

SEMESTER – I

COURSE NO.	COURSE TITLE	CREDIT HOURS
VAN-111	Veterinary Gross Anatomy-I (Osteology, Arthrology & Biomechanics)	1+2=3
VPB-111	Veterinary Physiology-I (Blood, Cardiovascular & Excretory Systems, Body Fluids)	2+1=3
VPB-112	General Veterinary Biochemistry	1+1=2
LPM-111	Livestock Production Management-I (General Principles and Ruminants)	3+1=4
AGB-111	Biostatistics and Computer Application	2+1=3
ANN-111	Principles of Animal Nutrition & Feed Technology	2+1=3
Total Credit		11+7=18

VAN-111 VETERINARY GROSS ANATOMY-I (Osteology, Arthrology and Biomechanics)

Credit hours 1+2=3

THEORY

Osteology: Definition of the terms used in Veterinary Anatomy in general and osteology in particular. Classification, physical properties and structure of bones, Gross study of bones of appendicular and axial skeleton of Ox / Buffalo as type species and comparison with Sheep / Goat, Pig, Horse, Dog and Fowl with particular emphasis on their topography, contour, landmarks and functional anatomy from clinical and production point of view. Detail study of bones of head, neck, thorax, abdomen, pelvis, tail, fore limb and hind limb.

Arthrology: Classification and structure of joints. Articulation and ligaments of head, neck, thorax abdomen, pelvis, tail, fore limb and hind limb of Ox / Buffalo as type species, their structure, functional anatomy and comparison with other domestic animals from clinical and production point of view.

Biomechanics: Biomechanics and its application with reference to quadruped locomotion, kinetics of locomotion, stress and strains falling on locomotor apparatus, landmarks, angulation and weight bearing bones of ox, buffalo and comparison with other animals particularly horse and dog.

PRACTICAL

Comparative study of the bones of appendicular and axial skeleton, their structure, landmarks, angulation, weight bearing and function in Ox/ Buffalo and comparison with that of Sheep/Goat, Pig, Horse, Dog and Fowl and relate them in live animals. Dissection of joints of all the body regions of Ox/ Buffalo to study the structure and function and comparison with other domestic animals. Biomechanics and kinetics of locomotion.

VPB -111 VETERINARY PHYSIOLOGY –I (Blood, Cardiovascular, Excretory system and Body Fluids)

Credit Hours: 2+1=3

THEORY

Introduction to Blood; Properties of blood as a body fluid, metabolism and fate of R.B.C; Hemoglobin-chemical structure, synthesis, physiological functions, derivatives of hemoglobin; Anemia; Plasma proteins, lipids -origin and function; Coagulation mechanisms and regulation of haemostasis; fibrinolysis; anticoagulation mechanism. Blood pH, Wood volume and their determination. Osmotic fragility, erythrocyte sedimentation rate, haemcrit and haemolysis; Leucocyte- phagocytic and immunogenic functions.

Heart- morphological characteristic, systemic excitability conduction & transmission processes. Cardiac Cycle:-Regulation of cardiac output; coronary circulation; properties of pulse; metabolism & energetic of working myocardial cell, extrinsic and intrinsic regulation; ECG and its significance in Veterinary Sciences - Echocardiography.

Haemodynamics of circulation, circulatory mechanics, resistance to flow, vasoconstriction, nervous and circulating fluid volume controls of blood pressure, neurohormonal control of vascular smooth muscle. Circulatory controls- shock stresses, regional and fetal circulations. Capillary exchange, control of blood pressure. Adjustments of circulation during exercise.

Kidney:- Functional morphology of nephron, factors determining filtration pressure, determination of glomerular filtration rate (GFR) and renal plasma flow -Reabsorption mechanisms for glucose, protein, amino acids, electrolytes; ammonium mechanism, glomerulotubular balance, methods of studying renal functions; urine concentration; micturition, uraemia. Fluid, water balance, fluid therapy, dehydration, water concentration mechanisms. Acid base balance and H⁺ regulation, correction and evolution of imbalances, total osmotic pressure, potassium balance, electrolyte and water imbalances, thirst Formation and excretion of urine in Birds.

Cerebrospinal fluid, synovial fluids -composition, formation and flow; Joints. Regulations of bone metabolism and homeostasis.

PRACTICAL

Collection of blood samples - Separation of serum and plasma - Preservation of defibrinated blood -enumeration of erythrocytes, leucocytes - differential leucocytic count -platelet count -estimation of hemoglobin -haemotocrit - erythrocyte sedimentation rate - packed cell volume - coagulation time -bleeding time - Erythrocyte fragility and viscosity - blood grouping -recording of ECG -measurement of arterial blood pressure (Sphygmomanometry). Recording of cardiogram of frog heart- Study the effect of heat and cold on heat -effect of vagus stimuli on heat – vagal escape - factors affecting blood flow through blood vessels- urine analysis -physiological constituents, pathological determinates, determined of GFR. Titerable acidity, determination of inorganic phosphorus, urine ammonia and creatinine in urine.

THEORY

Scope and importance of biochemistry. Structure of biological membranes and transport across membranes. Donnan membrane equilibrium. Dissociation of acids, pH, buffer systems, Henderson-Hasselbalch equation.

Biochemistry of carbohydrates: Biological significance of important Monosaccharides (ribose, glucose, fructose, galactose, mannose and amino sugars), Disaccharides (maltose, isomaltose, lactose, sucrose & cellobiose), Polysaccharides, (starch, dextrans, glycogen, cellulose, insulin, chitin), and Mucopolysaccharides including bacterial cell wall polysaccharides.

Biochemistry of lipids: Properties and biological significance of simple, compound and derived lipids and lipoproteins. Structure and functions of prostaglandins. Chemistry of bile and bile acids.

Biochemistry of proteins: Structure, properties and biological significance of proteins. Amino acids: classification and structure of neutral, basic and acidic amino acids. Properties of amino acids: amphoteric nature, optical activity, and peptide bond formation. Chemical reactions of proteins.

Biochemistry of nucleic acids: Chemistry of purines, pyrimidines, nucleosides and nucleotides. Biological significance of nucleosides & nucleotides. Structures and functions of deoxyribonucleic acid (DNA) and a typical ribonucleic acid (RNA).

PRACTICAL

Concentration of solutions - System international (S.I.) Units. Preparation/standardization of acids & alkalies. Preparation of buffers and determination of pH. Titration curve of acid versus base. Reactions of mono-, di-, and polysaccharides and their identification. Estimation of lactose in milk Determination of acid number of an oil. Colour reactions of proteins. Precipitation reactions of proteins. Estimation of aminoacids (Sorensen's method)

LPM-111 LIVESTOCK PRODUCTION MANAGEMENT-I (GENERAL PRINCIPLES AND RUMINANTS)**Credit Hours 3+1=4****THEORY**

Livestock in India- association of livestock to Indian society during vedic, medieval and modern era. Demographic distribution of livestock and role in economy. Animal holding and land holding patterns in different agro-ecologies.

Introductory animal husbandry. Common animal husbandry terms. Body conformation and identification. Dentition and ageing of animals. Transport of livestock by rail, road, air and on foot. Common farm management practices including disinfection, isolation, quarantine and disposal of carcass. Introduction to methods of drug administration. Common vices of animals, their prevention and care. Livestock production systems of different agro-climatic zones. Livestock resources and resources management Livestock produce and products and their availability and their role in rural/urban hearth/economy. Organic livestock production. General principles affecting the design and construction of building for housing for various livestock species. Selection of site. Arrangements of the building with special reference to Indian conditions. Utilisation of local materials. Building materials used for construction of wall, roof and floor of animal houses, their characteristics, merits and demerits.

Demography of cattle and buffalo population. Breeds and breed descriptors of important breeds. Important traits of cattle and buffaloes. General management and feeding practices of calves, heifers, pregnant, lactating and dry animals in bulls and working animals. Draught ability of cattle and buffaloes. Raising of buffalo mates for meat production. Housing systems, layout and design of different biddings for dairy animals inducing backyard dairy and mixed farms. Routine dairy farm operations and labour management Methods of milking and precautions. Factors affecting quality and quantity of milk production. Clean max production. Dairy farm accounts and records. Concepts of input and output cost of dairy farming (small and large holdings).

Demography of sheep and goat population and their role in economy. Breeds and breed descriptors. Important traits for meat milk and fibre. General management and feeding-practices during different stages of growth, development and production (milk, meat and wool) in small and large holdings. Breeding schedule and management of ram and buck. Weaning and fattening of lambs and kids. Glossaries of terms In wool industry. Shearing of sheep. Physical and chemical properties of wool. Impurities in wool Factors influencing the quality of wool grading.

Recovery of wool wax and its use. Housing systems, layout and design of different buildings for small ruminants Judging for the quality and confirmation of body parts of cattle, buffalo, sheep and goat Culling of animals. Preparation of animals for show.

Problems and prospects of dairy, meat and wool industry in India. Animal and animal products market and marketing. Animal Fairs and Melas. Animal pounds and Goshalas.

PRACTICAL

Identification of various breeds of cattle, buffalo, sheep and goat Familiarization with body points of animals. Approaching, handling and restraining of cattle, buffalo, sheep and goat Clipping, shearing, dipping, spraying and spotting sick animals. Detection of vices. Feeding of animals. Methods of identification (marking, tattooing, branding, tagging and electronic chip). Determination of age. Determination of body weight using different measurements. Preparation of animals for show and judging. Layout plans for dairy and sheep/goat farms.

Familiarization with routine farm operations. Selection and culling of animals. Milking of dairy animals. Training of breeding mates. Detection of heat Identification and care of pregnant animals. Care of neonatal and young stock. Maintenance, cost accounting, economic analysis and preparation of balance sheet of dairy and sheep/goat farm records. Structure of wool and its differentiation from hair fibre. Determination of staple length, crimps, diameter and strength of wool fibre. Sorting, packaging and grading of wool. Recovery of wax from wool. Scouring and carbonisation of wool. Visit to different animal farms/ demonstration centres/ individual rural, urban and peri-urban animal units/ wool production centres & industries/ wool, meat and live animal markets. Preparation of project proposals.

REFERENCE BOOKS

1. Sastry, N.S.R. and Thomas, C.K. (2005) Livestock Production Management 4th Ed.
2. Thomas, C.K. and Sastry, N.S.R (1991) Dairy Bovine Production
3. Cockrill, R.W. (1974) The Husbandry and Health of the Domestic Buffalo
4. Ensminger, M.E. (2002) Sheep and Goat Science, 6th Ed.
5. Clutton Brock, J. (2004) A Natural History of Domesticated Mammals, 2nd Ed.
6. Watson, J.A.S. and Mills, W.J. (2005) Farm Animals and their Management
7. Taylor, R.E. and Field, T.G. (1977) Scientific Farm Animal Production
8. Pagot, J. (1992) Animal Production in the Tropics and Sub-tropics

9. Mason, I.L. (1988) World Dictionary of Livestock Breeds, 3rd Ed.
10. Anderson, R.H. and Edney, A.T.B. (1991) Practical Animal Handling

AGB-111: SEMESTER- I BIO-STATISTICS AND COMPUTER APPLICATION

Credit Hours 2+1=3

THEORY

A. Basic Statistics:

Introduction and importance. Statistics, parameters, observation, recording and graphical representation of data Probability and probability distributions: binomial, Poisson and normal. Measures of central tendency and measures of dispersion (simple and grouped data). Moments and skewness to kurtosis. Correlation and regression. Tests of hypothesis and t Z, X² and F tests of significance and their interrelationship. Livestock census procedure and census. Introduction to sample survey methods for livestock and livestock products. Bioassay - meaning and uses.

B. Experimental designs: Completely Randomized Design (CRD.) and Randomized Block Design (R,B.D). Analysis of variance.

C. Computer application:

Computer and its components; Types of computers; Hardware, software, human ware and firm ware. Type of memories. Computer languages and their scope and limitations. Computer programming : Data types: Constants, variables, expressions, operations, functions, flow charts, commands, simple programs and their execution- scope and limitations. Data base management system: Storage of data, filing, retrieving, reproduction. Use of computer in animal husbandry and veterinary practices.

PRACTICAL

Systematic approach of data, tabulation, simple probability problems. Estimation of measures of central tendency (mean, median, mode) and estimation of measures of dispersion (variance, standard deviation, standard error and coefficient of variation): for simple and grouped data. Graphical representation of data. Tests of significance -t Z. X² and F tests. Estimation of correlation. Estimation of regression. Analysis of variance: CRD., R.B.D. Computer basics and components of computer. Simple operations: Entering and saving biological data, database management systems. MS-Office. Spread sheet Internet e-mail and geographic Information system (GIS).

DEMONSTRATION

Use of word processor and spreadsheet Graphics and their uses. Data retrieving and analysis through computer (Data base). Use of local area network (LAN) and other network systems. Retrieving library information through network. G.I.S. and Its use.

REFERENCE BOOKS

1. Statistical methods - Snedecor & Cochran
2. Fundamentals of Statistics - S.C. Gupta
3. Fundamentals of applied statistics - Gupta & Kapur
4. Statistical Methods for Biological workers - Pillai & Sinha
5. Biostatistical Analysis - Zar
6. Fundamentals of Biostatistical Analysis - Rosner

ANN-111: PRINCIPLES OF ANIMAL NUTRITION AND FEED TECHNOLOGY

Credit Hours 2+1=3

THEORY

Importance of nutrients in animal production and health. Composition of animal body and plants. Nutritional terms and their definitions. Importance of minerals (major and trace elements) and vitamins in health and production, their requirements and supplementation in feed. Common feeds and fodders, their classification, availability and importance for livestock and poultry production. Measures of food energy and their applications - gross energy, digestible energy, metabolisable energy, net energy, total digestible nutrients, starch equivalent, food units, physiological fuel value. Direct and indirect calorimetry, carbon and nitrogen balance studies. Protein evaluation of feeds - Measures of protein quality in ruminants and non-ruminants, biological value of protein, protein efficiency ratio, protein equivalent, digestible crude protein. Calorie protein ratio. Nutritive ratio. Various physical, chemical and biological methods of feed processing for improving the nutritive value of inferior quality roughages. Preparation, storage and conservation of livestock feed through silage and hay and their uses in livestock feeding. Harmful natural constituents and common adulterants of feeds and fodders. Feed additives in the rations of livestock and poultry; Antibiotics and hormonal compounds and other growth stimulants, and their uses.

PRACTICAL

Familiarisation of various feed stuff, fodders and their selection. Preparation and processing of samples for chemical analysis - herbage, faeces, urine and silages. Weende's System of analysis - Estimation of dry matter, total ash, acid insoluble ash, crude protein, ether extract crude fibre, nitrogen free extract, Calcium and phosphorus in feed samples. Demonstration of detergent methods of forage analysis. Qualitative detection of undesirable constituents and common adulterants of feed. Demonstration of laboratory ensiling of green fodders. Silage pit preparation.