

**COURSE SYLLABUS**  
**FOR**  
**DIPLOMA IN ANIMAL HUSBANDRY**



**KAMDHENU UNIVERSITY**  
**GANDHINAGAR**

**2014**

## SEMESTER WISE COURSE DISTRIBUTION

(Total duration Three years)

### First Semester

Sr. no	Course No.	Title of the Course	Credit
1.	LAN-111	Introductory Livestock Anatomy	3+1=4
2.	APHY-111	Introductory Animal Physiology	3+1=4
3.	LPM-111	Introductory Animal Management-I	2+1=3
4.	ENG-111	English	2+1=3
5.	CA-111	Introduction to Computer Application	1+2=3
<b>Total</b>			<b>11+6=17</b>

### Second Semester

Sr. no	Course No.	Title of the Course	Credit
1.	STAT-121	Elementary Statistics	2+1=3
2.	AN-121	Introductory Fodder Management and grassland Management	1+1=2
3.	AB-121	Introductory Animal Breeding	1+1=2
4.	LPM-121	Introductory Animal Management-II	2+1=3
5.	AHE-121	Introductory Animal Husbandry Extension-I	2+1=3
6.	ENV5-121	Introduction to Environmental Science	2+1=3
<b>Total</b>			<b>10+6=16</b>

### Third Semester

Sr. no	Course No.	Title of the Course	Credit
1.	VMI-211	Introductory Veterinary Microbiology	2+1=3
2.	VPARA-211	Introductory Veterinary Parasitology	2+1=3
3.	VPA-211	Preliminary Pathology	2+1=3
4.	AHE-211	Introductory Animal Husbandry Extension-II	2+1=3
5.	AN-211	Introductory Animal Nutrition-I	1+1=2
<b>Total</b>			<b>9+5=14</b>

### Fourth Semester

Sr. no	Course No.	Title of the Course	Credit
1.	AHEM-221	Introductory Animal Husbandry Economics and Marketing	2+0=2
2.	AN-222	Introductory Animal Nutrition-II	1+1=2
3.	VP-221	Introductory Pharmacology	3+2=5
4.	AR-221	Introductory Animal Reproductions-I	1+2=3
5.	AHC-221	Introductory Animal Health Care-I	2+2=4
<b>Total</b>			<b>9+7=16</b>

### Fifth Semester

Sr. no	Course No.	Title of the Course	Credit
1.	AHC-312	Introductory Animal Health Care-II	2+2=4
2.	AR-312	Introductory Animal Reproductions-II	1+2=3
3.	VPH-311	Introductory Veterinary Public Health	2+2=4
4.	LPM-313	Introductory Animal Management-III	2+1=3
5.	VSUR-311	Minor Veterinary Surgery	2+1=3
<b>Total</b>			<b>9+8=17</b>

### Sixth Semester

#### Farm Practice Training:

1. Two months of cattle and buffalo
2. One month of sheep and goat
3. One month poultry
4. One months and three weeks of government dispensary
5. Seven days Educational tour
6. Report Writing

#### Semester wise credits hours distributions:

Credit hour means the weekly unit of work reorganization for particular course as per the Syllabus. A theory lecture class of one hour per week shall be counted as one credit hour where as a practical class of two or three hours durations per week shall be counted as one credit hour.

	Semester	Theory	Practical	Total Credit Hours
First Year	I	11	6	17
	II	10	6	16
<b>Total</b>				33
Second Year	I	9	5	14
	II	9	7	16
<b>Total</b>				30
Third Year	I	9	8	17
	II	0	15	15
<b>Total</b>				32
<b>Grand Total</b>				95

## **DETAILED COURSE SYLLABUS**

### **FIRST SEMESTER:**

#### **Course No. LAN-111: Introductory Livestock Anatomy (Credit Hours: 3+1=4)**

##### **Theory:**

Cell Structure, Tissue Structure, Study of bones - Glossary of osteology, Classification, work and identification of various bones of the body of cow, horse, dog, sheep, pig and poultry and comparison thereof. Study of joints and hinges of the body. Study of muscles and tendons of leg and neck. Study of skin and others e.g. epidermis, dermis, hypodermis, sweat glands of skin, horn, claws, chest nut etc. Digestive system - mouth, tonsils, pharynx, esophagus, ruminant and non-ruminant stomach, Small intestine, large intestine. Associated organs and digestive gland for digestion. Respiratory system- nostril, nasal cavity, sinus, pharynx, larynx, trachea, lungs, thorax, pleura. Circulatory system-heart, blood arteries, veins, portal circulation, foetal circulation, lymphatic system. Excretory system-Structure of kidney, ureter, bladder, urethra, working of kidneys, structure of nephrons, micturation etc. female genital system. male genital system ó testis, scortum, epididymis, ductus deferens, penis, muscles, blood arteries, nerves related to genital system, accessory sex glands, secondary sex characters. Structure of udder.

##### **Practical**

Practical introductory study of following using charts, models and basis laboratory facilities:

Cell structure, tissue structure .gross study of bones-identification of various bones of the body of cow, horse, dog, sheep, pig, and poultry and comparison thereof. gross study of joints and hinges of the body. Study of muscles and tendons of legs and neck. study of skin and others e.g. epidermis ,dermis ,hypodermis, sweat glands of skin, horn, claws, chest nut etc. gross study of digestive system- mouth, tonsils, pharynx, esophagus, ruminant and non ruminant stomach, small intestine, large intestine. Associated organs and digestive gland for digestion. Respiratory system-nostril, nasal cavity, sinus, pharynx, larynx, trachea, lungs, thorax, pleura. Gross study of circulatory system- heart, blood arteries, veins, portal circulation, foetal circulation, lymphatic system. Excretion system- Structure of kidney, ureter, bladder, urethra, working of kidneys, structure of nephrons, micturation, etc. gross study of female genital system- ovary, uterine tube, uterus, vagina, vulva, blood arteries and nerves related to genital system.

Gross study of male genital system- testis, scrotum, epididymis, ductus deferens, penis, muscles, blood arteries, nerves related to genital system, accessory sex glands, secondary sex character. Gross study of structure of udder.

#### **Course No. APHY-111: Introductory Animal Physiology (Credit Hours: 3+1=4)**

##### **Theory:**

General Physiology of muscles i.e. smooth, cardiac, voluntary striated muscle. General physiology of body fluids: Formation of blood cells, haemopoiesis, plasma, serum, blood PH, blood clot formation, various types of blood cells, lymph, cerebrospinal fluid, synovial fluid, serum, macrophages and immunity. General physiology of digestive system, prehension, mastication, swallowing, gastric movement, physiology of small and large intestine, digestion in ruminants and non-ruminants and their comparative study, various enzymes used during digestion, absorption of feed ingredients, metabolism of protein, carbohydrate and fat. Digestive glands e.g. salivary glands, gall bladder, pancreas and their functions. General physiology of respiratory system- mechanism of respiration, respiratory action, dead space, artificial respiration, exchange of gases etc. general physiology of circulatory system Cardiac cycle, system of heart, nervous control of blood flow, shock (blood volume and pressure,) Venous and lymphatic return, theory of vaccination and immunity in animals. General Physiology of urinary system physiology of kidney and nephron. General physiology of female genital system-puberty, oogenesis ovulation, formation of corpus luteum, estrous cycle, hormones of female reproduction system, pregnancy and parturition. General physiology of male reproductive system-Erection, ejaculation, hormones of male reproduction system, factors affecting working of testis, sex determination, spermatogenesis, spermatozoa, working of accessory sex glands. General physiology of milk letdown-structure of udder, milk secretion, galactopoiesis, letdown of milk, formation of colostrums, milk fat and milk protein, agalactia.

### **Practical**

Use of anticoagulants. Collection of whole blood plasma and serum. Estimation of haemoglobin. Determination of packed cell volume. Study of microscope and its uses. Study of general principles of counting cellular elements of body. Counting RBCs in blood. Counting WBCs in blood. Method of examination of blood smear for differential leucocytes count. To find out differential leucocyte count. Recording of blood pressure. Study of sperm motility. Live and dead sperm count. Study of physical and chemical properties of urine. Study of normal respiration rate in various domestic animal.

**Course No. LPM-111: Introductory Animal Management-1 (Credit Hours: 2+1=3)**

### **Theory**

Economic importance of animals and their products. Common terminologies and definitions used in animal husbandry practices of cows and buffaloes. Importance of cow-buffaloes. Their classification based on utility milk purpose, draft purpose. Cows and buffalo population, income and their importance in Gujarat and in India. Exotic cattle: milk, Beef and dual purpose breeds. Animal husbandry practices followed by professional breeders, Farmers, Farm labours and city milk producers in India, Cow and buffalo breeds of Gujarat, their synonyms, native, rearing practices, physical and economical Characters, and breeding farms. Cows: Kankrej, Gir Dangi. Buffalo: Surti, Mehsani, Jaffarabadi, banni. Brief note on /knowledge about exotic and cross breed cow, their physical and economical characters and their importance in India. Jersey, Holstein Friesian, cross breed cows. Calf rearing, care of

new bone of calf, method of calf rearing with their advantages and disadvantages. Feeding rearing and breeding management of heifers. Feeding care and management of pregnant, dry and milch animals. Management of dry cow- reason for drying of cow (not milking), various method of drying, Care and management of bullock. Identification and importance of different buildings-structures of dairy farm, study of housing of milch animals and calves. Clean milk production and its importance. Maintaining records of dairy farm. Cattle yard report, service book, classified service register, daily milk production register, monthly milk production register, history sheet, Birth and death register, Roll call register, livestock register concentrate feeding register, dairy Business of Gujarat and knowledge of arrangement of milk distribution in Gujarat.

### **Practical**

Visit to a dairy farm and study of their daily routines. Identification of dairy farm utensils, utensils of milking and milk storage, milking machine chaff cutter, weighing machine etc. Body parts of cow, bull and importance of body parts. Compost making. Cleaning and disinfection of animal house. Daily routine operations of dairy farm. Care of cow and buffalo at calving. General information like handling of animals and their control-common restraints used in cow, bullock , bull and casting of these animals. use of nose ring and bull holder etc. Identification of animal by colours and marks. Determination of age by dentition of cow and buffalo. Weight determination of animal by girth and length. Method of identification animals by firing, numbering, tattooing, ear tagging, foot ring and number at foot etc. Normal temperature, pulse and respiration of animals. Castration of male calf and dehorning of calf.

**Course No. ENG-111: English**

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

### **Theory**

Grammatical Topics like- Parts of speech, sentence pattern, articles and determiners, tenses and auxiliaries, use of prepositions, transformation of sentences: (degree forms, voice, affirmative and negatives, use of too and enough, use though and although etc.) direct and indirect speech.

### **Practical**

#### **PART-A**

READING: Reading with correct pronunciation and intonations from books, magazines

LISTENING: Listening from recorded spoken talks, speech, records, taps, cassettes etc.

DIALOGUE: Introducing one self and giving introduction of other, shorts question- answers session, short talk/ speech on given topics etc.

#### **PART-B (composition writing)**

Practice in comprehension passages, letter writing, story writing with the help of given clues, essay writing with the help of given clues, application writing.

**Course No. CA-111: Introduction to Computer application**

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

### **Theory**

Computer- Definition, history, computer system, digital system, analog system. Block Diagram of Computer system. Functions and working of each part in block diagram. Types of Computers. Types, working and uses of various and output devices. Concept, meaning and differences of hardware and software . Operating system- DOS, WINDOWS. Directory, folder, importance of file. Data entry- text file, worksheet, entry and accounting in readymade software. Picture file, photographs (editing) and Printing, Importance and knowledge about anti-virus. Multimedia - song, music, recording, presentation etc.

### **Practical**

Demonstration of Computer system. Demonstration and working of computer peripherals like monitor, key-board, mouse, floppy disks, CD drive, printer, etc. Uses of DOS commands. Uses of start menu, uses of start menu, uses of paste, cut and copy of files. Preparation, editing and printing of simple text file. Preparation of work-sheet, formula and printing. Preparation of picture, photo file, editing with use of camera, scanner. Use of multimedia, net- work, e-mail, internet etc.

## **SECOND SEMESTER**

**Course No. STAT- 121: Elementary Statistics**

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

### **Theory**

Basic concepts: variable, statistics, types and sources of data. Classification and tabulation of data, construction of frequency distribution tables. Graphical representation of data, simple, multiple, component and percentage bar diagram; pie diagram, histogram, frequency polygon and frequency curve. Average and measures of location: arithmetic mean, mode, median, geometric mean and harmonic mean for raw and grouped data. Dispersion: range, quartiles, standard deviation, variance, coefficient of variation and standard error of mean for raw and grouped data. Sampling: basic concepts, sampling vs. complete enumeration, parameter and statistic. Sampling methods: simple random sampling and stratified random sampling. Tests of significance: basic concepts. Test for equality of means: one sample and two (independent) sample; paired t-tests. Introduction to experimental designs (CRD and RBD).

### **Practical**

Construction of frequency distribution table. Graphical representation of data: histogram, frequency polygon, frequency curve; bar chart-simple, multiple, component and percentage bar charts; pie chart. Mean median, mode and quadrille for raw and grouped data. Tests for equality of means: one sample and two (independent) sample; paired t-tests. Analysis of CRD and RBD.

**Course No. AN-121: Introductory fodder management and Grassland management**

**(Credit Hours: 1+1=2)**

### **Theory**

Importance of fodder production in animal nutrition. Soil plant animal relationship classification of animal feed. Proximate composition of animal feeds. Agronomical practices for cultivation of leguminous roughages ó Lucerne, Berseem, Cowpea, Cluster bean and sun flower. Agronomical practices for cultivation of cereal roughages (a) Maize and sorghum, Oats and pearl millet (rajkabajari). Pasture management, Silvi pasture, agro forestry and system of grazing. Agronomical practices for cultivation of grasses (a) Hybrid Napier and APPN Grass. Agronomical practices for cultivation of pasture grasses. (b) Marvel grass, Guinea grass, Para grass, Sudan grass, Dinanath, Dasarath and Anjan. Fodder trees-subabul, shevari, Borchhi. Importance of unconventional feeds and fodder in livestock feeding. Preservation of forages-silage, hay making and haylage. Feeding of livestock during scarcity and management of cattle camps. Recycling of livestock waste including vermin compost, Bio gas. Preparation of cropping scheme/crop rotation for dairy fodder farm Agencies involved in seeds, fertilizers, animal feeds, pesticides.

### **Practical**

Visit to a fodder farm. Familiarization with the various types of fodder. Agro climatic zone wise fodder crop rotation/fodder calendar. Preservation of fodders. Cost of fodder production. Familiarization with back yard fodder cropping of fodder, Silvi pasture and Agro forestry. Livestock waste utilization and recycling. Preparation of cropping scheme for dairy farm.

### **Course No. AB-121: Introductory Animal Breeding (Credit Hours: 1+1=2)**

#### **Theory**

Breeding- Definition and importance. Variation, sources of variation, implications. Choosing traits for selection. Degrees of relationship. System of breeding, inbreeding: close breeding, line breeding, Out breeding: out, cross breeding, species hybridization, grading up. Livestock breeding strategies in Gujarat. Selection methods: performance testing, pedigree selection, progeny testing, fertility and breeding efficiency, Factors affecting and technique to improve. Embryo transfer technology. Preliminary ideas of heritability, repeatability, genetic and phenotypic correlation of different economic traits. Heterosis, definition, causes, importance.

#### **Practical**

Visit to a cattle breeding farm. Study the breeding records of farms. Analysis of breeding records of different livestock farms. Method of selection of dairy animals and breeding bulls. Identification of animal in oestrus. Practical aspects of theory syllabus and basic statistical principles and practice.

### **Course No. LPM-122: Introductory Animal Management-II (Credit Hours: 2+1=3)**

#### **Theory**

Economic importance of sheep production in India and Gujarat. Different indigenous and exotic breeds of sheep. Care of lambs young stock, Weaning, Shearing. Selection of sheep for mutton and fibres. Judging of the quality and conformation of body parts. Sheep housing,



routine health care, Deworming, Vaccination, Breeding schedule, care in pregnancy, lambing, lambs. Marketing of wool and mutton, their economics of production. Grading and marketing, impurities in wool. Factors influencing the quality of wool importance of goat production at national and state level. Goat production for profit livelihood. Different indigenous and exotic breed. Buck management, care of goat in pregnancy and kidding. Rearing of kids, Weaning, Fattening etc. Selection of goats for chevon and milk. Judging of the quality and conformation of body parts. Rearing sheep and goat together. Goats as leaders in grazing. Goat housing and marketing. Chevon and goat milk marketing and their economics of production.

### **Practical**

Familiarization with livestock farm routines. Identification and selection of sheep and goat. Feeding of sheep and goat dipping, Spraying, Spotting sick animals. Examination for purities, Identification of impurities. Farm records and their maintenance. Detection of heat, mating. Care of pregnant animals, lambing, neonatal and young stock. Judging sheep for wool and mutton. Shearing and grading of wool and their bailing and storage. Layout plant for sheep/goat farm of different flock size. Determination of sepals length, crimps, diameters and strength of wool fibre. Visit to a wool analytic laboratory and woollen industries. Castration of kids, detection of vices of goat, Culling. Judging of goats for chevon and sheep for mutton. Marketing of chevon and live goats.

### **Course No. AHE-121: Introductory Animal Husbandry Extension-1 (Credit Hours: 2+1=3)**

#### **Theory**

Extension, concept, principles, scope. Education : Formal, informal and non-formal. Formal educational Vs non-formal educations. Non-formal education Vs A.H. extension. Concept of extension. Needs for extension. Levels of extension. Philosophy of extension. Objectives of extension. Function of extension. Extension educational process. Teaching learning process. Criteria for effective extension teaching-learning. Principles of learning as applicable to extension. Principles of A.H. extension. Motivation in extension. Scope of A.H. extension. Rural sociology and psychology. Concept of rural sociology: family, social interaction, community, society, personality, leadership, value, social institution, social control, beliefs, social change. Dairying as an instruments of change in rural India. Communication process: concept: communication response, empathy, homophily, heterophily, fidelity, perception, communication system. Feed back. Management information system, communication methods, its classification, audio visual aids. Adoption and diffusion of innovations: concept, adoption, diffusion, innovation, attributes of innovation, stage of adoption, innovation Decision process, over adoption. Agricultural journalism, definition, principle of Agricultural journalism.

#### **Practical**

Visit to a village institution like village panchayat, village co-operative milk marketing society, identification of key communicator and working through functional leader. Study of functioning of village institutions. Social survey, its kinds and importance. Methods and tools of data collection in social research social sampling, its kind and importance. Methods and tools of data collection in social research. Preparation of leaflets, folders and pamphlets for A.H. extension use. Use and principles of overhead projector and preparation overhead transparencies. Use and principles of LCD projector and preparation PPT presentation. Organizing a vaccination camp, farmers meet, exhibition at village level. Report writing.

**Course No. ENVS-121: Introduction to Environmental Sciences (Credit Hours: 2+1=3)**

**Theory**

Environment: introduction, definition and importance. Components of environment interactions with organism. Animal ecology. Global and Indian environment past and present status. Environmental pollution and pollutants. Air, water, food, soil, noise pollution sources. Causes and types. Smoke, acid rain, global warming, ozone hole, sewage and hazardous waste management. Impact of different pollutants on humans, plants, organisms and environment. Introduction to biological magnification of pollution technological and sociological measures and solutions- Indian and global efforts. India, international and voluntary agencies for environment conservation-mandates and activities. International conferences, conventions and summits- major achievements. Environmental policy and legislation in India. Introduction to environmental impact assessment. Causes of environmental degradation-socio-economic factors. Human population growth and lifestyle. Sources of water supply, contamination, and its prevention. Possibilities of recycling of farm surplus, waste etc.

**Practical**

Visit to a local areas-river /forest/grassland/catchments etc. Study of common plants, insects, birds and animals. Visit to a industries to study pollution abatement techniques. Demonstration of water purification plant, sewage disposal plans, carcass and fallen animal disposal methods. Visit to a recycling plants.

**THIRD SEMESTER**

**Course No.VMI-211: Introductory Veterinary Microbiology (Credit Hours: 2+1=3)**

**Theory**

Microbiology of unicellular organisms and their classification. Microbiology and structure of bacteria, shape, size and arrangement of bacteria, microbiological variations and classification of bacteria. Important bacterial, viral and fungal disease of animal. Source of infections. Methods of transmission of infections. Sterilization, disinfection, evaluation of disinfectants and antiseptics. Aseptic handling of sterilization materials; disinfection of

animals. Introduction, morphology, growth, nutrition, reproductive and classification of fungi. Classification, cultivation and replication of viruses.

### **Practical**

Microscopy and routines, Staining ( simple & Grams), Acid fast, Lactophenol cotton blue, Special staining : leishmenn, methylene blue staining. Glassware preparation. Sterilization, evaluation of disinfectants, asepsis etc. Preparation of reagents media, **Demonstarion:** Equipment and sterilization disinfection, Cultural characters, Pathogenicity test and antibiogram, slide culture technique for fungus

### **Course No.VPARA-211: Introductory Veterinary Parasitology (Credit hours: 2+1=3)**

#### **Theory**

Introduction of Parasitology, history, definitions. Importance of Parasitology in animal science curriculum. Parasites and parasitism. Type of parasitism. Classification of parasites. Important cestodes of livestock, their life cycle, mode of transmission and control measures. Important trematodes of livestock, their life cycle, mode of transmission and control measures. Important nematodes of livestock, their life cycle, mode of transmission and control measures. Important of protozoa of livestock, their life cycle, mode of transmission and control measures. Important insects, ticks and mites of livestock, their life cycle, mode of transmission and control measures.

#### **Practical**

Examination of the faecal samples for the trematode, cestode and nematode eggs. Demonstration of the life cycle and development of the type species of trematode, nematode, cestode, acanthocephalan. Demonstration of the type representative of various groups of insects, ticks and mites through charts, specimen, mounted slides etc. Demonstration of differential characters of insect and acarina (ticks and mites). Procedure for diagnosis of arthropoda infestation to hides and skin. Examination of the faecal materials for identification of intestinal protozoa, Coccidia, flagellates etc. Preparation of blood smears, their staining and examination of slides for haemoprotozan parasites. Methods of collection, fixation, preservation and mounting of protozoan parasites.

### **Course No. VPA-211: Preliminary Pathology (Credit hours: 2+1=3)**

#### **Theory**

Introduction to scope of pathology. Common terminologies of pathology: Pathology, health, disease, etiology, predisposing, pathogenesis symptoms or sign, lesion, diagnosis, incubation period, prognosis morbidity, mortality, autopsy, Biopsy, Necrosis, Somatic death, inflammation, fever/pyrexia, study of different causes of diseases. Mode of transmission of disease. Disturbance of growth: common terminology aplasia, agenesis, hypoplasia, atrophy hypertrophy, metaplasia, dysplasia. Local defence mechanism. Resistance to infection. Preliminary pathology of common diseases. Collection of various sample for laboratory

diagnosis care in preservation and dispatch of sample. Preparation for post mortem. Post mortem examination. Procedure to be followed in collection of samples of specimen for laboratory examination.

### **Practical**

Demonstration of post-mortem of livestock and poultry. Post mortem technique and collection of morbid materials. Technique of preservation, dispatch and section cutting. Record keeping of all kinds for pathology laboratory.

### **Course No. AHE-212: Introductory Animal husbandry Extension-II (Credit Hours: 2+1=3)**

#### **Theory**

Statistics of livestock & products of the state and nation. Organizational aspects of livestock farm, resource management, record keeping and accounting. Aspects of livestock farm, tools of management, function of management Entrepreneurship as an instrument of socio-economic transformation: Scope for a successful entrepreneur in livestock sector like, livestock feed manufacturing, dairy farming, livestock-poultry, dairy products manufacturing and marketing, farm equipment manufacturing and marketing etc. Knowledge of working and powers of officials of the department. Knowledge of various schemes and programmes of the department. Milk recording, herd registration, bull registration, owner registration, artificial insemination, follow up should be visualized. Animal production programme (Individual benefit scheme)-Cross breeding programme. Special poultry, swine, sheep, goat production. Information of departmental activities of animal husbandry, poultry and swine, sheep, goat production. Information of departmental activities of animal husbandry, poultry and swine husbandry. WTO and its implication on Indian dairy farming, Market, marketing, types of marketing. Functions of marketing. Channels of marketing of livestock products. Comparison of dairy farming on India with that of advanced countries of world. Integrated farming, need for integrated farming: factors determining types of integrated farming or factors to be considered for integrated types of farming, Physical condition: Topographic factors, climatic condition, pattern of rainfall, nature of water balance. Socio-economic conditions: Population pressure, pattern of land ownership, land inequalities, occupational structure. Technological advancement: Traditional pattern, modern pattern, level of mechanization, various systems of integrated farming: cash crop & vegetable crop integrated with dairy cattle. Cash crop & horticultural crop integrated with dairy cattle. Horticulture + rabbit farming + duck farming + wormi compost, goat farming, fish farming, bee keeping, cross bred dairy cow, buffalo and various other combination of integration and their economic viability & sustainability. Other income generating programmes.

#### **Practical**

Visit to a private, co-operative or public dairy enterprise. Study of economic aspects of a private, co-operative or public dairy or any livestock enterprise. Book keeping, to know about the book keeping and general entry. Visit to an integrated farming, units/village and

collection of data (three different combinations for three different practical) and to study the economic aspects of the same. To study about the trading account, profit and loss account and balance sheet. To visit cattle fair, livestock market, backyard unit and study their tools of management. Farm budgeting, its importance, object, methods and advantages. To estimate a project of 12 cross-breed cows. To estimate a project of 12 buffaloes. To estimate a project of 12 dairy cows. To estimate a project of 1000 layer birds

**Course No. AN-211: Introductory Animal Nutrition-I (Credit Hours: 1+1=2)**

History of animal nutrition. Importance of nutrients in animal health and production  
Composition of animal body and plants. Biochemical bases of soil, plant and animals  
Nutritional terms and definitions. Nutrients and their metabolism. Role and requirements of water. Carbohydrates, their digestion, absorption and metabolism in ruminants. Proteins and amino acids, their digestion, absorption and metabolism in ruminants. Use of NPA compound for ruminants. Lipids and their utility. Mineral elements and their functions importance of macro and micro elements in livestock health and production. Importance of vitamins, their deficiency symptoms, requirements in feed. Feed additives in the ration of livestock. Antibiotics and hormonal compounds and other growth stimulants, probiotics: their use and abuses.

**Practical**

General precautions while working in Animal Nutrition Laboratory. Preparation of normal solutions. Preparation of standard solutions. History of proximate principles of feed preparation of common reagents and indicators. Preparation of samples for chemical analysis. General precautions while weighing feed fodder sample. Estimation of dry matter, ash, acid insoluble ash in feed sample. Familiarization of various feed and fodders.

**FOURTH SEMESTER**

**Course No. AHEM-221: Introductory Animal Husbandry Economics and Marketing (Credit Hours: 2+0=2)**

**Theory**

Nature and scope of economics, definition and concepts, divisions of economics, economic systems, approaches to the study of economics. Consumption-theory of consumer behaviour, laws of consumption, classification of goods. Wants-their characteristics and classification, utility and its measurement. Theory of demand, demand schedule and curve market demand. Price, income and cross elasticities, Engle's law of family expenditure-consumer's surplus. Theory of firm, factors of production- land and its characteristics- classification and capital formation. Enterprises-forms of business organization-merits and demerits. Laws of return ó cost concepts. Law of supply ó schedule and curve elasticity's. money & bank. Marketing:- Concepts of marketing, Needs of marketing. Marketing of perishable and non-perishable

items. Types of marketing, functions of marketing, Defects of marketing, measure of improvement.

**Course No. AN-222: Introductory Animal Nutrition-II (Credit Hours: 1+1=2)**

**Theory**

Enzymes/ Metabolites. Vitamins. Hormones. Toxic plants and poisonous food stuffs. Economic status of animal feed. Feeding of diseased animal, Utility of trees as roughage, Study of non-conventional feed. Feeding management of different animals like young ones, pregnant animals, dry/ lactating animals, breedable male, sick animals. Grazing farm management.

**Practical**

Preparation of concentrate, identification of roughage, crops, trees and cereals as animal feed. Calculation of nutritive values in terms of DCP, TDN, & MF for maintenance, growth & production. Formulation of ration for different livestock under different condition. Familiarization of various feed stuff, fodder and their selection. Proper methods of preparation of roughage, various methods of its preparation, visit to feed factory, dairy & poultry farms.

**Course No. VP-221: Introductory Pharmacology (Credit Hours: 3+2=5)**

**Theory**

Introduction to Pharmacology: Historical development, branches and scope of Pharmacology, Sources of drugs, Pharmacological terms and definitions. Principles of Drug Activity: Pharmacokinetics- absorption, biotransformation and excretion of drug; Local anaesthetics (analgesic); Neuromuscular blocking agents: Peripheral and central muscle relaxants. Drugs acting on digestive tract: stomachics, antacids, intestinal astringents, carminatives, antizymotics, emetics, anti-emetics, purgatives, choleraetics and cholagogues. Drugs acting on respiratory system: expectorants and anti-tissues, respiratory stimulants; bronchial dilators. Drugs acting on urinogenital system: diuretics, urinary alkalizers, acidifiers and antiseptics, fluid therapy ecbolics. Vitamins: only in relation to pharmacotherapeutic effects. Drugs acting on skin and mucous membrane. ANTIBACTERAL AGENTS: Classification, general principles in antibacterial chemotherapy, sulphonamides and their combination with trimethoprim; sulfones; nitrofurans. ANTIBIOTICS: Penicillins and cephalosporins, aminoglycosides, tetracyclines, chloramphenicol. Polypeptides etc.: antituberculosis agents; miscellaneous agents; methelamine, nalidixic acid etc. ANTIFUNGAL AGENTS: Topical and systemic agents including antifungal antibiotics. ANTHELMINTHICS: Drugs and against cestodes, trematodes, nematodes, drug tolerance, broad spectrum anthelmintics. ANTIPROTOZOAL AGENTS: Drugs used in trypanosomiasis, theilariasis, babesiasis, anaplamosis, malaia, coccidiiosis, amoebiasis, giardiasis, trichomoniasis etc. ANTISEPTIC AND DISINFECTANTS: INDIGENOUS DRUGS: Source of alkaloids, glycosides, resins gums, tannins, fixed, and volatile oils; plant drugs with proven pharmacological and therapeutic efficacies in various animal and human ailments: popular indigenous

drugs(antiseptics, antifungals, anthelmintics, arthropode repellants). GENERAL TOXICOLOGY; Definition scope of toxicology, Sources of poisoning, mode of action of poisons, Factors modifying the toxicity and Line of treatment of the poisoned cases.

### **Practical**

Pharmacology : Fittings and apparatus, labeling, custody of poisons, weighing of drugs, pharmacy calculations, definition of pharmacological terms related to various systems, drug standards and regulations prescription writing; Pharmacy preparation: triple carb, antidiarrhoeal powder, dusting powder, iodine ointment with and without methyl salicylate: red iodide of mercury ointment, mistura alba, carminative mixture, ammonia liniment, turpentine liniment etc. Pharmacy Preparations: Potassium permanganate solution, lugol's iodine solution, trepan blue solution, gentian violet solution, tincture iodine benzoin co., boric acid ointment, zinc oxide ointment, ointment of salicylic acid with benzoic acid etc. Demonstration of toxic weeds and plants.

**Course No. AR-221: Introductory Animal Reproduction-I (Credit Hours: 1+2=3)**

### **Theory**

Physiology of reproduction- Puberty, estrus cycle, sign of heat, reproductive hormones, conception, gestation and parturition and their importance. Knowledge of instrument used during artificial insemination and their sanitization, Cryogenic jar and their maintenance, Artificial insemination- Collection, preservation and transportation of semen. Insemination by speculum/ per rectal route, use of frozen semen, details of insemination technique, preservation and usefulness of frozen semen. Precautions of handling of liquid nitrogen semen.

### **Practical**

To get knowledge of reproductive organs. Live animal/reproductive organs. Obtained from slaughter house/ phantom box etc. per rectal examination reproductive organs. Artificial insemination- Thawing, preparation of A.I.gun, practice of artificial insemination. Study of semen quality. Study of morphology and motility of sperms. Maintenance of frozen semen, cryogenic jar and apparatus used in artificial insemination. Study of female genitalia; palpation technique. Heat detection in farm animal and companion animals.

**Course No. AHC-221: Introductory Animal Health Care-I (Credit Hours: 2+2=4)**

### **Theory**

Sign of healthy and diseased animal-history, etiology, diagnosis, symptoms, treatment, death. General disease of different system of animals-disease of digestive system-stomatitis, pharyngitis, choke, simple indigestion, bloat, impaction of rumen, colic, constipation, enteritis, dysentery, traumatic reticulitis, traumatic pericarditis, intestinal obstruction, hepatitis, jaundice, liver cirrhosis etc. Disease of respiratory system- UR, epistaxis, pneumonia, drenching pneumonia, pleurisy bovine asthma etc. disease of urinary system-

nephritis, urinary calculi, retention of urine, hematuria etc. Disease of reproductive system- mastitis, metritis, pyometra, dystocia, retention of placenta etc. Disease of nervous system- meningitis, encephalitis etc. Metabolic diseases- milk fever, downer cow syndrome, ketosis, hemoglobinuria, hypomagnesaemic tetany, vitaminosis-A, pica etc. Disease of skin, eye, ear and joints- dermatitis, eczema, scabies, conjunctivitis, otitis, rheumatism etc. Knowledge of instrument, use in laboratory or hospitals, methods of their sterilization. Definition of sepsis and asepsis. Suturing and treatment of wound, abscess. Sign and handling of simple fractures, sprain and dislocation, choke, prolapse of vagina, uterus and rectum. Assistance in anaesthesia and operation of animals. Suturing of skin and the instrument used thereof. Firing, tattooing, dehorning, docking.

### **Practical**

Clinical Attendance, Administration of drugs, care and management of sick indoor and outdoor animal. Diagnose the disease by recording symptoms, temperature, pulse, respiration. Awareness and uses of surgical instrument. Sanitization/Sterilization of instrument used in hospital, first aid and bandaging of wounds etc. To prepare site for operation and to help veterinary doctor during operation. Demonstration of castration and other minor surgical procedures.

## **FIFTH SEMESTER**

**Course No. AHC-312: Introductory Animal Health Care-II (Credit Hours: 2+2=4)**

### **Theory**

Bacterial disease- anthrax, H.S., B.Q., Brucellosis, T.B., Actinomycosis, leptospirosis, salmonellosis, contagious, pleuropneumonia, calf pneumonia, tetanus, enterotoxaemia, bacillary haemoglobinuria, nava ill, food rot. Viral diseases-R.P., F.M.D., Pox (cow pox, sheep pox, goat pox, fowl pox etc.). Rabies, bovine malignant catarrh, mucosal disease complex, ephemeral fever, mycoplasma, African horse sickness, ranikhet, Marek's disease, pullorum disease, CRD. Fungal disease- Ring worm, aflatoxicosis, Fungal mastitis. Parasitic disease- Protozoan diseases-Anaplasmosis, Theilariosis, Babesiosis, Surra, Leishmaniasis. Internal parasitic disease- Liver fluke, Amphistomiasis, Ascariasis, tapeworm. Parasites of digestive tract- schistosomiasis, coccidiosis. External parasitic disease- nasal granuloma, filarial, myiasis, mange, ticks, lice infestation. Toxicology- poison (types, effect, treatment etc.)-arsenic, lead, cyanide, nitrate, nitrite etc.

### **Practical**

Identification of sick animals. Taking history of sick animals. Various methods for diagnosis of disease. Taking various specimen for diagnosis of various disease. Handling, preservation and transportation of samples for disease diagnosis. Clinical attendance. Methods of administration of drugs. Examination of fecal sample, examination of skin scraping,



examination milk and milk tests, examination urine, preparation pus smear for laboratory diagnosis. Introduction to veterinary laboratory diagnosis.

**Course No. AR-312: Introductory Animal Reproduction-II (Credit Hours: 1+2=3)**

**Theory**

Reproductive disease, anoestrus, sterility/ infertility, silent heat, repeat breeding and retention of placenta, pyometra, functional infertility, cystic ovary. Obstetrical problems and their management. Pregnancy diagnosis. Maintenance of artificial insemination and breeding records. Sexual health control and herd reproductive health programme. Parturition stages, care during and after parturition.

**Practical**

Approach to post operative care of animals operated too obstetrical cases/second. Endocrine control of reproduction in male domestic animal. Forms of male infertility. Factors affecting infertility in male. It diagnosis & primary treatment. Pregnancy diagnosis and differential diagnosis/second. Study of identification use various instruments & appliance/second. Artificial insemination ó practice. Pregnancy diagnosis. Practical knowledge in case of retention of placenta, prolapse.

**Course No. VPH-311: Introductory Veterinary Public Health (Credit Hours: 2+2=4)**

**Theory**

Introduction: definition of veterinary public Health. Milk hygiene in relation to public health. Microbial flora of milk and milk products. Source of bacterial contamination of raw milk and method of control. Clean milk production: source of contamination during collection and transport and processing of milk and methods of control. Hygiene control of dairy equipment and dairy products. Quality control of milk products. Milk hygiene practice in India and other countries. Milk borne diseases and methods of control. Definitions and objectives of zoonosis. Classification of zoonosis, Role of domesticated pets, various wild and cold blooded animals in transmission of zoonotic diseases. Mode of transmission of zoonotic diseases and Study of the important zoonotic diseases of the region . Methods of prevention, control and eradication of zoonotic disease. Socioeconomic condition and Human Health zoonosis.

**Practical**

Collection of milk samples for chemical and bacteriological examination. Grading of milk, on the basis of MBR test: preparation of sample for detection of antibiotic residues in milk and milk products. Preparation of sample for bacteriological examination of raw and pasteurized milk, product and water for processing plant viz. its S.P.C. coliform count, faecal streptococcal count, detection of adulteration and detection of preservatives in milk ; adulteration in ghee. Test of mastitic milk in relation to public health. Visit to primary health

centres to study the common condition of rural population. Demonstration of water purification plant, sewage disposal system and carcass/fallen animal disposal methods.

**Course No. LPM-311: Introductory Animal Management-III (Credit Hours: 2+1=3)**

### **Theory**

Economic importance of poultry, development of poultry industry in India, different breeds and varieties of chicken, ducks and turkeys; terms used in poultry science; how egg is formed & structure of eggs. Formation yolk, albumen and shell; selling of poultry and effect of culling on egg production, incubation of hatching of eggs, selection of hatching eggs, handling and care of hatching eggs, natural and artificial breeding, brooders. Season for breeding; different systems of housing of poultry; floor space requirements construction details of poultry houses and hatcheries, cost of construction, construction of budget poultry sheds for small, medium and large operators; layout plants for poultry farm of various sizes, poultry equipments: incubators, brooders, debeakers, trapnets, feeders and waterers etc. Care and management of chicks, pullets and cockerels, care and management of broilers and layers, feeds and feeding of broilers and layers, poultry farm records; commercial hatcheries and its role in poultry development; random, sample tests; preparation of poultry for show; poultry judging; disinfection of incubators, brooders, farm implement and poultry houses. Disposal of poultry wastes. Utility of poultry manure. Economy in poultry production- Cost of production of table and hatching eggs, broiler meat. Day-old-chick-Preparation of project reports for broiler, layers, hatchery. Cockrel and Japanese Quail farms. Role of avian farms in a mixed farm unit. Vaccination, deworming, detecting deficiencies and combating them etc.

### **Practical**

Handling of poultry. External body part, identification of species, breeds and varieties of poultry. Reproductive and digestive systems of chicken, structure and a composition of eggs and meat, poultry judging, selection and selling of poultry, candling of eggs evaluation of quality, presence off blood and meat spots etc; measuring the strength of eggs, grading of eggs and management of incubators, sexing of chicks, brooding of chicks feeders, waterers, trap nests and poultry farm and hatchery equipments; different systems of housing and lay out plants for poultry farms of different sizes, feeds and feeding of broilers and layers, systems of feeding, slaughter and dressing of poultry, different methods of preservation of eggs and meat; health care and management of chicks, ducklings and turkey care and management of broilers and layers during summer and winter. Record keeping of poultry farm (including accounts). Preparation of feasibility reports for small and medium poultry farms. Preparation of projects reports for the same. Model scheme for a large poultry farm.

**Course No. VSUR-311: Minor Veterinary Surgery (Credit Hours: 2+1=3)**

### **Theory**

Introductions, history, classification and development of Veterinary Surgery. General Surgical principles, preoperative and post-operations. Importance of sutures, suturing materials and different knots asepsis-antisepsis, their application in Veterinary Surgery.

Knowledge of instrument, used in laboratory or hospitals and materials used in surgery. Methods of their sterilization. Inflammation, abscess, tumours, cysts, haemorrhage, haematoma, necrosis, gangrene, burn and scald, surgical affections of muscles, etc. and their treatment, Wound: classification, symptoms-diagnosis and treatment; complications and their preventions. Surgical infections and their preventions and their management. Sign and handling of simple fracture, sprain and dislocation and other affections of joints. Different kinds of bandages, its application. Sign and handling of choke, prolapsed of vagina, uterus and rectum. Assistance in anaesthesia and operation of animals. Suturing of skin and the instrument used thereof. Firing, tattooing dehorning, castration with burdizzo castrator.

### **Practical**

Introduction to the layout of operation theatre, common equipments, surgical instrument. Restraint, positioning, bandaging, catheterizations etc. Operations theatre routines. Preparation of surgical pack, sterilization. Familiarization with various suture materials, sutures. Tying surgical knots, double hand, single hand etc. tension sutures; bowel and uterine sutures. Demonstration of surgical operation-control of haemorrhage, suturing etc. Demonstration of live surgery or recorded operations. Firing, tattooing, dehorning, docking, castration with burdizzo castrator.