecology and Obstetrics (DVP-211) (1+1)

Theory

Structure and function of reproductive organs of livestock and poultry. Estrous cycles and reproductive patterns of domestic animals, signs of heat, gestation periods, signs of parturition in domestic animals. Principles and constraints of pregnancy diagnosis, assistance in obstetrical cases. Transport of materials from abortions. Nomenclature of gynaecological and obstetrical conditions. Introduction to infertility and its common causes in livestock.

Practical

Rectal palpation of reproductive organs and pregnancy diagnosis. Sterilization of glass wares/laboratory wares used in intrauterine medication. Use of vaginoscope. Preparation of packs for obstetrical cases. Assistance to parturient animals. Care of new born.

Basics Concepts of Milk and Meat Products (DVP-212) (1+1)

Theory

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, homogenization, bactofugation. Dried, dehydrated and fermented milk. 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. 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. . Packaging of meat and meat products.

Practical

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.

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

Basics of Surgical Procedures and soundness (DVP-213) (2+1)

Theory

Classification and development of veterinary surgery, general surgical principles. Pre-operative and Post-operative care and management, Importance of sutures and suturing material. Introduction to common terms used in surgery. Sterilization in surgical practice. Introduction to superficial surgical ailments (Abscess, Fistula, Sinus, Wounds, Gangrene Cyst Burn and Scald), Haematoma, Tumor, Hernia. Surgical affection of muscles. Wound: classification; symptoms and dressing.

Sign and handling of simples fracture, dislocation and other affections of joints, dental care, hoof management, First aid management of fracture, bloat, haemorrhage and post operative management. Application and use of various antiseptics, lotions, ointments and tinctures in surgical practice.

Practical

Identification of various surgical instruments. Physical restraint of animals for surgery. Preparation of pack for autoclaving and sterilization. Familiarization with various suture materials and sutures. Operation room discipline. Dressing of wounds and bandage. Burdizzo castration, Tattooing, Dehorning, Preparing animals for surgery. Application of counter irritants, heat, cold fomentation. Different kinds of bandages and their applications.

Practice of Veterinary Pharmacy (DVP-214) (1+1)

Theory

Definition and scope of veterinary pharmacy. Principles of compounding and dispensing. Metrology, systems of weights and measures. Pharmacy calculations. Pharmaceutical processes. Pharmaceutical dosage forms. Incompatibilities. Drug standards and regulations.

Practical

Handling and washing of laboratory wares. Handling and operation of commonly used laboratory instruments. Pharmacy fittings appliances. Compounding and dispensing of powders, ointments, mixtures, liniments, lotions, liquors, tinctures, emulsions, and electuaries.

Basic Concepts of Pharmacy and Toxicology (DVP-215) (2+1)

Theory

Introduction to pharmacy. Pharmacy: Fittings and apparatus, labeling, custody of poisons, weighing of drugs, compounding of preparation, meteorology: systems of weights and measures; Pharmacy calculations, pharmaceutical process, incompatibilities, sources and composition of drugs pharmaceutical preparations. Indigenous Drugs: Sources of alkaloids, glycosides, resins, gums, tannins, fixed and volatile oils; plant drugs with proven pharmacological and therapeutic efficacies in various livestock and poultry ailments; popular indigenous drugs (antiseptics, anti-fungals, anthelmintics, arthropod repellents). Definition and terminology of toxicology. Sources of poisoning, mode of action of poisons. Factors modifying the toxicity and care of the poisoned cases.

Practical

Pharmacy Preparations: Potassium permanganate solution, Lugol's iodine solution, trypan blue solution, Gentian violet solution, tincture iodine, tincture benzoin co., boric acid ointment, zinc oxide ointment, ointment of salicylic acid with benzoic acid, triple carb, ant-diarrheal powder, dusting powder, iodine ointment with and without methyl salicylate; red iodide of mercury ointment, mistura alba, carminative mixture, ammonia liniment, turpentine liniment etc. Demonstration of toxic weeds and plants of Uttarakhand; detection of heavy metals and alkaloids, glycosides, tannins, resins etc.

Basics of Veterinary Medicine (DVP-216) (2+1)

Theory

Identification of diseased animals on the basis of various aspect of clinical examinations. Various methods of examinations and detection of abnormalities including vital physiological parameters . Methods of injection of drugs, sera, vaccine etc. Use of canula, passing of stomach tube, probang, teat syphon and other instruments for treatment, classification of diseases on the basis of etiology, system/organ involved, distribution pattern. General agents responsible for causing diseases-Bacteria, Viruses, Fungi and Parasites; systemic diseases, metabolic diseases and diseases of skin. General principles of prevention and control of diseases. Drug delivery system i.e. topical oral parenteral.

Practical

Identification of sick animals, collection, handling and transportation of biological samples for disease diagnosis; Collection and processing of blood, urine, faeces, skin scraping and milk for examination. Collection, preservation, fixation and dispatch of morbid material for laboratory examination. Therapeutic evaluation of drug on the basis of therapeutic efficacy/response.

Semester IV

Veterinary Pharmacy Jurisprudence (DVP-221) (1+0)

Theory

Origin and nature of pharmaceutical legislations in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the Health care system. Principles and significance of professional ethics. Pharmacy Act, 1948.The Drugs and Cosmetic Act, 1940.The powers of Inspectors, the sampling procedures and the procedures and formalities in obtaining licenses under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C,C1,F,G,J,H,P and X and salient features of labeling and storage conditions of drug. Poison Act 1919 (as amended to date). Provisions in the Indian Penal Code, 1860 (45 of 1860), relating to animals. Provincial and Central Acts relating to animals. Glanders and Farcy Act 1899 (13 of 1899), Dourine Act 1910 (5 of 1910), Prevention of Cruelty to Animals Act, 1960 (59 of 1960). Laws relating to offences affecting Public Health. Laws relating to poisons; Laws relating to adulteration of drugs. Livestock Importation Act. Evidence, Liability and Insurance.

Practice of Laboratory Diagnosis (DVP-222) (1+1)

Theory

Importance of clinical pathology in confirmation of disease, and their value as legal evidence. Diseases that can be confirmed/ substantiated through haematological examination. Diseases that can be confirmed through urine and other body fluid examination. Basic concepts of hepatic and renal function tests.

Practical

Collection, preservation and processing of the biological samples for diagnosis of animal diseases. Clinical examination of blood and urine of diseased animals and principles of interpretation of results. Analyzing and correlating with clinical findings and interpreting the results.

Practice of Ayurvedic Pharmacy (DVP-223) (1+1)

Theory

Introduction to Ayurvedic Pharmacy Practices- definitions and scope; drug interactions, Drugs in clinical toxicity, bioavailability of drugs. Pharmacy preparation and their application in the veterinary hospital. Preparation and uses of country medicines.

Practical

Identification of Medicinal plants of Uttarakhand. Preparation of Herbal Medicaments for the treatment of animal disease. Preparation of country medicines.

Practice of Veterinary Hospital Pharmacy (DVP-224) (1+1)

Theory

Metrology, Maintenance of various records of veterinary hospital. Custody of drugs and poisons. Preparation and compilation of various reports of hospitals. Data recording and analysis. Acquaintance to instruments and their management and utilization. Maintenance of various medicines, preparations and their uses.

Practical

Dispensary Management. Animal housing and sanitation. Handling of sick animals; Medication; Post-operative care of surgical patients, Vaccination; Semen handling; Artificial insemination and Pregnancy diagnosis etc.

Basics of Poultry Production (DVP-225) (1+1)

Theory

Brief outline of poultry statistics. Classification of poultry with respect to production characters, age and standards. Production characters of various poultry breeds. Description of indigenous fowls and their value in rural farming. Housing, feeding and management of chicks, broilers and laying birds. Rural poultry production; back yard poultry in rural eco-system. Introduction to health care for common poultry diseases – vaccination. General principles of poultry medication.

Practical

Identification of common breeds of poultry, Indian chickens and other avian species breeds. Economic traits of egg-type chicken and breeders.AI in poultry. Housing and design of a poultry farm. Poultry farm equipment and their classification. Brooding arrangement in broiler farms. Poultry feed ingredients and its quality assessment. Poultry feed preparations. Calculation of different economic indices of broiler farm. Calculation of economic indices of layer farm. Collection and dispatch of samples for PM examination. Management during Summer, Winter and Rainy season. Automization in poultry farms.

Acquaintance to Veterinary Hospital and Polyclinics (DVP-226) (1+1)

Theory

Recording of temperature, pulse and respiration. Methods of drug administration. Methods of drug administration. Practice of compounding and dispensing various drugs. Use of trocar and canula, stomach tube and probang. Action and uses of various pharmacy preparation. Sterilization of instruments etc. Introduction to X-ray procedure.

Practical

Practice of recording of temperature, pulse and respiration. Practice of administration of drugs. Methods of drug administration. Administration drugs. Intra-mammary infusions. Dressing of wounds. Preparation of commonly used ointments, tinctures, lotions/solutions etc. Acquaintance with various gynaecological and surgical

instruments with their uses: Sterilization of instruments etc.: Demonstration of gynaecological and surgical problems; Preparation and handling of surgical pack; Introduction to X-ray procedure; Collection of clinical material for laboratory examination; Burdizzo castration of calf, sheep and goat.

Acquaintance to Dairy Operations (DVP-227) (1+1)

Theory

Introduction to housing systems, layout and design of different buildings for animals. Basic principles of design and construction of building for housing for various livestock species with special reference to Uttarakhand. Utilization of local materials. Identification of important breeds of cattle and buffalo. Economic traits of cattle and buffaloes. General bulls and working animals. Raising of buffalo males for meat production. Importance of grasslands and fodder in livestock production.

Practical

Routine animal farm operations and labour management. Animal farm accounts and records. Methods of milking and precautions. Preparation and maintenance of dairy records. Routine work of dairy farms and keeping of records. Preparation and compilation of various reports and performa.

Introduction to Andrology and Artificial Insemination (DVP-228) (1+1)

Theory

Growth, puberty, sexual maturity, libido. Factors affecting maturity and sex drive in bulls. Sexual behaviour in males. Forms of male infertility. General considerations. Factors affecting infertility in male. Diseases, abnormalities and malformations of male genitalia, their diagnosis and prevention of coital injury and infections. Introduction, history, development, 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.

Practical

Preparation of artificial vagina., collection of semen, evaluation, dilution, preservation techniques at different temperatures. Freezing of semen. Insemination techniques using liquid and frozen semen. Planning and organization of A.I. centre. Selection, care, training and maintenance of breeding bulls for A.I., recording systems. Care, sterilization, storage and upkeep of equipments used for artificial insemination.