FIRST SEMESTER

Code	Course	Cr.Hrs
VAN-111	Gross Anatomy – I	2+2=4
VPY-111	Veterinary Physiology-I	2+1=3
VBC-111	General Veterinary Biochemistry	2+1=3
AGB-111	Biostatistics and Computer Application	2+1=3
LPM-111	General Live-stock Management	1+1=2
LPM-112	Fodder Production & Grassland Management	1+1=2
AHE-111	Sociology and Principles of Veterinary and A.H. Extension	2+1=3
	Total	**12+8=20**

SECOND SEMESTER

Code	Course	Cr.Hrs
VAN-122	Gross Anatomy - II	2+1=3
VAN-123	Gross Anatomy - III	1+1=2
VPY-122	Vet Physiology - II	2+1=3
VBC-122	Veterinary Physiology Chemistry	2+1=3
VBC-123	Introduction to Molecular Biology and Biotechnology	1+1=2
AGB-122	Principle of Genetic and Population Genetics	2+1=3
LPM-123	Animal Housing Sanitation	1+1=2
AHE-122	Livestock Economics, Marketing and Business Management	2+1=3
	Total	**13+8=21**

THIRD SEMESTER

Code	Course Title	Cr.Hrs.
VAN-214	Histology and Embryology	2+2=4
VPY-213	Veterinary Physiology III	2+1=3
ANU-211	Principles of Animal Nutrition	2+1=3
ANU-212	Evaluation of Feedstuff and Feed Technology	1+1=2
VPA-211	General Veterinary Parasitology	1+1=2
VMC-211	General Veterinary Microbiology	2+1=3
VPL-211	General Veterinary Pathology	2+1=3
AGB-213	Principal of Animal Breading	1+1=2
	Total	**13+9 =22**

FOURTH SEMESTER

Code no.	Course Title	Cr. Hrs
VAN-225	Applied Anatomy	0+2=2
VPY-224	Veterinary Physiology IV	1+1=2
ANU- 223	Applied Nutrition-I	2+1=3
ANU- 224	Applied Nutrition-II	1+1=2
VPA –222	Veterinary Helminthology	2+1=3
VMC-222	Veterinary Immunology and Serology	2+1=3
VPL-222	Systemic Pathology	2+1=3
AGB-224	Livestock Breeding System	1+1=2
	Total	**11+9=20**

FIFTH SEMESTER

Code	Course topic	Cr.Hrs
VPT-311	General and C.N.S. Pharmacology	2+1=3
VPA-313	Veterinary Parasitology- III (Entomology and Acarology)	1+1=2
VMC-313	Veterinary Bacteriology and Mycology	2+1=3
VPL-313	Special Pathology – I	2+1=3
VPH-311	Veterinary Public Health (Milk Hygiene and Public Health)	1+1=2
LPM-314	Swine/Equine/Yak Production and Management	1+1=2
LPM-315	Wild and Zoo Animal Health Care and Management/Fish Production	2+1=3
LPM –316	Laboratory Animal/Rabbit/ Fur Animal Care and Mgmt.And Pet Animal Care	1+1=2
LPT-311	Milk and Milk Products Technology	1+1=2
	Total	**13+9=22**

SIXTH SEMESTER

Code	Course Title	Cr.hrs
VPT-321	Autonomic and Systemic Pharmacology	2+1=3
VPA-324	Veterinary Protozoology	2+1=3
VMC-324	General and Systemic Veterinary Virology	2+1=3
VPL-324	Special Pathology – II	2+1=3
VPH-322	Meat Hygiene and Public Health	1+1=2
LPM-327	Sheep And Goat Production And Management	1+1=2
LPM-328	Avian Production and Management	2+1=3
LPT-322	Abattoir Practices and Animal By-Products Technology	1+1=2
	Total	13+8=21

SEVENTH SEMESTER

Code	Course	Cr. Hrs
LPM-419	Livestock Production and Management (Cattle and Buffalo Production and Management)	1+1=2
VPH-413	Veterinary Public Health (Zoonoses and Human Health)	1+1=2
VPH-414	Veterinary Public Health & Enviromental Hygine	1+1=2
LPT-413	Livestock Product Technology (Meat & Meat Products Technology)	1+1=2
VSR-411	Surgery and Radiology (General Surgery and Anaesthesilogy)	2+1=3
VEP-411	Veterinary Epidemiology (Veterinary Epidemiology & Preventive Veterinary Medicine)	1+1=2
AHE-413	Veterinary & Animal Husbandry Extension (Extension Techniques in Veterinary Practice and Livestock Production)	1+1=2
VPT-413	Veterinary Pharmocology & Toxicology(Chemotherapy)	2+1=3
VBC-414	Veterinary Biochemistry (Veterinary Clinical biochemistry)	1+1=2
	Total	**11+9=20**

EIGHTH SEMESTER

Code	Course	Credit hours
VPT-424	Veterinary Toxicology	2+1=3
VOG-421	Veterinary Gynaecology & Obstetrics	2+2=4
VSR-422	Radiology Regional and Clinical Surgery-I	2+2=4
VCM-421	Clinical Veterinary Medicine- I (General & Systemic)	2+2=4
VEP-422	Preventive Veterinary Medicine-I (Bacterial, Viral and Fungal diseases)	2+2=4
VFC-421	Project Work on Veterinary Field Clinic (Veterinary Practice and Management)	0+2=2
VLD -421	Project Work on Veterinary Laboratory Diagnosis-I (Clinics)	0+2=2
	Total	**10+13=23**

NINTH SEMESTER

Code	Course	Credit hrs
VOG-512	Andrology and Artificial Insemination	2+2
VSR-513	Regional & Clinical Surgery-II and Lameness	2+2
VCM-512	Clinical Vet. Medicine-II	2+2
VCM-513	Vet. Ethics and Jurisprudence	1+0
VEP-513	Preventive Vet. Medicine-II	2+2
VLD-512	Project work on Veterinary Laboratory Diagnosis-II	0+2
VFC-512	Project work on Veterinary Field Clinic-II	0+2
CAVM-511	Alternative Veterinary Medicine	Non-credit
	Total	**9+12=21**

FIRST SEMESTER

Code	Course	Cr.Hrs
VAN-111	Gross Anatomy – I	2+2=4
VPY-111	Veterinary Physiology-I	2+1=3
VBC-111	General Veterinary Biochemistry	2+1=3
AGB-111	Biostatistics and Computer Application	2+1=3
LPM-111	General Live-stock Management	1+1=2
LPM-112	Fodder Production & Grassland Management	1+1=2
AHE-111	Sociology and Principles of Veterinary and A.H. Extension	2+1=3
	Total	**12+8=20**

FIRST SEMESTER

Course Title: GROSS ANATOMY- I (Locomotor System, Osteology, Arthrology, Myology)
Code no: VAN-111

Cr. Hr. 2+2=4 **Theory – 50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Upon successful competition of this course students will be able to apply their knowledge in field of veterinary osteology, mycology, arthrology and dissect gross structure of different bones, muscles, joints and integument efficiently.

THEORY

Osteology
Introduction, definition of the terms used in Veterinary Anatomy in general and in osteology in particular. Classification of bones, physical properties, structure of bones. Gross study of bones of appendicular and axial skeleton of ox/buffalo as type species and comparison with other species viz. sheep/goat,pig,horse,dog rabbit and fowl with particular emphasis on their topography, contour, landmarks, functional anatomy etc. from clinical and production point of view.

Arthrology
Introduction, classification of joints of head, neck, trunk, forelimb and hindlimb of ox/buffalo as type species, their structure functional anatomy and comparison with other species from clinical and production point of view.

Myology
Introduction, classification, gross studies of muscles (skeletal) of head, neck, trunk, tail, forelimb and hindlimb of ox/buffalo as a type species; their structural and functional importance from clinical and production point of view. Comparison of structure and function with other species.

PRACTICAL

Osteology
Gross study of the bones of appendicular and axial skeleton, their structure, landmarks, angulation, weight bearing and function in Ox/Buffalo in comparison to horses, dogs, cats, goats/sheep, fowl etc. and relate them in live animals.

Arthology
Study of joints of all the regions of ox/ buffalo to study the structure and function and compare with other species and relate them in live animals.

Myology
Study of the muscles of different region of ox / buffalo, their location and function role in the body and compare with other species and relate them to live situations.

References

- Anatomy of ox –ICAR publication
- Anatomy of Farm animal-Fradson, R.D.
- Anatomy of Domestic Animal-Sisson and Grossman
- Primary Veterinay Anatomy-R.K. Ghosh and A.K. Ghosh.

FIRST SEMESTER

Title: VETERINARY PHYSIOLOGY-I (Locomotory, cardiovascular, Respiratory system and Blood)
Code:VPY- 111

Cr. Hr. 2+1=3 Theory – 50
Full Marks – 75 Practical - 25

OBJECTIVES

Upon successful competition of this course students will be able to understand physiology of locomotor system and muscle contraction, physiology of cardiovascular and respiratory system.

THEORY

Structure of different types of muscles, mechanism of contraction, excitation of muscles, electrical stimulation, isotonic and isometric contractions, effect of temperature and repetitive stimuli on contraction. All or none law, refractory period, fatigue. Rigor mortis, chemical composition of muscle, chemical and thermal changes during muscular contractions, muscles and its physiological properties.

Heart- Structure, course of circulation, rhythmic excitation of heart, conduction system and transmission of impulse, electrical changes accompanying heart and electrocardiogram, cardiac cycle, heart sounds, cardiac output, its variation and regulation, coronary circulation, heart beat and properties of heart pulse, neural and chemical regulation of heart, circulation, hemodynamics of circulation, Blood pressure: venous pressure and arterial pressure. Neural and chemical control of blood vessels and vasomotor reflexes. Adaptation of circulation during exercise. Shock, its mechanism, Unitarian theory, classification of shock, Fluid and electrolyte balance.

Respiratory appratus, Mechanisms of respiration, volume of air respired, intra thoracic pressure and pneumothorax, Artificial respiration. Chemistry of respiration. Composition of inspired and expired air, blood gases, Law of solubility of gas, transport of blood gases, oxygen and carbon dioxide, exchange of gases in lungs and tissues, regulation of respiration, automaticity of respiratory centre and physio-chemical regulation of respiratory centre. Respiratory reflexes, adaptation of respiration during muscle exercise. Hypoxia, role of respiration in acid base mechanism. Respiration in birds.

General function of blood, blood cells, plasma and serum, anticoagulant, Erythrocytes; number, shape size, composition, specific gravity, erythrocytes sedimentation rate, hematocrit and hemolysis,erythroposis and its regulation,life span and fate of R.B.C. Hemoglobin: chemical structure, synthesis estimation, physiological functions, derivatives of hemoglobin and absorption spectra, anemia. Leukocytes: classification, origin, properties, differential count, role of lymphocytes in immunity, plasma composition, plasma proteins, origin and function, coagulation of blood volume and its determination.
Lymph, cerebrospinal fluid and synovial fluid: composition, formation and flow.

PRACTICAL

Collection of blood samples from various animals and bird(s) - preservation of defibrinated blood- Enumeration of erythrocytes, leukocytes - leukocyte differential count- platelet count- estimation of haemoglobin- haematocrit, erythrocyte sedimentation rate, packed cell volume, clotting time, bleeding time, erythrocyte fragility, blood grouping, microscopic study of blood flow in frog web, recording of ECG in various animals, effect of heat and cold (on heart), all or none law, measurement of blood pressure and central venous pressure/ atrial pressure.

Demonstration

Recording of respiration- spirometry, vital capacities- PaO_2, PvO_2, $PaCO_2$, $PvCO_2$, Cardiac output and calculation of related parameters.

Reference:

- Animal physiology-Arora
- Animal physiology-Kanta
- Physiology of Domestic Animal-Dukes.
- Veterinary Physiology- Cunninghams
- Medical Physiology- Guyton

FIRST SEMESTER

Course Title: GENERAL VETERINARY BIOCHEMISTRY

Course Code-VBC-111

Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVES

After completing this course the students will be able to understand the biochemical composition of plant cells, their functions and understand the higher course of agriculture science.

THEORY

Scope and importance of biochemistry - biochemistry of cellular and subcellular components, concentration of solutions, diffusion, osmotic pressure, viscosity, absorption, colloidal state of matter, dissociation of acids, pH, buffer systems, membrane equilibrium, biochemistry of carbohydrates, classification, isomerism - optical isomers, Stereo isomers - Alfa and beta anomers, epimers, furamose and pyramose structure - aldose and ketose - mutarotation, structure, properties and identification of monnosaccharides: ribose, glucose, fructose, galactose, manose, amino sugars, chemical reactions of monosaccharides: osozone formation, oxidation of aldose, reduction of monosaccharides with mineral acids; with alkali. Disaccharides: structure of maltose, lactose, sucrose, Polysaccharides: starch, glycogen, cellulose. Structure of insulin, dextrins, and chitin. Mucopolysaccharides - biochemical significance of important carbohydrate.

Biochemistry of lipids - composition, structure, properties and classification of lipids - simple lipids, compound lipids and derived lipids, Biochemical significance of phospholipids, fat indices, importance of steroids - identification of fat, biochemistry of proteins - classification, structure and properties of simple, conjugated and derived proteins - protein structures, Properties of proteins, denaturation, amphoteric nature, precipitation and coagulation. Amino acids; classification and structupe, neutral amino acids, basic amino acids, acidic amino acids. Properties of amino acids, amphoteric nature, optical activity, peptide bond formation. Reaction with ninhydrin, 1-flouro - 2, 4-dini-trobenzene (sander's reagent). Decarboxylation, saLt formation with HCl. Nucleic acid: classification and structure of nucleic acids - purines and pyramiding bases. Nucleotides and NuCleosides of Purines and Pyrimidines. Structure of DNA. Structure of typical RNA.

PRACTICAL

Preparation and standardisation of acids and alkalies - Determination of osmotic fragility, viscosity, pH-preparation of buffers, calorimetric and electrometric determination of pH, qualitative and quantitative tests and identification of carbohydrates. Saponification value of fat, colour reactions of proteins, electrophoresis, paper chromatography, other colorimetric studies.

Reference

- Ahmand , M . 1995. Modern Biochemistry(Vol I& II).Oxford and IBH Publication , Co, Pvt,Ltd, New Delhi.
- Conn, E.E ., P.K. Stumpf, G .Brueing and H .D. Roy.1987.Outline of Biochemistry.John Wiley and Sons . New work.
- Rameshwor , A. 1993 . Outlines of Plant Biochemistry . Naya Prakash, Calcutta.
- Rameshwor, A .1993 Practical Biochemistry : A basic course Kalyani Publication, New Delhi.
- Well , J. H . 1990 . General Biochemistry . Wiley Eastern Ltd. New Delhi.
- Wilson, K. and J.Walker .1995 Principles and Techniques of Practical Biochemistry Cambridge Universities Press.

FIRST SEMESTER

Course Title: BIOSTATISTIC AND COMPUTER APPLICATION.

Course Code- AGB-111

Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVES

Upon completion of this course the students will able to organize and analyse the data, and interpretate the result. Apply the basic principle of computer for statistical analysis.

THERORY

A. BASIC STATISTICS:-

1. Introduction and importance.
2. Observation and data recording.
3. Frequency distribution and Normal distribution.
4. Statistics parameters – mean, mode, median, variance, standard error and coefficient of variation.
5. Probability, correlation and regression.
6. Test of hypothesis – T.F.S.Z. tests for significance.

B. EXPERIMENTAL:-

1. Design C.R.D.; R.B.D.
2. Analysis of variance.
3. Programming of Data.

C. BIO ASSAY: -

Meaning of bio-assay, dosage response curve, meaning of relative potency of drugs, ED_{5O}, LD_{50}, Parallel ratio, mortality rates, fertility rates, incidence and prevalence rate – standardised rates.

D. **COMPUTER APPLICATION: -**

What is a computer? Components of a computer (anatomy of a P.C.). Types of computers. Hard ware, soft ware, human ware, firm ware. Types of memories control unit. Inputs and outputs. Execution of a Program; data types. Constants, variables, expressions, operators, function commands, simple programs, flow charts, storage of data. Filling, retrieving, reproduction, computer languages, their scope and limitation. Database management system. What are computer programs, their scope, limitation, and use of computer for statistical analysis? Use of computer in Epidemiology; use of computer in farm;

use of computer in Veterinary Hospital. Graphics, Geographic Information System. National informatic centre. Libraries on computer disc/floppies.

PRACTICAL:

1. Systemic approach of data tabulation, estimation of statistical parameters – mean, variance, SE, S.D., C.V.
2. Test of significance T.F.C.Z. tests.
3. Estimate of simple correction.
4. Simple probability questions.
5. Anova formulation.
6. Computer basics; key board, function keys, escape key, control key, shift key, under soccer key, enter key, cursor, backspace, end, home, Pg up, Pg dn etc.
7. Simple operations/programs.
8. Saving your data.
9. Entering biological data into computer.
10. Access data, analysis-using database, and retrieving data for printing, print controls.

DEMONSTRATION:

1. Graphics, their use.
2. G.I.S. its use.
3. Use of word precessor.
4. Data retrieving and analysis through computer (Data base).
5. Use of LAN and other network systems.
6. Retrieving library information through network.

Reference

1. Gomez, K.A. and Gomez, A.A. (1976). *Statistical procedures for agricultural research with emphasis on rice.* The International Rice Research Institute. Los Banos, Laguna. Philippines.
2. Elhance, D.N. (1979). *Fundamentals of Statistics.* 21st edn. Kitab Mahal. Allahabad. India.
3. Gupta, S.P. (1997). *Statistical Methods*. 28th edn. Sultan Chand & Sons. New Delhi. India.
4. Levin, R.I. and Rubin, D.S. (2000). *Statistics for Management.* 7th edn. Prentice-Hall of India Pvt. Ltd. New Delhi, India.
5. Rangaswamy, R. (2002). *A Text Book of Agricultural Statistics.* New Age International (P) Limited. New Delhi, India.
6. Recide, R.S. (1984). *Elementary Statistics.* Istedn. Institute of Mathematical Sciences and Physics, UPLB, Laguna, Philippines.

FIRST SEMESTER

Course Title: GENERAL LIVESTOCK MANAGEMENT
Course Code- LPM-111
Cr. Hr. 1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVES

Upon successful completion of this course students will be able to recognize different breeds of cattle, buffalo, sheep and goats and to rear ruminants animals.

THEORY

Introductory animal husbandry; common animals husbandry terms; body conformation and identification; breeds of cattle and buffalo, sheep, goats, horses, pig, poultry. Common vices in animals, their prevention and care; factors affecting health of livestock. Signs of illness and care and management of sick animals. Disinfection, isolation, quarantine and disposal of carcasses; dentition and age of animals. Rules and regulations regarding transport of livestock by rail, road, air and on foot. Care and management of young stock. Dry and pregnant animals, protection against external and internal parasites. Methods of administration ofmedicines.

PRATICALS

Familiarising parts/ points of various animals. Approaching and handling of farm animals. Tattooing, branding, ear tagging and notching of animals for identification. Methods of restraining and casting controlling of animals like horse, cattle, sheep, goat, pigs, cats, dogs, lab animals, poultry and other birds.
Determination of age of farm animals through dentition, horn rings etc. Washing, grooming, exercise, dipping, spraying, clipping and shearing. Weighing of farm animals and birds by measures and by formulae and their correspondence or discrepancy. Management of animals during transport by different means. Preparation of animals birds for show. Milking dairy animals. Training of breeding males. First aid, methods of administration of medicine and bandages and bandaging, identification of animals to be done in livestock – poultry farms. Recognising various breeds of animals and birds. Familarisation of farm routine.

Reference:

- Cattle Management – Cheryl May, Roston Publishing Company, Inc.Roston, Virginia.
- Textbook on Buffalo Production –C.K. Rajhan, N.N.Pathak.Vikas Publishing House Pvt.Ltd, New Delh.

FIRST SEMESTER

Course Title: FODDER PRODUCTION AND GRASSLAND MANAGEMENT

Course Code- LPM-112
Cr. Hr. 1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVES

Upon the successful completion of this course students will be able to understand basic principle and their application to produce fodder at farmland and identify seasonal common fodders and understand their cultivation practices.

THEORY

Introduction on fodder production. Importance of grasslands and fodders in livestock production; agronomical practices for production of leguminous fodders in different seasons. Agronomical practices for production of non- leguminous fodders, storage of feeds and fodders; scarcity fodders; feed and fodder management for individual animals; fodder production for small units through inter cropping or back yard cultivation. Recycling of animal washings and wastes in fodder production

PRACTICAL

Visit to the fodder farm. Familiarization with the various types of fodder crops utilised in the state and the samples of fodder in Nepal. Fodder cropping routines-familiarization. Collection and preservation of fodder. Cost calculations of fodder production. Familiarisations with the back yard fodder cropping and inter cropping of fodder, livestock waste utilisation an recycling. Calculation on the economic aspects of fodder cropping in the above situations.

Feed storage in animal and poultry farms. Possible damages/loss and methods to prevent them. Economic aspects of procurement of feeds. The recording feeds that are used in small and back yard units and their economics.

Reference

- Pandey K.K ..1982. Fodder tree and tree fodder in Nepal.Swiss Federal Institute of Forestry research. Birmensdrof , Switerland.
- Relwani.L.L .1979.Fodder crops and grasses. ICAR Publication.
- Cayley, J.W.D.and P.R.Bird 1991. Technique for measuring pasture. Technical report series No.191 Hamilton, New Zealand.
- Bayer, W.and A.W.Bayer. 1998. Tropical Agriculture forage Husbandry.ICAR, Macmillan.
- Pande R.S.1997. Fodder and pasture development in Nepal. Udaya R.D.Service (P). Ltd, Kathmandu, Nepal.
- Pathak N.N. and R.C. Jakhmola. 1983. Forage and livestock production. Bikash publishing house, New Delhi.
- Stevens. J.E.1991. Fodder and pasture seed program. Consultant report. HMG, Nepal. DOAD, Livestock Development Project, Nepal.

FIRST SEMESTER

Course Title: SOCIOLOGY AND PRINCIPLES OF VETERINARY AND ANIMAL HUSBANDARY EXTENSION
Course Code- AHE-111
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVES

Upon completion of this course the students will be able to understand the principles of sociology and extension and their application in field level.

THEORY

Definition of sociology, significance of the study of rural and urban sociology for extension workers. Primary concepts of sociology, i.e. society, community, association, institution, rural institution. Difference between rural, tribal and urban communities, social change, factors of change, caste and adoption of non-traditional caste occupation on Nepalese villages social groups, its types and functions for undertaking development program. The social transformation under urban society in resect of these said factors.

Definition, philosophy and principles of extension education, steps of extension teaching. Community development, aims, objectives, organisational set-up. Concept of C.D.; difference between community development and Extension Education; evolution of extension in Nepal; classification of extension teaching methods; audiovisual aids, their classification.

Role of animal in the economy, health and socio-psychology of rural, semiurban and urban society (role of farm stock, companion animals, sports animals etc.) Animal rearing patterns in rural and urban areas their economic, health, psycological impacts.

Client dealing: Communication with rural and urban public for data collection, history taken, follow up, appraisal on prognosis, announcing death of animal to the owner etc.

PRACTICAL

Social survey, its kinds, social sampling, using various types and tools of data collection; data analysis. Motivating individuals to divulge data. Assessing the livestock-man relation, sentiments, fads etc.

Identification of key communicators, operating through them/volunteers in society. Methods of working through functional leaders. Identifying social taboos, social differences, and irritants in the way of organising programs. Identifying right man for right jobs, organising their cohesion, ironing out their differences, motivating individual for a program.

Reference

- Textbook of extension education. B.B.Sing Dangol & N.N. Joshi
- Sociology, B.Bhushand
- Principles of Ecomonic. P.Chopra

SECOND SEMESTER

Code	Course	Cr.Hrs
VAN-122	Gross Anatomy - II	2+1=3
VAN-123	Gross Anatomy - III	1+1=2
VPY-122	Vet Physiology - II	2+1=3
VBC-122	Veterinary Physiology Chemistry	2+1=3
VBC-123	Introduction to Molecular Biology and Biotechnology	1+1=2
AGB-122	Principle of Genetic and Population Genetics	2+1=3
LPM-123	Animal Housing Sanitation	1+1=2
AHE-122	Livestock Economics, Marketing and Business Management	2+1=3
	Total	**13+8=21**

SECOND SEMESTER

Course Title- GROSS ANATOMY – II (Neurology, Angiology and Aesthesiology)
Course code- VAN-122
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon successful completion of this course students will be able to understand the network of blood supply and nerve supply to the different parts of body of animals.

THEORY

1. Neurology - introduction, gross study of meanings, brain, spinal cord, cranial and spinal nerves and autonomic nervous system of ox/buffalo as a type species and comparison of features with other species; functional importance from clinical and production point.
2. Angiology - Introduction, gross study of heart, its conduction system and vessels of Ox/buffalo as a type species and comparison of the features important from clinical and production point of view in sheep/goat, pig, horse, dog and fowl.
3. Aesthesiology - Gross study of the eye and ear of ox/buffalo, its structures and their normal appearance and functional importance; comparison of the above features in other species.

PRACTICAL

1. Study of the brain, its parts, spinal chord, its branching, motor nerve trunks, autonomic and peripheral nerves of ox/buffalo and its comparison with the same or other species and their clinical importance.
2. Study of heart; its structures, conduction system; dissection of great vessels, afferent and efferent blood vessels, lymph channels, lymphoids, their drainage. Comparison of cardiovascular system of various species, and their functional importance.
3. Dissection of the eye and ear of ox (buffalo) and comparison of its shape and structures in various species and their functional importance.

Reference

- Anatomy of ox –ICAR publication
- Anatomy of Farm animal-Fradson, R.D.
- Anatomy of Domestic Animal-Sisson and Grossman
- Primary Veterinay Anatomy-R.K. Ghosh and A.K. Ghosh.
- Tropographical anatomy of domestic animals, Atlas by Peter Popesco.
- Text book of Veterinary anatomy by Dyce.
- The systemic study of canine anatomy by D.R.Adams.
- Miller's Guide to the dissection of the dog by H.E.Evans.

SECOND SEMESTER

Course Title- GROSS ANATOMY - III (Splanchnology)
Course code- VAN-123
Cr. Hr. 1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Students will be familiar with different organs of different systems and their functions.

THEORY

Introduction, gross study of organs of digestive, respiratory, urinary, reproductive and endocrine system of ox (buffalo) as a type species, and comparison of salient structural and functional features with other species.

PRACTICAL

Gross study of digestive, respiratory, urinary, reproductive and endocrine system of ox (buffalo and their comparative anatomy in other species. Topographic comparison in live animals.

Reference

- Anatomy of ox –ICAR publication
- Anatomy of Farm animal-Fradson, R.D.
- Anatomy of Domestic Animal-Sisson and Grossman
- Primary Veterinay Anatomy-R.K. Ghosh and A.K. Ghosh.
- Textbook of Veterinary anatomy by Dyce.
- The systemic study of canine anatomy by D.R.Adams.
- Miller's Guide to the dissection of the dog by H.E.Evans
- Topographical anatomy of domestic animals, Atlas by Peter Popesco.

SECOND SEMESTER

Course Title- VETERINARY PHYSIOLOGY-II (Digestive, Excretory and Nervous System)
Course code- VPY-122
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon successful completion of this course students will be able to understand physiology of cardiovascular and respiratory system.

THEORY

Functional anatomy of digestive tract of monogastric and ruminant animals, prehension, mastication, deglutition, movements of stomach, small intestine and large intestine, - rumination. Defecation; hunger contractions. Thirst, vomition; saliva, its composition, secretion and function, pancreatic juice, bile, intestinal juices - their regulation, composition and function.

Digestion in the ruminant stomach, microbial activities in the stomach and intestine. Absorption of foodstuffs, places of absorption, mechanism of absorption, absorption of carbohydrates, proteins, fats and water. Digestion in poultry.

Kidney: Structure of nephron (Histological peculiarities) blood supply to kidneys. Methods of studying renal function, mechanisms of urine formation, micturition. Physical characteristics and composition of urine in health and diseases. Role of kidney in acid base and electrolyte balance. Excretion of urine in birds.

NERVOUS SYSTEM:

Structure of nerve fibre, degeneration and regeneration of nerve fibres, nature of the nerve impulse and its propagation, all or none character of nerve impulse, transmission of excitatory state from nerve to effect or tissue.

Neurons, synapse and transmission of nerve impulse, cutaneous receptor organs; peripheral nerves. Spinal cord and reflex action. Brain stem and cerebellum, cerebral hemisphere; conditioned reflexes; wakefulness and sleep. Autonomic nervous system; general arrangement and chemical transmission.

SENSORY ORGANS

Eye: Structure of eyes, nourishment and protection, mechanism of vision; visual accommodation and defective vision; retina and its structure; physiological and structural changes in retina on exposure to light.

Ear: Structure and mechanism of hearing; physiology of olfaction and taste.

Skin: Functions, sebaceous and sweat glands and their functions, thermoregulation; maintenance of body temperature, regulation against heating and cooling.

PRACTICAL

Counting of rumen motility, estimation of volatile fatty acids and ammonia in rumen, Identification and counting of bacteria and protozoa. In-vitro action of proteolytic enzymes - pepsin and trypsin - recordings of rumen movements - reticular sounds. Intestinal motility. Physiological constituents of urine. Estimation of titrable acidity in urine.

Nerve muscle preparation - simple muscle curve - in vivo muscle stimulation - effect of cold, heat and load -effect of fatigue.

Demonstration of kidney function tests, - urine secretion- excretory system of birds.

Reference

- Animal physiology-Arora
- Animal physiology-Kanta
- Physiology of Domestic Animal-Dukes
- Veterinary Physiology- Cunningham
- Medical Physiology- Guytons

SECOND SEMESTER

Course Title- VETERINARY PHYSIOLOGY CHEMISTRY (Animal Metabolism, Systemic Functions and Enzymes)
Course code- VBC-122
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

After completing this course the students will be able to understand the biochemical composition of cell, their fuctions and understand the higher course of agricultural science.

THEORY

Study of physio-chemical laws (osmosis, diffusion, colloidal state, Donnan's theory of membrane equilibrium, etc.)

A. Enzyme – definition, unit of enzyme.
   (i) Properties: - Protein nature, enzyme substrate complex formation, and modern concept about the active centre of enzyme. Specificity of enzyme action:- group specificity, steriospecificity, optical specificity.
   (ii) Effect of substrate concentration, effect of enzyme concentration. Effect of pH, effect of temperature on enzyme action, competitive and non-competitive inhibition of enzyme.
   (iii) Enzyme classification.
   (iv) Coenzyme and cofactors.

B. Biological oxidation:
(i) Enzymes and coenzymes involved in oxidation and reduction :- Oxidoreductase; oxidizes, aerobic dehydrogenate, hydroperoxidase, anaerobic dehydrogenate, cytochromes.
   (ii) Mitochondrial electron transport chain.

C. Metabolism in ruminants and non-ruminants: -
   (i) Carbohydrate metabolism: (a) Glycolysis. (b) T.C.A. Cycle.
   (ii) Fat metabolism: (a) B-Oxidation of fatty acid, ketone body formation.
   (iii) Protein metabolism: (a) Deamination & Transamination. (b) Urea synthesis. (c) Protein synthesis.
   (iv) Nucleic acid metabolism: (a) DNA synthesis

D. Energy metabolism in domestic animals: -
   (i) Caloric value of foods, R.Q., S.D.A.,
   (ii) Basal metabolism.

E. Metabolism of calcium, phosphorus, & trace minerals:
   (i) Metabolism of calcium & phosphorus etc.
   (ii) Metabolism of essential trace elements.
   (a) Iron
   (b) Cobalt and selenium.

F. Use of Isotope in metabolic studies.

G. Vitamins: Structure and metabolic reel:-
   (i) Vitamin A, D, E, &K.
   (ii) Vitamin C.
   (iii) Role of Vitamin B-complex as coenzyme only: - Thiamine, Riboflavin, Niacine, Prysozine, Pantothenic acid, Lipoid acid, Biotin, Folic acid, Vitamin B 12.

H. Biochemistry of blood and other body fluids: -
   (i) Plasma proteins and functions of plasma proteins.
   (ii) Plasma protein changes in disease some inherited deficiency of plasma protein fractions.
   (iii) Hemoglobin chemistry.
   (iv) Coagulation and haemolysis of blood.
   (v) Lymph, tissue fluid and C.S.F.
   (vi) Chemistry of Bile.

I. Biochemistry of tissue (only brief notes).

PRACTICAL

1. biochemical estimation of plasma proteins.
2. Urine analysis.
3. Estimation of blood sugar.
4. Estimation of serum total serum cholesterol.
5. Serum bilirubin determination.
6. Blood urea estimation.
7. Glucose tolerance test.

Reference

- Ahmand, M, 1995. Modern Biochemistry (Vol I& II).Oxford and IBH Publication, Co, Pvt, Ltd, New Delhi.
- Conn, E.E., P.K. Stumpf, G. Brueing and H .D. Roy.1987.Outline of Biochemistry.John Wiley and Sons. New work.
- Rameshwor, A. 1993. Outlines of Plant Biochemistry. Naya Prakash, Calcutta.
- Rameshwor, A .1993 Practical Biochemistry: A basic course Kalyani Publication, New Delhi.
- Well, J. H . 1990. General Biochemistry. Wiley Eastern Ltd. New Delhi.
- Wilson, K. and J.Walker .1995 Principles and Techniques of Practical Biochemistry Cambridge Universities Press.

SECOND SEMESTER

Course Title- INTRODUCTION TO MOLECULAR BIOLOGY AND BIOTECHNOLOGY
Course code- VBC-123
Cr. Hr. 1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon successful completion of the course the students will be able to describe Molecular Biotechnology.

THEORY

History of molecular biology-molecules in cell-basic principles of biosynthesis of proteins and nucleic acids-Ribonucleic acid (RNA), Polimerase Chain Reaction (P.C.R.) Definition of biotechnology – Basic principles of biotechnology applicable to veterinary science e.g. :-

- Reproduction, Embryo transfers technology, in vitro fertilizations, pregnancy diagnosis, and transgenic animal.
- Disease diagnosis : hybridoma technique. Monoclonal, DNA probes. Prophylaxis: - Sub unit vaccines.

Basic principles of fermentation technology, animal cell culture and cell lines.

PRACTICAL:

Demonstration of the following:-

(i) Isolation and culturing of lymphocytes, chromosomal preparation and staining.

(ii) Embryo transfer techniques – Superovulation, collection and screening of embryo.

(iii) Cell culture techniques and cell lines.

(iv) Demonstration through Models/charts of Molecular biology aspects.

* Use of audio visual technology (slide, videotape, films, floppies, etc) for applied aspects of veterinary biotechnology (with respect to Livestock Health, Production and Technology).

Reference

- Principle of Biochemistry: Lehninger, Nelson, Cox , CBS Publications , 1993.
- Molecular Cell Biology: Darnell, Lodish and Baltimore:1986 by Scientific American Books.
- Textbook of Biochemistry with Clinical correlations: Thomas M.Delvin; A John Wiley and Sons, Inc. Publications.
- Textbooks of Chemotherapy: Gunter Zweig Joseph Sherma.Editors-in –chief: General Data and Principle VolumnII, RCR Press, Inc.Boca Raton, Florida; 1982.

SECOND SEMESTER

Course Title- PRINCIPLES OF GENETICS AND POPULATION GENETICS
Course code- AGB-122
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to understand different genetic principle and methodology of quantitative genetic.

THEORY

History of genetics in brief. Study of animal cell. Chromosome number in different species of livestock and poultry, behaviour of chromosomes during mitosis and meiosis with special reference to gameto-genesis, mendalian principles, dihybrid and polyhybridations. Gene interaction, epistasis, multiple alleles, linkage and crossing over, sex controlled inheritance and sex determination.

Modified Mendalian Inheritance-Lethals and sublethal characters, mutation, chromosomal aberration, cytoplasmic inheritance. Preliminary ideas of biochemical; bacterial and developmental genetics.

Quantitative Inheritance, genetics constitution of population – gene frequency, genotype frequency, Hardy Weinberg law, defects of selection, migration, mutation and population size on gene frequency.

Values and Means – Population mean, average effect breeding value, Dominance deviation, interaction deviation. Variance-genetics and environmental variance, resemblance and phenotype resemblance, heritability.

PRACTICAL

Study of cytological slides of animal tissues with special reference to mitosis and meiosis. Problems of Monohybrid inheritance, dihybrid inheritance, gene interaction. Multiple allele, linkage and crossing over, sex-linked inheritance, lethal factors.

Computation of gene and genotype frequencies. Testing of hardy Weinberg law on basis of data supplied. Calculation of efforts of selection, migration, mutation and population size on gene frequency, calculation of population mean, average effect breeding value, dominance deviation and interaction deviation, computation of genetic and environmental variance and covariance computation of heritability.

Reference

1. Mukherjee, D.P. and Banerjee, G.C., Genetics and Breeding of farm animals. Oxford and IBH Publishing Co. Pvt Ltd Delhi, India.
2. Rastogi, V.B.(2001).Genetics .Kedar Nath Ram Nath.Delhi , India.
3. Stansfield, W.W.Theory and problems of Genetics.Schaum's Outline Series.Tata McGraw Hill Publishing Co.Ltd.,New Delhi, India.
4. Strickberger, M.W. (2001). Genetics.Third edition. Prentice-Hall of India Pvt. Ltd., New Delhi, India.
5. Winchester, A.M.(1996).Genetics .Third edition.Oxford & Publishing Co.Pvt.Ltd, New Delhi, India.

SECOND SEMESTER

Course Title- ANIMAL HOUSING AND SANITATION
Course code- LPM-122 Theory – 25 Practical - 25
Cr. Hr. 1+1=2 **Full Marks – 50**

OBJECTIVE
Upon successful completion of this course students will be able to recognize different breeds of cattle, buffalo, sheep and goats and to rear ruminants animals.

THEORY
Rainfall and geology in relation to water supply. Sources of water supply; impurities and pollution of natural waters; prevention of pollution and contamination of water sources, hardness of water significance of hard and soft waters, treatment of hard

waters, purification of water supplies; storages; coagulation and sedimentation; filtration; physical and chemical sterilisation. Distribution and storage of water supplies; action of water on metals.

Water supply for domesticated animals; animal disease associated with water supplies; hygienic requirements; amount of water required by domestic animals; hygienic method of watering livestock; urban and rural water supply. Water requirements of various species of individual animals.

Sanitation
Drainage for buildings; drain pipes, traps, and fittings; laying of a drainage system: testing of drains.

General principles of sewage disposal and purification. Removal and disposal of excreta and other wastes from animal habitations. Collection, storage and disposal of solid manure, Compost making. Drainage, storage and disposal of liquid manure. Animal excreta as breeding material for flies; fly-borne diseases; methods of manure disposal to prevent fly breeding.

Environment
Effect for environment on the health and productivity of livestock and measures to counteract this.

Ventilation
Composition of atmospheric air, pol,ution of atmospheric air; change3 in the air resulting from respiration; significance of the changes in the expired air; detrimental effects of inadequate ventilation; air- borne diseases.

Ventilation requirements, presumptive standards for permissible air pollution in buildings; respiratory ehchange of domestic animals; carbon dioxide excreted by domestic animals fresh air flow and ventilation, natural and mechanical ventilation size of air inlets and outlets, Findlay's and King's method of ventilation; ventilation of double-story kennels, stables, poultry and other animal houses.

Light:
Daylight change; effect of light on breeding habits, body covering, growth and production of farm animals; experimental light treatment, mechanism of light action; practical consideration.

HOUSING OF ANIMALS:
General principles affecting the design and construction of buildings for housing livestock. Selection of site. Arrangement of the buildings with special reference to Nepalese conditions. Utilisation of local materials.

General principles of buildings, building materials, bricks, tiles, stones, limes, mortars and cements, mud, asphalt's, felts and bituminous roof covering; timbers; characteristics of good timber; common defects in timber. Wall, roof and floor construction.

PRACTICAL
Familiarisation with the various types of animal houses, pens and cages for avians, cost estimation of housing of animals and birds. Cost effective animal houses and avian pens. Different systems of ventilation, drainages, sewerage disposal techniques; waste diversion for liquid manure compost, cow dung gas unit etc.; cost estimation of cost effective methods. Familiarization with rural and urban animal housing systems – their construction; cost estimation and assessment of efficiency.

Reference

- Cattle Management – Cheryl May, Roston Publishing Company, Inc.Roston, Virginia .
- Textbook on Buffalo Production –C.K. Rajhan, N.N.Pathak.Vikas Publishing House Pvt.Ltd., New Delh

SECOND SEMESTER

Course Title- LIVESTOCK ECONOMICS, MARKETING AND BUSINESS MANAGEMENT
Course code- AHE-122
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE
Upon completion of this course the students will be able to understand different theory of ecomomic and relate it with marketing and business.

THEORY

ECONOMICS

Introduction, definition and scope of Economics, wants, goods, wealth utility consumption, demand, supply, value, price, real income and money income. Important features of land, labour, capital and organisation, production, exchange, distribution and statistics of animal and poultry to State and Nation.

Theory of demand, theory of production price determination.

MANAGEMENT

Organisational aspects of livestock farm (poultry and animal). Tools of Management.

(a) Resource Management: sources and Procurement of material; financial resources. Resources scheduling under limited resource and capacity problems; procedures of norm fixation.
(b) Accounting - Definition, objectives, common terms used; different systems of book keeping, double entry book keeping definition, application and its division, original record, closing of accounts, rules for debit and credit. Recording of business transactions.
Analysis of financial accounts:
(c) Product management:
Principles of product optimisaiton (timing, production season etc.); producing cost and break- even analysis.
(d) Personnel (labour) management:
Identification of work. Work analysis, distribution of labour; Optimisaiton of Labour input. Tenets of labour srpervisison, supervising the supervisors. Department - alisation of economic efficiency, division of labour: merits and demerits of job specialisation.
(e) Marketing:
Concepts of marketing needs for marketing, marketing perishable and non-perishable goods.
Merchandising - product planning and development standardising and grading; buying, selling; transport storage; risk bearing; market information; market intelligence; Market opportunities - consumer behaviour, consumer demand, market demand; market stagnation; market measurement and forecasting.

PRACTICAL

Bookkeeping. General entry; writing of cash book (two column & three column); ledger, purchase sale registers, purchase sale return register; trading, profit loss accounts; income & expenditure accounts; balance sheet; bill of exchange (bill of receivable and bill of payable); types of error; rectification of errors; branch accounts; bank reconciliation statement. Cost accounting practices. Project estimation trials.

Analysis of input and output data in farming. Working out a feasibility report. Working out the economics of a dairy unit; poultry, piggery, sheep and goat units of varying sizes. Visits to farms, markets, cattle fares, back yard units and studying their tools of managements. Case analysis.

Reference

- Johl and Kapoor, Farm management.
- S.S. Gupta, Principle of Economic.
- Slowman, Ecomonic.
- Lepsy, Principle of Economics.

THIRD SEMESTER

Code	Course Title	Cr.Hrs.
VAN-214	Histology and Embryology	2+2=4
VPY-213	Veterinary Physiology III	2+1=3
ANU-211	Principles of Animal Nutrition	2+1=3
ANU-212	Evaluation of Feedstuff and Feed Technology	1+1=2
VPA-211	General Veterinary Parasitology	1+1=2
VMC-211	General Veterinary Microbiology	2+1=3
VPL-211	General Veterinary Pathology	2+1=3
AGB-213	Principal of Animal Breading	1+1=2
	Total	**13+9 =22**

THIRD SEMESTER

Course Title: HISTOLOGY AND EMBRYOLOGY (General and Systemic)
Course code: VAN-214
Cr. Hr. 2+2=4 **Theory – 50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Upon successful completion of this course students will be able to explain normal cell and basic tissue of the animal body and understand basic facts, principles and developmental processes of different species of animals (mammals and birds).

THEORY

General Histology

Introduction, cell structure, cell division and study of basic tissues of the body.

Systemic Histology

Histology of the organs of digestive, respiratory, urinary, reproductive, nervous and cardiovascular systems, sense organs endocrines, lymphoid organs etc. of domestic animals and birds.

General Embryology

Introduction, gametogenesis, fertilization, cleavage, gastrulation and the development of foetal membranes in birds and mammals. Placentation and placenta in mammals.

Systemic Embryology

An over view of development of the organs of digestive, respiratory, urogenital, cardiovascular, nervous and locomotary system and organs of special sense and endocrines. Stage wise study of embryo/foetus of chick, cattle/buffalo, sheep, goat, dog etc.

PRACTICAL

Study of compound microscope, its parts, histological technique and study of different basic tissues of the body. Study of different histological slides of various systems of the body. Study of different parts of eggs of fowl. Microscopic study of sperm of bull and ova of cow/she-buffalo.

Study of the serial sections of chick/pig embryos/foetus at different stages of development. Study of foetus of various species at various stages of pregnancy (comparing development of different systems).

Reference

- Veterinary Histology-Horst Dieter Dellmann.
- Textbook of Veterinary Histology-Dellmann and Brown.
- Embryology of Pig-Bradley M. Pattern.
- Outline Text, Histology and Embryology-Robert Getty.
- A Textbook of Embryology –G.S. Sandhu, Sharad Srivastava, C.K. Arrora.
- Handbook of Histology and Histochemical techniques-S.K. David.
- Bailley's Textbook of Histology.

THIRD SEMESTER

Course Title: VETERINARY PHYSIOLOGY III (Endocrinology Reproduction and Lactation)
Course code: VPY-213
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon successful completion of this course students will be able to understand physiology of the endocrine system, reproduction, system and function of mammary gland.

THEORY

Endocrinology
Gonadotrophic hormones of anterior pituitary glands; follicular stimulating hormone, leutinizing hormone and prolactin.

General organisation and methods of study of endocrine system, Hormones; definition and classification, general mode of action and regulation of hormones. Physiology of hormones. Hypothalamus and hypophysis and their relationship to target glands and organs. Endocrine physiology of Thyroid, Parathyroid, Adrenals, Pancreas, Pineal body, Thymus. Hormones of gastrointestinal tract. Prostaglandins.

Reproduction
Male genital organs; functional anatomy of testes and accessory genital glands. Spermatogenesis. Testosterone, its functions and regulation, Cryptorchidism.

Female genital organs: Function of ovary structure of graffian follicles and corpus luteum. Estrogen and progesterone and their actions. Changes in the female genital organs during the various phases of the sexual cycle and their regulation, ovulation and fertilisation; pregnancy: function of placenta, hormones present in the biological fluids during pregnancy and their use for the diagnosis of pregnancy.

Lactation
Functional organisation of mammary glands, structure and development, effect of estrogen and progesterone, hormonal control of mammary growth, lactogenesis and galactopoesis. Composition of milk.

PRACTICAL

Sperm motility. Sperm concentration, live and dead sperm count.

Demonstration
Estimation of progesterone and oestrogen by RIA and ELISA techniques; characteristics of oocytes.
Effect of heat and cold on scrotal musculature, demonstration of factors affecting 'let down of milk'.

Demonstration of oestrus cycle in different species; demonstration of parturition in various animals (live or video films); egg laying; phenomenon of mating.

Reference:

- Animal physiology-Arora
- Animal physiology-Kanta
- Physiology of Domestic Animal-Dukes
- Veterinary Physiology- Cunninghams
- Medical Physiology- Guytons
- NMS Physiology

THIRD SEMESTER

Course Title: PRINCIPLES OF ANIMAL NUTRITION
Course code: ANU-211
Cr. Hr. 2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

The objective of this course is to enable students about the formulation of ration for ruminants and nonruminants species. This course will also strengthen student's ability to improve feeding practices of livestock through applied knowledge in animal nutrition.

THEORY

History of Animal Nutrition, importance of nutrients in animal health and production, composition of animal body and plants, comparison between plants and animals, biochemical basis of soil, plant and animals. Nutritional terms and their definitions. Nutrients and their metabolism, role and requirements of water, carbohydrates, their digestion, absorption and metabolism in ruminants and non-ruminants. Proteins and amino acids, their digestion, absorption and metabolism. Use of NPN compound for ruminants and non-ruminants. Lipids and their utility. Mineral elements and their function – major elements. Importance of trace elements in livestock health and production. Importance of Vitamins, their deficiency symptoms, requirements of supplementation in feed. Feed additives in the rations of livestock and poultry; Antibiotics and hormonal compounds and other growth stimulants; their uses and abuses.

PRACTICAL

General precautions while working in Nutrition Laboratories. Normal solution, equivalent weight, molar and normal solution, titration, standard solution, titre, end point and Indicators. Preparations of solutions of various strength of common acids, alkalies and alcohols for determination of proximate principles of feed. Preparations of common reagents and indicators. Preparation of samples for chemical analysis – herbage, faeces, silages. Processing and weighing of biological samples – weighing of sample for proximate analysis, General precautions in weighing samples. Proximate principles in feed – general views, main features of Weende's system of analysis, estimation of dry matter, total ash and acid insoluble ash in feed samples. Familiarisation of various feed stuff, fodders and their selection.

Reference

- Benerjee, G.C. 1984. The text book of Animal Husbandary. Published by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Benerjee, G.C.1986. A Text book of Animal Nutrition.Publishing by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Morision, F.B. 1984. Feeds and feeding. C.B.S. Publishers and distribution, Jain Bhawan , Bhola Nath Nagar Delhi, India.
- Ranjhan, S.K . 1993 Animal Nutrition and Feeding Practices in India, Vikash publishing house Pvt. Ltd., India.
- Singh, S.B. and M. Sapkota. Animal Nutrition and Fodder production. Publishing by T.U.IAAS Rampur.

THIRD SEMESTER

Course Title: EVALUATION OF FEEDSTUFF AND FEED TECHNOLOGY
Course code: ANU-212
Cr. Hr.1 +1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be familiar about the evaluation, processing, formulation and storage of the feedstuff.

THEORY

Common feeds and fodders, their classification, availability and importance for livestock and poultry production. Chemical composition and nutritive value of various feed and fodders. 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 e.g. silage and hay making and their uses in livestock feeding. Harmful natural constituents and common adultrants of feeds and fodders.

PRACTICAL

Determination of proximate principles of feed-Estimation of crude protein, ether extract, crude fibre, Nitrogen free extract, calcium and phosphorus in feed samples. Demonstration of detergent method of forage analysis. Qualitative detection of undesirable constituents and common adulterants of feed. Demonstration of laboratory ensiling of green fodders. Feed mixing (Selection of material for quality control, feed processing). Silage pit preparation.

Reference

- Benerjee, G.C. 1984. The textbook of Animal Husbandary. Published by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Benerjee, G.C.1986. A Textbook of Animal Nutrition.Publishing by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Morision, F.B. 1984. Feeds and feeding. C.B.S. Publishers and distribution, Jain Bhawan, Bhola Nath Nagar Delhi, India.
- Ranjhan, S.K. 1993 Animal Nutrition and Feeding Practices in India, Vikash publishing house Pvt, Ltd India.
- Singh, S.B. and M. Sapkota. Animal Nutrition and Fodder production. Publishing by T.U.IAAS Rampur.

THIRD SEMESTER

Course Title: GENERAL VETERINARY PARASITOLOGY
Course code: VPA-211

Cr. Hr. 2+1=3
Theory – 50
Cr. Hr.1 +1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to assess the knowledge about the drugs used in parasites control and identify the cestode parasite on the basis of morphology and development features.

THEORY

Introduction of parasitology, history, definitions. Importance of Parasitology in Veterinary curriculum. Parasites and parasitism. Types of Parasitism. Commensalism, symbiosis and predatorism, type of hosts: Final and Intermediate hosts, paratenic host and reservoir hosts, natural and unnatural hosts. Host parasite relationship; mode oftransmission of parasites and methods of dissemination of the infective stages of the parasites, harm done by parasites, to the host (pathogenicity), specificity in relation to species, breed, sex and location, tissue reactions caused by parasites to the host, resistance of hosts to parasitic infections/infestation. Importance of immunity against parasitic infections – natural and acquired immunity. General control measures against parasitic diseases. Parasitic immunity, Nomenclature of parasites, international, zoological nomenclature; rules and regulation, general classification of parasites. Characteristics of various Phyla: Protozoa, Arthropod, Platyhelminths, Nemathelminths and Acanthocephala. Types of development. Direct and indirect life cycles. Development of parasites in the host system. Importance of chemotherapy in relation to parasitic control program. Anthelminthic medication.Use and abuse of Antiparasitic drugs insecticides and acaricides in Veterinary Practice.

PRACTICAL

Demonstration of the types of final and intermediate hosts. Demonstration of different organs/tissues of the hosts affected with endo and ecto parasitic; Demonstration of free living and parasitic stages of the parasites through charts, specimens etc. Demonstration of specific parasitic lesions caused by endo and ecto parasites. Demonstration regarding the types of life cycles of different parasites. Direct and indirect life cycles. Visit to P.M. Hall to acquaint with different organs of animals affected with parasites in large/small animals. Demonstration of Parasites culture, Bayermann technique, sporulation etc. Faecal examination technique, Egg counts, blood smear preparation – Thick and Thin smears. Staining of blood smears. Examination of skin Scrapings and nasals washings - collections, fixation and preservation of parasites- making temporary & permanent mounts of parasites.

Reference

- Helminths, Arthropods and Protozoa of Domesticated Animals, E.J.L. Soulsby, ELBS, and Bailliere and Classes, London.
- General Parasitology, Thomas C.Chang, Academic Press, Orlando, Florida 32887.
- Veterinary Parasitology, G.M. Urguhart *et. al.* Blackwell Science Ltd.
- Animal Parasitology, J.D. Smyth, Cambridge University Press.

THIRD SEMESTER

Course Title: GENERAL VETERINARY MICROBIOLOGY
Course code: VMC-211
Cr. Hr.2 +1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to understand morphology, staining principle and identification of bacteria, bacterial metabolism, general properties of virus and fungi.

THEORY

Highlight on developmental history of Veterinary Microbiology. Microbiology of unicellular organisms and their classification. Microscopy-bright field, dark field, ultraviolet, fluorescent, phasecontrast and electron microscope and their modified applications.

Micro-organisms: Morphology and structure of bacteria, shape, size and arrangement of bacteria, morphological variations. Cell wall, capsule, nucleus, cytoplasmic inclusions, flagella,motility, endospores, sporulation, vegetative reproduction. Bacterial stains, staining principles of gram, acid fast and endosperm, flagella and capsular staining. Cultivation of bacteria, nutritive requirements of bacteria, culture media, reproduction and growth rate, growth curve of bacterial population, continuous culture of bacteria and measurement of growth. Isolation of bacteria in pure culture, cultural characteristics on solid medium, aerobic and anaerobic cultivation and identification of bacteria. Distribution of bacteria and other microbes. Sources of infections. Methods of transmission of infections.

Sterilisation, disinfection, and evaluation of disinfectants and antiseptics: phenol co-efficient. Factors influencing sterilization and disinfection. Break in asepsis and defective sterilisation. Antibiotics and antimetabolites and their mode of action. Aseptic handling of sterilized materials; disinfection of animals. Life of sterile status.

Bacterial metabolism: - energy relationship, source of energy and catabolism, dissimilation of carbohydrates, proteins and fats. Classification and nomenclature of bacteria. Bacterial genetics, mutation and variations associated with virulence, antigenicity and colonial characteristics. Plasmids and drug resistance, transformation, transduction and conjugation.

Introduction, morphology, growth, nutrition, reproduction and classification of fungi.

General properties of virus: Morphology, electron microscopy and size of viruses. Bacteriophage. Viral proteins, nucleic acids and lipids. Purification of virus particles and reaction of viruses to physical and chemical agents.

Classification, cultivation and replication of viruses. Viral genetics and interactions. Viral haemagglutination, interferons and inclusion bodies. Oncogenic and latent viruses.

PRACTICAL

Microscopy and routines, Motility, Staining (simple & Grams), Acid fast, Lactophenol cotton blue,
Special staining (Capsular, Spore staining Leishminn, Methylene blue staining), Sterilisation, evaluation of disinfectants, asepsis etc., Preparation of reagents media.

DEMONSTRATION

Equipment and sterilization, disinfection, Culture characters, Aerobic cultivation, Anaerobic cultivation, Biochemical characters, Pathogenicity test and Antibiogram, Slide culture technique for fungus.

Reference

- Clinical Veterinary Microbiology by P.J.Quinn, M.E. Carter, B.K. Markey and G.R. Carter.
- Diagnostic procedure in veterinary bacteriology and mycology by G.R.Carter and J.R.Cole.
- Applied Microbiology –Prasad.
- Techniques in Microbiology-Gupta.

THIRD SEMESTER

Course Title: GENERAL VETERINARY PATHOLOGY
Course code: VPL-211
Cr. Hr.2 +1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to understand the pathological terminology, differentiate the normal and abnormal structures grossly and microscopically.

THEORY

Introduction, history and scope of pathology, its relation with other discipline, definitions. Causes of diseases- intrinsic and extrinsic, nutritional, physical, chemical and biological. Developmental disturbances: anomalies and monsters.

Disturbances of circulation: hyperemia, congestion, hemorrhage, thrombosis, embolism, infarction, oedema and shock.

Disturbances of cell metabolism: gout, hyaline degeneration, mucoid degeneration, amyloid infiltration, cloudy swelling, hydropic degeneration fatty changes, classification, Ossification, disturbance of pigment metabolism, Icterus, Necrosis, gangrene and P.M. changes.

Disturbance in growth: Atrophy, Aplasia Hyperplasia, Hypoplasia, Hypertrophy and metaplasia.

Inflammation: Introduction. Definition, etiology and cardinal signs, circulatory changes. Increased vascular permeability-cellular change. phagocytosis and body defense. Classification of inflammation as per duration, per-acute, acute, sub-acute and chronic inflammation. Healing.

Fever, Concretions: urolith, cholelith, sialolith, pancreolith, enterolith, Immune reaction: Hypersensitivity and auto- immunity.

PRACTICAL

Study of gross pathological specimens and recognition of gross pathological lesions. P.M. techniques and collection of morbid materials. Techniques of preservation, dispatch and section cutting. Staining and identification of sections prepared from pathological lesions. Examination of slides depicting changes in cells and tissues. Steps on P.M. examination of dead animals. Study of histopathological slides showing haemorrhage congestion, oedema, infarction, hyperplasia, metaplasia, hypertrophy, necrosis, cloudy swelling amyloid degeneration, fatty changes, calcification and inflmmation etc.

Reference

- Veterinary Pathology CBS Publishers and Distributors, India –Ganti Sastry.
- Pathology of infectious diseases of domestic animals –H.V.S .Chauhan.
- Veterinary Pathology in the tropics –Mugera.
- General Veterinary Pathology- J.L. Vegad

THIRD SEMESTER

Course Title: PRINCIPLES OF ANIMAL BREEDING
Course code: AGB-213
Cr. Hr.1 +1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course the students will be able to understand the different characteristic of breeds of different animals, and basic principles of genitics in animal breeding.

THEORY

Basis for classification of breeds, concept of environment and genotype. Important breeds of cattle, buffalo, sheep, goat, pig, poultry, and ducks with special reference to their importance, economic character and adaptability from breeding stand point (Indigenous and Exotic).

Preliminary ideas of heritability, repeatability, genetic and phenotypic correlations of different economic traits.

Aids to selection, methods of selection (Tandem, Independent-culling-level and total score), basis of selection, response to selection and its measures, selection differential, sire index, selection index.

Recurrent and reciprocal recurrent selection, establishment of new breeds.

PRACTICAL

Computation of selection differential, sire index; selection index, genetic gain, heritability, repeatability, genetic and environmental correlations. Culling of livestock and poultry. Preparation of pedigree sheets for farm, pet and companion animals.

Reference

- Lasley, J.F. (1978), Genetic of Livestock Improvement. Prentice –Hall of India Pvt.Ltd.New Delhi, India.
- Mukerjee, D.P.and Banerjee, G.C.Genetic and Bredding of farm animals. Oxford and IBH Publishing Co.Pvt.Ltd, Delhi India.
- Stansfield W.W.Theory and Problems of Genetics. Schaum's Outline series. Tata McGraw Hill Publishing Co.Ltd. New Delhi, India.
- Stickberger, M.W. (2001) Genetics. Third edition. Prentice –Hall of India Pvt.Ltd.New Delhi, India.

FOURTH SEMESTER

Code no.	**Course Title**	**Cr. Hrs**
VAN-225	Applied Anatomy	0+2=2
VPY-224	Veterinary Physiology IV	1+1=2
ANU- 223	Applied Nutrition-I	2+1=3
ANU- 224	Applied Nutrition-II	1+1=2
VPA –222	Veterinary Helminthology	2+1=3
VMC-222	Veterinary Immunology and Serology	2+1=3
VPL-222	Systemic Pathology	2+1=3
AGB-224	Livestock Breeding System	1+1=2
	Total	**11+9=20**

FOURTH SEMESTER

Course Title: APPLIED ANATOMY
Course code: VAN-225
Cr. Hr.0 +2=2 **Theory – 00**
Full Marks – 50 **Practical - 50**

Objective:

Upon successful completion of this course students will be able to conduct post-mortem, dissection of specimens and identify the sites for surgical operations.

PRACTICAL

Study of dissected specimens of ox/buffalo and other species and comparison with live animals. Surface anatomy and gross anatomical structures involved in the surgical interferences viz. extirpation of eye ball, amputation of horn, legation of stenson's duct, Zepp's operation, tracheotomy, oesophagotomy, amputation of fore and hind limbs, nerve blocks and neurectomy of ulnar, volar, tibial plantar nerves, medial patellar desmotomy, amputation of tail, laparotomy, ruminotomy, gastrotomy, ovario hyseterectomy, cystotomy, urethrotomy, caesarian section and vasectomy and castration in ox and other species.

Comparative study of the organs of (female and male) reproduction in ox/buffalo, sheep/goat, dog, rabbit, fowl, etc.

Topographic anatomy of large and small animals - contours of body cavities, location and contours of visceral organs, regions of percussion, paracentesis, biopsy etc. location of peripheral lymph nodes. Location of surface veins, palpable arteries etc.

Gross anatomical visualization of various regions of domestic animals through plane and contrast radiography.

Demonstration of the principles of biomechanics (Kinetic and Dynamic) through slides/radiographs.

Gross anatomic study in post mortem. Histology of organs of importance in forensic medicine.

Reference

- Textbook of Veterinary Anatomy-Dye
- Miller’s Anatomy of Dog.
- A systemic Study of Anatomy-Donald R. Adams.
- Guide to the Dissection of the Dog-Howard E.Evans.
- Ruminants Surgery-R.P.S.Tyagi.

FOURTH SEMESTER

Course Title: VETERINARY PHYSIOLOGY-IV (Growth, Environment and Climatology)
Course code: VPY-224
Cr. Hr.1 +1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon successful completion of this course students will be able to understand physiology of growth and physical reaction to environment and climatology.

THEORY

Animal ecology, physiology of growth, regulation of growth, factors affecting efficiency of growth. Clinical effect on growth and production, Physical reactions to environmental changes, physiology of behavior, Climatology- various parameters and their importance; reaction of animals to different environmental variation, viz. temperature and fever; central control of heat regulation.Temperature regulation in birds.

PRACTICAL

Measures and measurements of growth in various species. Physiological changes related to climate. Climatology- instruments and equipments used in climatology, meteorological assessments. Demonstration of stress and its physiological effects in various animals (effect of extreme heat and cold; effect of starvation, water deprivation, fear and excitement, bath, etc. on physiological parameters).

Reference

- Animal physiology-Arora
- Animal physiology-Kanta
- Physiology of Domestic Animal-Dukes
- Veterinary Physiology- Cunninghams
- Biological Sciences- F.J. Taylor *et.al,*.

FOURTH SEMESTER

Course Title: APPLIED NUTRITION-I (Livestock feeding)
Course code: ANU- 223
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

Objective:

The objective of this course is to develop student's ability about the application of animal nutrition in practice. Besides, students will also have insights of feeds and feeding system to the ruminant and non ruminants.

THEORY

Importance of scientific feeding, Feeding experiments, different methods of feeding experiments digestion and metabolic trials. Norms adopted in conducting digestion trial – measurement of digestibility by conventional methods, indirect method of determining digestibility, indicator method of determining digestibility. Pasture consumption and digestibility, Factors affecting digestibility of feed, nutritive requirements of livestock and poultry-Energy and protein requirement for maintenance and production. Methods adopted for arriving energy and protein requirements for maintenance and production in terms of growth, reproduction, milk, egg, meat, wool and work. Balanced rations and its characteristics & feeding of dairy cattle & buffaloes. Nutritive requirements for various categories of poultry & formulation of ration as per I.S.I. & NRC specification. Nutritive requirements of swine and formulation of ration as per I. S. I. & ARC specification. Feeding standards, their uses and significance, merit and demerits of various feeding standards. Utilisation of agro-industrial by products and agricultural wastes as animal feeds. Utilisation of unconventional feeds. Use of urea molasses with concentrate and forages. Use of feed additives, antibiotics, and hormones. Economics and efficiency of food conversion to animal products in farm animals, Diet Schedules for hand fed individual animals:

Feeding of Cattle: Calf, growing animals, mature dry animals, lactating and pregnant cows, breeding bull and working bullock.

Feeding of buffaloes: Calf, growing animals, mature dry animals, fattening animals, lactating and pregnant she-buffaloes, breeding bulls and working animals

Feeding goats: Kids, growers, lactating and pregnant doe, meat producers.

Feeding of sheep: Lambs, growers, lactating and pregnant ewe, breeding rams wool producers.

Feeding of pigs: Piglets, growers, lactating and pregnant sows, breeding boars, fattening animals.

Feeding of ducks: Starter (for meat and egg production), growers, broilers, layers.

Feeding of poultry: Starter, growers, layers, broiler starter, broiler finisher.

PRACTICAL

Demonstration of conducting digestion trial in ruminants. Calculation of nutritive value in terms of DCP, TDN and SE in feeds and fodders. Calculation of requirements of nutrients in terms of DCP, TDN and ME for maintenance, growth and other types of production like meat, milk, wool, reproduction and work. Formulation of rations for different livestock under different conditions. Formulation of rations for poultry and swine with conventional and unconventional feed ingredients. Principles of compounding and mixing of feeds. Formulation of rations for feeding livestock during scarcity periods. Demonstration of the methods for improving the nutritive quality of straws and other crop residues. Visit to feed factory, dairy and poultry farms.

Reference

- Benerjee, G.C. 1984. The textbook of Animal Husbandary. Published by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Benerjee, G.C.1986. A Text book of Animal Nutrition.Publishing by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Morision, F.B. 1984. Feeds and feeding. C.B.S. Publishers and distribution, Jain Bhawan, Bhola Nath Nagar Delhi, India.
- Ranjhan, S.K. 1993 Animal Nutrition and Feeding Practices in India, Vikash publishing house Pvt, Ltd India.
- Singh, S.B. and M. Sapkota. Animal Nutrition and Fodder production. Publishing by T.U.IAAS Rampur.
- Rajhan, S.K. 1993. Animal Nutrition and feeding Practices in India.Vikash publishing house Pvt.Ltd, India.

FOURTH SEMESTER

Course Title: APPLIED NUTRITION-II
Course code: ANU- 224
Cr. Hr.1 +1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

The main objectives of this course is to teach students about principles and practice of animal nutrition mainly with respect to the feed processing, formulation and storage system.

THEORY

Dietary principles and food pattern of simple stomachs. Nutrients and their role in living systems. Composition of adult animal body. Composition of selected food stuff with reference to selected amino acids, carbohydrate and fat as source of energy; Role of water and minerals in body, importance of vitamins. Selected of foods as sources of vitamins, Dietary allowances. Requirements and recommended amounts of calories. Proteins, minerals and vitamins for different groups. Nutritional potentiality of important feed ingredients for balanced diets. Effect of processing on nutritive value of feeding stuffs. Preservation of feeds and its importance simple stomach diets and their improvements in practice. Importance of colostrum and suckling, composition of different milk formulae. Feeding and care of expectant and nursing mothers. Modification of normal diet in selected conditions. Diet charts for growing pups, sick and old animals.

Dog Nutrition: Nutrient requirement of dogs and cats, Diet formulation and preparation for various age groups of dogs and cats.

Rat Nutrition: Nutrient requirement of rat, Significance of CHO, lipids, protein and amino acids, minerals and vitamins in rat nutrition, Diet formulation and preparation and feeding practices.

Guinea pig Nutrition: Nutrient requirement of Guinea pigs. Significance of CHO, lipids, protein and amino acids, minerals and vitamins in Guinea pig nutrition.

Rabbit Nutrition: Nutrient requirement of rabbit, Significance of CHO, lipids, protein and amino acids, minerals and vitamins in rabbit nutrition. Diet formulation, preparation, and feeding practices.

PRACTICAL

Planning for balanced feeding. Diet charts, preparation of balanced diet for new born, growing and sick animals as oral and intravenous feeds. Preparation of modified diet under selected conditions, Hygienic preparation, preservation and storage of foods. Visit to rural and urban areas for observing feeding habits/animal feeding routines; storage.

Reference

- Benerjee, G.C. 1984. The textbook of Animal Husbandary. Published by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Benerjee, G.C.1986. A Textbook of Animal Nutrition.Publishing by Mohan Primlani for Oxford and IBH publishing Co. Pvt. Ltd.
- Morision, F.B. 1984. Feeds and feeding. C.B.S. Publishers and distribution, Jain Bhawan, Bhola Nath Nagar Delhi, India.
- Ranjhan, S.K. 1993 Animal Nutrition and Feeding Practices in India, Vikash publishing house Pvt, Ltd India.
- Singh, S.B. and M. Sapkota. Animal Nutrition and Fodder production. Publishing by T.U.IAAS Rampur.
- Rajhan, S.K. 1993. Animal Nutrition and feeding Practices in India.Vikash publishing house Pvt.Ltd. India.

FOURTH SEMESTER

Course Title: VETERINARY HELMINTHOLOGY
Course code: VPA -222
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to identify the Trematoda, Nematoda, Acanthocephala and Annelida parasite on the basis of morphology and development features.

THEORY

General description of helminth parasites affecting domesticated animals and birds. Classification of helminths, characteristics of platyhelminths, nemathelminth and acanthocephala, types of life histories and mode of transmission of helminth parasites.

Important morphological features, life cycles, mode of transmission, pathogenesis, diagnosis, chemo-and immuno-prophylaxis and general control measures of the following helminth parasites:

Intestinal flukes and liver flukes (Fasciolopsis, Fasciola, Dicrocoelium and Opisthorchis. Blood flukes/ nasal Schistomiasis, Cercarial dermatitis Schistosoma and Ornithobilharzi. Amphistomes/Immature amphistomiasis/ fluke diarrohea (Paramphistomum, Cotylophoron, Gastrodiscus, Gastrodiscoides, Gastrothules, Gigantocotyle and Pseudodiscus), Lung flukes (Paragonimus and Oviduct flukes (Prosthogonimus). General revision of trematoda.

Visceral Schistosomiasis - S. Spindale, S. indicom S. incognitum Fischoederius Sp. Thysanieza Sp. Hymenoleptis sp. Metastrongylus Sp.

General development and characteristic of tapeworms including broadfish tapeworms, (Diphyllobothrium) Development of Bladderworms.

Equine tapeworms. (Anoplocephala, Paranoplocephala), Ruminant tapeworms: (Monieza, Avitellina and Stelesia). Canine tapeworm: (Diphydium, Taenia, Multiceps and Echinococcus). Poultry tapeworm: (Daveniea, Cotugnia, Rillentina, Amoebotaenia, etc.).

General Accounts of nematode parasites, life history and reproduction. Free-living and parasitic stages of nematode.

Large Roundworms: (Ascaris, Parascaris, Toxocara, Toxascaris, Ascaridia, Heterakis and Oxyuris). Bursate worms: (Strongyloides, Strongylus, Chabertia, Syngamus, Oesophagostomum). Kidneyworms: (Stephanurus, Dicctophyma). Hookworms, (Anchylostoma, Agriostomum, Bunostomum, Trichostrongylus, Ostertagia, cooperia, Nematodirus). Stomach worms: (Haemonchus, Mecistocirus). Tissue roundworms: (Habronema, Thalezia, Spicrocerca, Gongylonema). Filarial Worms: (Dirofilaria, Parafilaria, Onchocerca, Setaria, Stephanofilaria). Lungworms: (Dictyocaulus, Mullerius and Protostrongylus). Guinea worms: (Dracunculus). Plasmic nematodes: (Trichinella, Trichuris). Acanthocephala, Macracanthorhynchus. Parasitic vaccines. Methods of preparation and application.

PRACTICAL

Study of morphological characters of adults and their larval stages and damages caused by them. Method of collection, fixation, preservation and mounting of heliminth parasites. Identification of important trematodes, cestodes and round worms. 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, acanthocephala.

Reference

- Helminths, Arthropods and Protozoa of Domesticated Animals, E.J.L. Soulsby, ELBS, and Bailliere and Classes, London.
- General Parasitology, Thomas C.Chang, Academic Press, Orlando, Florida 32887.
- Veterinary Parasitology, G.M. Urguhart *et. al.* Blackwell Science Ltd.
- Animal Parasitology, J.D. Smyth, Cambridge University Press.
- Textbook of Veterinary Parasitology, Norman D Levine, CBS Publisher and Distributor. Delhi.

FOURTH SEMESTER

Course Title: VETERINARY IMMUNOLOGY AND SEROLOGY
Course code: VMC-222
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to describe different classes of antigens and antibiotics, immune response system, hypersensitivity, autoimmunity and immunoprophylaxis.

THEORY

Highlights on Veterinary immunology. Pathogenicity, virulence and infection.

Nature of microbial diseases - epizootics and enzootics, resistance and susceptibility of host, bacterimia, septicemia, toxemia, endotoxins and exotoxins. Type and grades of immunity.

Development of immune system, humoral and cellular- immune responses. Antigens; Definition, specificity, azoprotein, heterophil and blood group antigens.

Antibodies: Chemical and physical properties, electrophoresis, structure and function of immunoglobulins, site, mechanism and theories of antibody production. Complement system. Serological reactions; Agglutination, precipitation, isohaemagglutination, phagocytosis, opsonic index, cytolysis, complement fixation, neutralization, toxin and antitoxin reaction, immunoflourescene.

Hypersensitivity - allergy, classification, anaphylacis. Arthus reaction and delayed type hypersensitivity, auto-immunity. Immunization of animals, biological immunoprophylaxis and diagnosis of disease.

PRACTICAL

Preparation of antigen, Raising of antisera, Concentration of immunoglobulins, Agglutination (Plate, tube), Precipitation (AGPT, CIE, RIE), Indirect Agglutination (Latex, Co-agglutination, PHA, RPHA), Haemagglutination (HA) and Haemagglutination inhibition (HI), ASHI, CFT, IPT, FAT, ELISA, CMI response, Veterinary biological laboratory (visit and appraisal)

Reference

- Basic Immunology-W.M.G. Amos.
- Immunology and Serology-Philip L. Carpentor.
- Immunology: Understanding the Immune System. -Klaus D. Elgert.
- Immunology-Benjamini.

FOURTH SEMESTER

Course Title: SYSTEMIC PATHOLOGY
Course code: VPL-222
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to understand the pathological processes occurring in different systems of the body and correlate them with specific diseases.

THEORY

Pathology of cardiovascular system: functional disturbances and malformation. Diseases of pericardium, myocardium, epicardium and endocardium. Changes in size of heart. Diseases of arteries and veins.

Hemopoitic system: diseases of lymph nodes, vessels and spleen. Conditions affecting blood and bone marrow; anemia.

Respiratory System: diseases of the nasal cavity, larynx, bronchi, lungs and pleura, emphysema, atelectasis, pulmonary adenomatosis.

Digestive system: functional disturbances, diseases of the mouth, pharynx, salivary glands, oesophagus, stomach, intestine, liver, gall bladder and pancreas.

Urinary system: functional disturbances. Diseases of kidneys, ureter, bladder and urethra.

Genital system: diseases of different organs of male and female genital system. Accessory sex glands, mammary glands, etc.

Nervous system: functional disturbances, reaction of nervous tissue to injury. Diseases of meninges, brain, and spinal cord.

Endocrine glands: functional disturbances of adrenal, thyroid, thymus, pituitary, parathyroid and pancreas.
Disease of eye, ear, skin, hoof/nail, horn etc.

Musculoskeletal system: Different disease of muscle, bone and ligament.

PRACTICAL

P.M. Examination of large animals and small animals. Techniques of writing. P.M. examination report. Techniques of P.M. examination of medico-legal cases with collection and dispatch of morbid materials to forensic laboratory. Diagnosis on the basis of P.M. lesions. Clinical examination of blood and urine of diseased animals and principles of interpretation of results. Study of histopathological slides of organs of different systems.

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 exam.

Reference

- Veterinary Pathology CBS Publishers and Distributors, India –Ganti Sastry.
- Veterinary Clinical pathology, CBS Publishers, India. Ganti Sastry.
- Text book of Veterinary Special Pathology-Vegad.
- Text book of Veterinary General Pathology-Chauhan.
- Pathology of infectious diseases of domestic animals –H.V.S .Chauhan.
- Veterinary Pathology in the tropics –Mugera.

FOURTH SEMESTER

Course Title: LIVESTOCK BREEDING SYSTEM
Course code: AGB-224
Cr. Hr.1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course the students will be able to understand different breeding system and their application in field level.

THEORY

Breeding methods: Different mating systems. Inbreeding and its measure, effects and application of inbreeding with its merits and demerits. In-breeding coefficient and co-efficient of relationship, line-breeding.
Open nucleus breeding system, its merits, demerits application etc.
Out breeding: strain crossing; cross breeding; its merit and demerits.

Heterosis: Definition, causes, measurement and its application in animal breeding, outcrossing, top crossing, grading up, criss-crossing, rotational crossing in-crossing and incross-breeding, species hybridisation. Performance records and standardizations.

Breeding behaviour: Current-breeding programs in the state and the country. Importance of breeding records in dairy cattle, buffaloes, sheep, goat, equines, canines, wild animals etc. Pedigree sheets.

PRACTICAL

Computation of in-breeding coefficient, coefficient of relationship and heterosis.

Analysis of breeding records of different livestock and poultry farms and their maintenance, milk recording, study of pedigree and history sheets. Use of pedigree sheets in the breeding of cattle, buffalo, pig, sheep, goat, horse, dogs, laboratory animals etc.; their preparation and interpretation.

Reference

- Lasley, J.F. (1978), Genetic of Livestock Improvement. Prentice –Hall of India Pvt.Ltd.New Delhi, India.
- Mukerjee, D.P.and Banerjee, G.C.Genetic and Bredding of farm animals. Oxford and IBH Publishing Co.Pvt.Ltd, Delhi India.
- Stansfield W.W.Theory and Problems of Genetics. Schaum's Outline series. Tata McGraw Hill Publishing Co.Ltd.New Delhi, India.
- Stickberger, M.W. (2001) Genetics. Third edition. Prentice –Hall of India Pvt.Ltd.New Delhi, India.

FIFTH SEMESTER

Code	Course topic	Cr.Hrs
VPT-311	General and C.N.S. Pharmacology	2+1=3
VPA-313	Veterinary Parasitology- III (Entomology and Acarology)	1+1=2
VMC-313	Veterinary Bacteriology and Mycology	2+1=3
VPL-313	Special Pathology – I	2+1=3
VPH-311	Veterinary Public Health (Milk Hygiene and Public Health)	1+1=2
LPM-314	Swine/Equine/Yak Production and Management	1+1=2
LPM-315	Wild and Zoo Animal Health Care and Management/Fish Production	2+1=3
LPM –316	Laboratory Animal/Rabbit/ Fur Animal Care and Mgmt.And Pet Animal Care	1+1=2
LPT-311	Milk and Milk Products Technology	1+1=2
	Total	**13+9=22**

FIFTH SEMESTER

Course Title: GENERAL AND C.N.S. PHARMACOLOGY
Course Code: VPT-311
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course the students will be able to understand pharmacokinetics and pharmacodynamic properties of drugs and prepare drugs in pharmacy as per prescription.

THEORY

Introduction to pharmacology: Historical development, branches and scope of Pharmacology. Sources of drugs; pharmacological terms and definitions.

Principles of Drug Activity: Pharmacokinetics-absorption, distribution, biotransformation and excretion of drugs; pharmacodynamics-Concept of drug and receptor, dose response relationship, terms related to drug activity and factors modifying the drug effect and dosage.

Drugs acting on the C.N.S.: History and theories of general anesthesia; volatile, gaseous intravenous and dissociative anaesthetics; hypnotics and sedatives; tranquilizers; mood elevators; analgesics, antipyretics and anti-inflammatory agents; Transmitters of the CNS analeptics and other stimulants.
Local anesthetics (analgesics); neuromuscular blocking agents: Peripheral and central muscle relaxants.

PRACTICAL

Pharmacy: Fitting and apparatus, labeling, custody of poisons, weighing of drugs, compounding of preparation, meteorology: system of weights and measures; Pharmacy calculations, pharmaceutical process, incompatibilities, sources and composition of drugs pharmaceutical preparations, definition of pharmacological terms related to various systems, drug standards and regulations; prescription writing;

Demonstration: effect of CNS depressants, analgesics, CNS stimulants, muscle relaxants and local anesthetics in laboratory animals.

Reference

- Akhtar, M.S. (1984). *Introduction to Veterinary Pharmacology and Therapeutics*. 2nd edition. University of Faisalabad. Faisalabad. Pakistan.
- Booth, N.H. and McDonald, L.E. (1982). *Jones Veterinary Pharmacology and Therapeutics*. 5th edition. Kalyani Publishers. New Delhi. India
- Brander, G.C., Pugh, D.M., Bywater, R.J. and Jenkins, W.L. (1991). *Veterinary Applied Pharmacology and Therapeutics*. 5th edition. ELBS. London. U.K.
- Chaudhari, K.D. (1983). *Manual of Pharmacology*. 9th edition. Minati Chaudhari. Ranchi, India.
- Gilman, A.G., Goodman, L.S. and Gilman, A. (1980). *Pharmacological basis of therapeutics.* 6th edition. McMillan Publishing Company. New York. Roy, B.K. (2001). *Veterinary Pharmacology and Toxicology*. 1st edition. Kalyani Publishers. New Delhi. India
- Wanamaker, B.P. and Pettes, C.L. (1996). *Applied Pharmacology for the Veterinary Technician*. 1st edition. W.B. Saunders Company. Philadelphia. U.S.

FIFTH SEMESTER

Course Title: VETERINARY PARASITOLOGY-III (Entomology and Acarology)
Course Code: VPA 313
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to identify the important arthropods, ticks and diagnose the gross lesions caused by these parasites.

THEORY

Introduction of Arthropoda, General description of Insecta and Archmida affecting domesticated animals and birds. Historical account and classification of Arthropoda. Arthropoda as disease transmitters/general morphological features of arthropod. Arthropoda as direct/indirect parasites. Economic losses to hide and skins due to ectoparasitic infestation.

General bionomics, life cycles, vector potentiality, pathogenesis and control of following important arthropods affecting man, animals and birds.

The biting midges (Culicguiden), Black flies or buffalo ganats (Simullium) and Sand flies (Phlebotomus). The mosquitoes (Culex, Anopheles, Acdes). The Horse flies (Tabanus), Warbles (Hypoderma) and Bots (Gastrophilus). The bottle flies; Myasia. The wingless flies (Hippobosca, Malophagus, Pseudolynchia); Bugs (Cimex). Lice and fleas. (Haematopinus, Linognathus, Trichodectes, Manoppon). Lice and fleas, (Pulex, Ctenocephalides, Echnidnophga). General description and characters of class Arachnida. Anatomical features of mouth parts. General description of the order Acarina/ Ticks and mites infestation in animals. Ticks: Soft ticks, (Argaz, Ornithodoros). Hard Ticks: (Ixodes,Boophilus, Hyalomma, Rhibicephalus, Haemophysalis, Dermacentor)

Musca sp, Stomaxys sp, Damalinia sp, Menacanthus sp, Lipeurus sp, Otobius sp., Megtninia sp, Amblyomma sp.

PRACTICAL

Demonstration of the type representatives of various groups of insects, ticks and mites through charts, specimen, mounted slides etc. Demonstration of differential characters of Insecta and Acarina (Ticks and mites). Procedure for diagnosis of arthropod infestation to hides and skin. Demonstration of enteric myasis. Procedures for the collection, fixation, preservation and mounting of arthropod parasites.

Reference:

- Helminths, Arthropods and Protozoa of Domesticated Animals, E.J.L. Soulsby, ELBS, and Bailliere and Classes, London.
- General Parasitology, Thomas C.Chang, Academic Press, Orlando, Florida 32887.
- Veterinary Parasitology, G.M. Urguhart *et. al.* Blackwell Science Ltd.
- Animal Parasitology, J.D. Smyth, Cambridge University Press.
- Textbook of Veterinary Parasitology, Norman D Levine, CBS Publisher and Distributor. Delhi.
- Veterinary Parasitiology, G.M. Urguhart et.al. Blackwell Science Ltd.
- Manual of tropical Veterinary Parasitology, Published by CAB international.
- Arthropods in Livestock and Poultry Production, J.N. Lancaster, M.V.Meisch.
- Acarology, Volume I and II, D.A.Griffiths and C.E. Bowman, Holsted Press.

FIFTH SEMESTER

Course Title: VETERINARY BACTERIOLOGY AND MYCOLOGY
Course Code: VMC-313
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to learn the morphology, colonial, biochemical and antigenic properties, and pathogenicity of important pathogenic bacteria and fungi.

THEORY

Study of following important pathogenic bacteria and fungi in relation to their morphology, isolation, growth, colonial, biochemical and antigenic characters. Pathogenicity and diagnosis of bacterial disease caused by the following: -

Class- 1 (Bacteria) –

Leptospira, Vibrio, Brucella, Aeromones, Pseudomonas, Pasteurella, Yersinia, Actinobacillus, Entero-bacteriaceae, Staphylococcus, Bacillus, Clostridium, Listeria, Erysepelothrix, Corynebacterium, Actinomyces, Mycobacterium, Nocardia, Spherophorus, Bacteroides, Haemophilus, Bordetalla, Morexalla, Spirochetes.

Class-2- Rickettsia and Chlamydia.

Class-3- Mycoplasmas and acholeplasmas Fungi, Superficial mycoses, contageous-dermatophytes, Subcutaneous-Rhinosporidium, Sporotrichum, Candida Mycetomal fungi.
Systemic- Histoplasma, Cryptococcus, Aspergillus, Zygomycetes and others.
Rare - Pencillium, others Fungi causing mastitis and abortion, mycotoxin.

PRACTICAL

Demonstration or identification of the agents of following diseases-

1. Anthrax -1
2. H S -1
3. B Q -1
4. Enterotoxaemia -1
5. Mastitis -1
6. Respiratory and enteric infection -1
7. Tuberculosis -1
8. Brucellosis -1
9. Johne's Disease -1
10. Aspergillosis -1
11. Other agents of importance 5-15

Reference

1. Veterinary Bacteriology and Virology by I.A. Merchant and R.A. Packer.
2. Medical Mycology by J.W.Rippon.
3. Bergey's Manual of Systemic bacteriology by N.R.Krieg.

FIFTH SEMESTER

Course Title: SPECIAL PATHOLOGY - I
Course Code: VPL-313
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to know the etiology, pathogenesis and diagnostic measure adopted for the infectious diseases.

THEORY

Neoplasm-Definition, general characteristics and classification. Difference between benign and malignant tumors. Causes of neoplasms, pathology of different types of tumours. Tumour-immunity.

Diseases caused by viruses: general introduction. Pathology of F.M.D., vascular stomatitis, vascular exanthema, rabies, equine encephalomyelitis, scrapie, pseudo-rabies, canine distemper, infectious canine hepatitis, Hog-cholera, Rinderpest, Blue tongue and African horse sickness. Diseases caused by bacteria-Actinomycosis. Actinobacillosis, Nocardiosis, Tuberculosis, Anthrax, B.Q., Bovine bacillary haemoglobinuria, Malignant-oedema. Braxy, gas gangrene, Tetanus, Enterotoxemia and Botulism. Pathology of Streptococcal and Staphycoccus infections, abortion, mastitis, HS. Glander and Leptospirosis. Pathology of diseases caused by fungus, helminths and protozoa.

Biopsy- its scope and limitation in the diagnosis of lesions. Cytology - as a method of disease diagnosis; Exfoliative cytology its scope and limitation.

Procedure for preparation of post-mortem report. Legal implication of post mortem.

PRACTICAL

Studies of gross specimens of diseases and diagnosis. Special staining of causative organisms of different infectious diseases. Slides of systemic diseases and slides of diseases caused by infection, infestations and toxic and metabolic agents.

Demonstration of Exfoliative cytology and cytological examination. Biopsy, Collection of various body fluids. Frozen sectioning.

(One half of the practical will be used for demonstration of gross and microscopic lesions, preferably through and projection microscope or video projections. The other half will be used for post mortem examinations).

Reference

- Veterinary Pathology CBS Publishers and Distributors, India –Ganti Sastry.
- Veterinary Clinical pathology, CBS Publishers, India. Ganti Sastry.
- Textbook of Veterinary Special Pathology-Vegad.
- Textbook of Veterinary General Pathology-Chauhan.
- Pathology of infectious diseases of domestic animals –H.V.S. Chauhan.
- Veterinary Pathology in the tropics –Mugera.

2. Parasite Zoonoses-S.C. Pacija.

FIFTH SEMESTER

Course Title: VETERINARY PUBLIC HEALTH (MILK HYGIENE AND PUBLIC HEALTH)
Course Code: VPH-311
Cr. Hr.1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVES

Upon completion of this course student will be able to assess the role of different animals in the transmission of Zoonotic diseases and describe the methods of prevention, eradication, and control of Zoonotic disease.

THEORY

Introduction; definition of Veterinary public Health. Milk hygiene in relation to public health. Microbial flora of milk and milk products. Sources of bacterial contamination of raw milk and method of control. Clean milk production, sources of contamination during collection and transport and processing of milk and methods of control. Hygienic control of dairy equipment, hygienic aspect of processing of dairy products. Quality control of milk and milk products. Milk hygiene practice in Nepal and other countries. Principles of milk legislation. Milk borne diseases and methods of control. Bacteriophage in milk; germicidal property of milk.

PRACTICAL

Collection of milk samples for chemical and bacteriological examination. Grading of milk on the basis of MBR test; Detection of antibiotic residues in milk and milk products; Test for pasteurization; Test of plant sanitation; bacteriological examination of raw and pasteurized milk, milk products and water for processing plant viz. its S.P.C. coliform count, faecal streptococcal count, Psychrophilic, mesophilic and thermophilic count. Detection of adulteration and detection of preservatives in milk; detection of adulteration in ghee. Isolation and identification of organisms of public health significance from milk and its products. Test of mastitic milk in relation to public health.

Reference

1. Veterinary Medicine and Human Health-Cavin W.Schwabe.

FIFTH SEMESTER

Course Title: SWINE/EQUINE/YAK PRODUCTION AND MANAGEMENT
Course Code: LPM-314
Cr. Hr.1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon successful completion of this course students will be able to recognize different breeds of swine, equine and Yak and management.

THEORY

SWINE

Introduction and scope of swine farming in the country census, breeds and distribution of swine, and management of breeding and pregnant sows; Care and management of sows at farrowing and after farrowing; care and management of pig-lets, growing stock, lactating sows, feedlot stock. Selection and breeding technique in swine; management for optimal production; swine feed and feeding; housing of swine; vaccination, disease detection and parasitic control in swine; slaughter and preservation of swine products; marketing of different pig products in Nepal and abroad; economics of pig production.

EQUINES

Equine population of Nepal and abroad. Horses, donkeys and mules and their utility in our country. Identification of horses by their breeds, colour and markings (as per R W T C I). Dentition and ageing of horses. Handling, care and routine management of equines. Health care routines for horses. Colic and its prevention. Hygiene and management of stable. Feeding routine for horse, donkeys and mules. Control of external and internal parasites of horse. Stable and its management. Grooming, saddling and exercising horses, vices of horses. Foot care and shoeing care of stallion – mating of horses- broodmare and its care. Foaling and care of new born. Breeding mules. Race clubs. Race horses and their care Doping, its detection-control of horse for examination. Passing stomach tube, grooming, saddling & riding. Exercising horses, walking, trotting ,cantering and galloping

YAK

Yak as domesticated animal. Utility of yaks. Feeds and feeding of yaks. The peculiarities of yak. Breeding of yaks. The yak x cattle crossing; hybrids from yak. Common ailments of yak. Controlling of yak. Adaptation of yak to high altitude. The milk and its composition. Yak meat and its production.

PRACTICAL

Identification of breeds- Nepalese and exotic swine; handling of swine, formulating rations for boar and sows; feeding growers, farrowing, lactating and pregnant animals. Routine inspection, identification of diseases, examination and control of parasites, vaccination, marketing, identification of pregnancy, care during pregnancy, isolation and care of farrowing sows, care of piglings. Castration, culling, tooth cutting etc. Profit workouts for piggeries. Preparation of feasibility reports and projects. Layout plans of swine houses; routine operations of swine farms; marketing the swine.

Reference

- Cattle Management – Cheryl May, Roston Publishing Company, Inc.Roston, Virginia.
- Textbook on Buffalo Production –C.K. Rajhan, N.N.Pathak.Vikas Publishing House Pvt.Ltd., New Delh

FIFTH SEMESTER

Course Title: WILD AND ZOO ANIMAL HEALTH CARE AND MANAGEMENT/FISH PRODUCTION
Course Code: LPM-315
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon successful completion of the course students will be able to recognize the basics and importance of wild life and its ecosystem.

THEORY

Wild and zoo animal management

Taxonomy of wild and zoo animals. Importance of management and health care of wild animals. Habitats and housing of various class of wild animals. Feeding habits, feeds and feeding system of zoo animals and wild animals. Principles and practices of reproduction and breeding in zoo animals and wild animals. Methods of restraint, capture, handling and physical examination of wild animals. Common diseases and control strategies against it. Principles and practices in zoo management . Zoo animal hygiene and disease prevention.

Fish and BeeKeeping and management

Introduction and importance of fish production (Census and status) in Nepal. Types of common fish for fresh water and in land cultivation. Economics of fish production.
Lay out plan for inland fish culture. Principle and practices of fish breeding including hatchery management practice. Care and management of breeding stocks, eggs and fingerlings. Spawn nursery and pond management. Detection, diagnosis and control of fish diseases. Types of common honey bees. Food values of honey. Layout, preparation of bee hives. Principles and practices of feeding bees. Cure and maintenance of honey bees . Common diseases of honey bees and their control.

PRACTICAL

Visit to zoo and zoo animals Methods of restraints..Familirization visit to demonstration fish farm. Identification of exotic and indigenous species of fish. Feed formulation and diet preparation and feeding fish.Inspection and detection of sick and unhealthy fish specimen collection and laboratory procedures for disease diagnosis.Methods of administration of medicine to fish.

Reference

- Wildlife Wealth of India (Researches and Management-T.C.Majupuria, Tecpress Service, L.P. Bangkok.
- Himalayan Wildlife: Habitat and Conservation-S.S. Negi. Indus Publishing Co. New Delhi.
- E.F.Phillips, Bee keeping.
- T.C. Majpuria, Wild life of Nepal

FIFTH SEMESTER

Course Title: LABORATORY ANIMAL/RABBIT/FUR ANIMAL CARE AND MANAGEMENT AND PET ANIMAL CARE
Course Code: LPM-316
Cr. Hr.1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE
Upon completion of this course the students will be able to recognize lab animal, their proper care and management.

THEORY

Laboratory Animal
Importance of laboratory animal breeding. Care and housing standards of mice, rats, guinea pigs etc.

General consideration on feeding aspects and nutritional requirements of lab animals, important consideration in breeding of laboratory animals, prophylactic measures for commonly occurring lab animal diseases, preliminary ideas on technology for production of specific pathogen free and germ free lab animals.

Rabbit/Fur Animals
Introduction and scope of Rabbit/Fur animals farming in the country; census, breeds and their distribution in Nepal and abroad. Scope and limitation of rabbit/fur animal production; selection, care, and management for breeding for commercial purpose. Identification, care and management of farrowing animals, farrowing, care of new born, growing stock; harvesting of products; breeding and selection techniques for optimal production; feeds and feeding for rabbit/fur animal production; housing of rabbit/fur animals, shearing/slaughtering and preservation of products; diseases and parasite control, hygienic care; disposal, utilization and recycling of wastes etc. The economic aspects of rabbit/fur animal production; accounting their expenditure, income etc. Manpower requirements and personnel/labor management. Preparing projects for micro (backyard), mini and major rabbit/fur animal farms.

Pet Animal Care
Breeds of dogs commonly seen in Nepal. Different breeds of dogs; handling a dog; Major breed traits of dogs. Selecting a breed to keep. Selection of a pup, feeding tips, Simple training, housebreaking, control of parasites. Vaccination schedules. Vices of dogs and how to correct them. Pedigree sheet; kennel clubs, dog shows, heat and its detection, breeding a dog, care of a pregnant female, whelping: care of mother and new born. Utility dogs - defense, patrolling, riot control, scouting, espionage, mine detection, tracking, guiding, hunting, races, retriving, life saving, guarding and other uses.

Norms for tail docking, Ear cropping etc. Nail cutting, grooming, bathing and teeth hygiene for dogs.

Cats their breeds and habits. Food and feeding of cat. Kitten; their care and management. Prophylactic vaccination; handling cats for examination; administration of medicine, vices of cats.

Common pets birds seen in Nepal Tips on their caging, breeding and management. Tips on health care of pets' birds.

PRACTICAL

Laboratory Animal
Identification of body parts and handling of laboratory animals, housing system and space requirements for laboratory animals, weighing sexing and weaning of laboratory animals. Management and Marking for identification of laboratory animals for purpose of their individual recording. Computation and compounding of balanced diet for laboratory animals mainly Mice, Rats, Guinea pigs and Rabbits. Feeding schedule of laboratory animals. Selection of breeding stock of laboratory animals for high breeding of efficiency. Maintenance of breeding records of laboratory animals. Prophylactic measures against common diseases of lab animals. Hygienic care and control of parasites (routines).

Pet Animal Care
Recognizing various breeds and their colors, handling dogs for examination. Use of leads, choke collars; brushing and bathing a dog; deticking, deworming. Exercising a dog. Detection of heat, mating, whelping (through video film or real). Care of new born. Weaning. Administration of medicine; Nail and tooth care, visit to dog show; clipping of hair in some breeds. Hygiene of Pens, feeding utensils for dogs, pups etc. Common breeds of cats, control, examination and medication of cats and kitten.

Identification of common pet birds. Handling of pet birds, their examination and administration of medicine.

Reference

1. Chakrabarti Amalandu, Dog care and management.
2. Angela Sayer and Howard Loxton- Encyclopedia of cat.
3. Prof, Dr. K.D.Budras, Dr, P.H. Mc. Carthy, Anatomy of dog- an illustrated text.

FIFTH SEMESTER

Course Title: MILK AND MILK PRODUCTS TECHNOLOGY
Course Code: LPT-311
Cr. Hr.1+1=2 **Theory – 25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to define milk and determine milk constituents and get acquaintance with mammary gland, milk letdown and standardize milk.

THEORY

Developments of dairy industry in Nepal. Composition and nutritive value of milk. Factors affecting composition of milk; physical and chemical properties of milk. Clean milk production. Bacteriology and deterioration of milk. Principles involved in pasteurization, homogenization and dehydration. Preparation of various concentrated and dehydrated milk products. Preparation of butter, ghee, khoa, lahssi, curd, ice cream and cheese.

Packaging and distribution of milk; Legal, ISI and NSI standard of milk and milk products. Sanitation in milk plant. Utilization of milk by-products. Role of milk and milk products in human nutrition.

Storage, conservation and marketing of milk and milk products

PRACTICAL
Sampling of milk, estimation of fat, S.N.F. and total solids. Detection of adulteration of milk through various tests. Estimation of efficiency of pasteurization through different tests. Bacteriological examination of milk and products for their wholesomeness. Preparation of milk products likes curd, butter, ghee, yogurt, lahssi, khua, ice-cream etc. Visit to dairy plant.

Reference

- Milk and milk products-Eckles, Combs and Macy.
- Handbook of dairy science-K.C. Mahanta.
- A textbook of dairy chemistry- E.R.Ling.
- Principle of practices of dairy farm management-Jagdish Prasad.
- Principles of dairy chemistry-Jennes and Patton.
- Principles of dairy processing-James N. Warner.
- Milk and its properties-S.M. Shrivastava.
- Dairy technology in the tropics and subtropics-J.C.T.Van den Berg.
- Handbook of dairy Sciences-K.C.Mahanta.
- Lab guide in dairy Chemistry practical- C.L.David.
- Lab manual of dairy science –P.V.Jeleh and Negendra Sah.

SIXTH SEMESTER

Code	Course Title	Cr.hrs
VPT-321	Autonomic and Systemic Pharmacology	2+1=3
VPA-324	Veterinary Protozoology	2+1=3
VMC-324	General and Systemic Veterinary Virology	2+1=3
VPL-324	Special Pathology – II	2+1=3
VPH-322	Meat Hygiene and Public Health	1+1=2
LPM-327	Sheep And Goat Production And Management	1+1=2
LPM-328	Avian Production and Management	2+1=3
LPT-322	Abattoir Practices and Animal By-Products Technology	1+1=2
	Total	13+8=21

SIXTH SEMESTER

Course Title: AUTONOMIC AND SYSTEMIC PHARMACOLOGY
Course Code: VPT-322
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course the students will be able to understand drug acting on autonomic system, cardiovascular system, digestive system, respiratory system, urogenital system, skin, mucus membrane and endocrine system.

THEORY

Drugs acting on autonomic nervous system: Introduction to the autonomic nervous system, neurohumoral transmission, adrenergic antagonists, adrenoreceptor blockers and adrenergic neuron blockers, cholinergic antagonists and blockers, ganglionic stimulants and blockers.

Autocoids, histamine and antihistaminic agents; 5-hydroxy-tryptamine and its antagonists, prostaglandins, angiotensin, bradykinin etc.

Drug acting on CVS: Cardiac glycosides, antiarrhythemic drugs, vasodilators and antihypertensive agents, haematinics, coagulants and anticoagulants.

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 antitussives, respiratory stimulants; bronchial dilators.

Drugs acting on urogenital system: diuretics, Urinary alkalizes, acidifiers and antiseptics, fluid therapy, ecbolics.

Endocrine pharmacology: adrenocorticoids sex hormones, insulin, other hypoglycemic agents, and thyroid hormones.

Vitamins: Only in relation to pharmacotherapeutic effects.

Drugs acting on skin and mucous membrane.

PRACTICAL

Demonstration of the action of adrenergic and cholinergic agonists and blockers on isolated and intact preparations of animals; action of sympathomimetic drugs, parasympathomimetics, sympathetic and parasympathetic blockers, ganglionics – stimulants and blockers.

Demonstration: effect of drugs on E.C.G., blood pressure, and central venous pressure.

Pharmacy preparations: 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.

Reference

- Akhtar, M.S. (1984). *Introduction to Veterinary Pharmacology and Therapeutics*. 2nd edition. University of Faisalabad. Faisalabad. Pakistan.
- Booth, N.H. and McDonald, L.E. (1982). *Jones Veterinary Pharmacology and Therapeutics*. 5th edition. Kalyani Publishers. New Delhi. India
- Brander, G.C., Pugh, D.M., Bywater, R.J. and Jenkins, W.L. (1991). *Veterinary Applied Pharmacology and Therapeutics*. 5th edition. ELBS. London. U.K.
- Chaudhari, K.D. (1983). *Manual of Pharmacology*. 9th edition. Minati Chaudhari. Ranchi, India.
- Gilman, A.G., Goodman, L.S. and Gilman, A. (1980). *Pharmacological basis of therapeutics.* 6th edition. McMillan Publishing Company. New York.
- Roy, B.K. (2001). *Veterinary Pharmacology and Toxicology*. 1st edition. Kalyani Publishers. New Delhi. India
- Wanamaker, B.P. and Pettes, C.L. (1996). *Applied Pharmacology for the Veterinary Technician*. 1st edition. W.B. Saunders Company. Philadelphia. U.S.

SIXTH SEMESTER

Course Title: VETERINARY PROTOZOOLOGY
Course Code: VPA-324
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course students will be able to evaluate the protozoan parasites based on their mode of transmission, pathogenesis, diagnosis and control measures.

THEORY

Introduction of protozoa and general description of protozoa. Historical account of Protozoology. Free living and parasitic protozoa. Difference between protozoa and protophyta. Classification of protozoan parasites. Protozoon development/reproduction and life cycles. Modes of transmission of protozoan parasites and immunological responses in protozoan diseases.

Important morphological features, multiplication and modes of transmission, pathogenesis, diagnosis, Chemo and immunoprophylaxis and general control measures of the following protozoan parasites.

Kala azar, Visceral and cutaneous leishmaniasis. Tropical leishmaniasis (Leishmania). Animal and Human trypanosomiasis, surra. bovine and avian Trichomoniasis. Trichomonal abortions (Trichomonas). Blackhead in turkeys (Histomonas). Bovine amoebae (Entmoeba, Balantidium). Giardia sp, Coccidia and coccidiosis (Eimeria), Canine & Sarcocystis and Sarcocystosis, Toxoplasmosis of Animal and man (Toxoplasma). Leucocytozoon sp, Ehrlichia sp, Malarial Parasite of Man, Animals and Poultry (Plasmodium**),** Haemoporoteus, Babesia and babesiosis (Babesia). Bovine Theileriasis in tropics (Theileria), Anaplasmosis of animals (Anaplasma). General control of Haemoprotozoan diseases of exotic livestock in Nepal. Recent developments in the preparation of protozoan vaccines for field use.

PRACTICAL

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. Identification of drugs against the protozoan diseases. Identification of representative slides of protozoan parasites.

Reference

- Helminths, Arthropods and Protozoa of Domesticated Animals, E.J.L. Soulsby, ELBS, and Bailliere and Classes, London.
- General Parasitology, Thomas C.Chang, Academic Press, Orlando, Florida 32887.
- Veterinary Parasitology, G.M. Urguhart *et. al.* Blackwell Science Ltd.
- Animal Parasitology, J.D. Smyth, Cambridge University Press.
- Textbook of Veterinary Parasitology, Norman D Levine, CBS Publisher and Distributor, Delhi.
- Veterinary Parasitiology, G.M. Urguhart et.al. Blackwell Science Ltd.
- Manual of tropical Veterinary Parasitology, Published by CAB international.
- Arthropods in Livestock and Poultry Production, J.N. Lancaster, M.V.Meisch.
- Acarology, Volume I and II, D.A.Griffiths and C.E. Bowman, Holsted Press.

SIXTH SEMESTER

Course Title: GENERAL AND SYSTEMIC VETERINARY VIROLOGY
Course Code: VMC-324
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to know the general properties, morphology, replication, cultivation, diagnosis and immunity of different viruses.

THEORY

General characteristic of various families of RNA and DNA biology, diagnosis and immunity of the following viruses: -

DNA
Pox virus - Pox diseases of cow, Sheep, goat and fowl; Iridovirus - African swine fever; Herpes virus – Pseudorabies, Malignant catarrhal fever, Infectious bovine rhinotracheitis, Equine abortion, Marek's disease, Infectious laryngeotracheitis; Adenovirus- Infectious canine Hepatitis, EDS; Papovo virus- Papillomatosis; Parvo virus-Parvo virus infection of dogs

RNA
Orthomyxo virus-Swine, Equine & fowl influenza; Paramyxovirus - Rinderpest, canine distemper and Ranikhet disease; Orbo virus – African horse sickness, blue tongue; Rhabdo-virus-Rabies, ephemeral fever; Corona virus-Infectious bronchitis & transmissible gastroenteritis, neonatal calf diarrhoea virus; Toga virus-Swine fever, mucosal disease & equine encephalitis; Picorna virus –FMD, duck virus hepatitis; Retro virus – Avian leucosis complex. Unclassified bursal disease (Birna), Latent & oncogenic viral infections, sheep pulmonary adenomatosis, Maedi/ visna, Equine infectious anemia Virus. (lenti)

PRACTICAL

Filteration, Egg inoculation, Tissue culture technique, Animal inoculation
Viral inclusions: Rinderpest, FMD, RD, Blue tongue, Rabies, IB/IBD/ILT, MD, Other agents

Reference

- Veterinary Bacteriology and Virology by I.A. Merchant and R.A. Packer.
- Medical Mycology by J.W.Rippon.
- Fundamental Virology-Kinpe.
- Microbiology-Strohi.

SIXTH SEMESTER

Course Title: SPECIAL PATHOLOGY - II
Course Code: VPL-324
Cr. Hr.2+1=3 **Theory – 50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to know the etiology, pathogenesis and diagnostic measure adopted for the infectious diseases.

THEORY

General introduction and pathology of nutritional deficiency diseases, Avian: Inflammation, Respiratory disease complex, New-castle disease, infectious bronchitis, Infectious laryngotracheitis, Influenza, fowl pox, coryza, Avian encephalomyelitis, Viral Arthritis, Infectious bursal disease, EDS $_{76}$, IBH(Inclusion body hepatitis), neoplastic disease: Marek's disease and avian leucosis complex, Salmonellosis - pullorum disease, typhoid and Paratyphoid; Pasturellosis-Fowl cholera and Avian pseudo tuberculosis; Avian mycoplasmosis, Chlamydiosis, Avian brucellosis, Colibacillosis, Spirochetosis, Fungal infection: Aspergillosis and flavus infection, parasitic infestation caused by: nematodes, Cestodes and Protozoa; Vices and Miscellaneous diseases.

Common pathological conditions seen in wild and zoo animals and birds. Pathological lesion commonly seen in laboratory animals.

PRACTICAL

Postmortem examination of poultry, techniques of collection and dispatch of morbid materials. Writing of P.M. examination reports of important diseases. Diagnoses of diseases of poultry on the basis of symptoms, gross lesions and histopathological changes. Clinical examination of blood and faeces of poultry and interpretation of its results. Study of gross specimens and histopathological slides of different infectious diseases of poultry.

P.M. examination of wild animals and birds; specimens of lesions from wild animals and birds. P.M. of laboratory animals (if any) and demonstration of lesions thereof, demonstration of nutritional diseases.

Reference

- Veterinary Pathology CBS Publishers and Distributors, India –Ganti Sastry.
- Veterinary Clinical pathology, CBS Publishers, India. Ganti Sastry.
- Textbook of Veterinary Special Pathology-Vegad.
- Textbook of Veterinary General Pathology-Chauhan.
- Pathology of infectious diseases of domestic animals –H.V.S. Chauhan.
- Veterinary Pathology in the tropics –Mugera.

SIXTH SEMESTER

Course Title: MEAT HYGIENE AND PUBLIC HEALTH
Course Code: VPH-322
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon completion of this course student will be able to explain meat born diseases and their control and differentiate the meats of different food animals.

THEORY

Aim, objectives and role of Veterinary Public Health in modern society. General principles and objectives of meat inspection; Food animals, Transportation of food animals; Elements of meat inspection. Different components and management aspects of abattoir. Methods of slaughter. Conditions detected at meat inspection and their judgement; Characteristics of meats of different food animals; Composition. Rigor mortis. Differentiation of meat of different food animals. Emergency slaughter. Disposal of unsound meat, Utilization of meat and methods of preservation. Inspection of poultry eggs, fishes and game animals. Meat borne diseases and methods of control. Principles of meat preservation. Examination of lymph nodes and their importance in meat inspection.

PRACTICAL

Inspection of meat processing plant, marketing centres and food service establishments. Ante-mortem and post-mortem inspection of food animals. Methods of slaughtering (Demonstration at slaughter house); Differentiation of meats of different food animals; Isolation and identification of pathogens from meat and meat products; Physical and bacteriological quality of meat, fish and eggs.

Reference

1. Veterinary Medicine and Human Health-Cavin .W.Schwabe.
2. Textbook of Meat Inspection –Horace Thornton.

SIXTH SEMESTER

Course Title: SHEEP AND GOAT PRODUCTION AND MANAGEMENT
Course Code: LPM-327
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon successful completion of the course students will be able to rear sheep and goats.

THEORY

Sheep

Sheep production in Nepal. Importance of sheep production in national economy. Selection of sheep for mutton and fibres. Judging of the quality and conformation of body parts; Different indigenous and exotic breeds of sheep; feeding and management; Sheep housing, routine health care: deworming, vaccination, breeding schedules, care in pregnancy, lambing; care of lambs, young stocks; weaning, shearing. Marketing of wool and mutton, their economics of production, grading and marketing. Preparation of projects for sheep units. Glossaries of terms in wool industry. Growth and structure of wool fibre. Physical and chemical properties of wool. Impurities in wool; factors influencing the quality of wool. Recovery of wool wax and its use.

Goat

Goat production in Nepal; Goat production for profit, Selection of goats for chevon and milk; judging of the quality and conformation of body parts; Different indigenous and exotic breeds of goats; Goat feeding and management; breeding of goats, buck management, care of goat in pregnancy and kidding; rearing of kids, weaning, fattening etc. Rearing sheep and goat together. Goats as leaders in grazing. Goat housing and marketing; Chevon and goat milk marketing and their economics of production. Individual and back yard goat farm management (on household surplus and hand feeding).

PRACTICAL

Sheep

Familiarization with farm routines. Identification and selection of sheep. Handling of sheep. Dipping, Spraying, spotting sick animals, examination for parasites, administration medicine, Vaccination. Grazing/feeding sheep; farm records maintenance. Detection of heat, mating, identifying pregnant animals, care of pregnant animals, lambing, neonatals and young stock. Care of pasture. Judging sheep for wool and mutton. Shearing and grading of wool and storage; Marketing of wool, mutton and live animals; Layout plans of sheep farms of different sizes. Working out economics of sheep production from the 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, scoring and carbonization of wool, Visit to wool production center and woolen industries.

Goat

Familiarization with farm routines, handling, identification and selection of goats; spotting sick animals examination for diseases and parasites, adm. of medicine, vaccination. Detection of vices; culling. Detection of estrus, mating, care of pregnant, kidding, neonatal care, weaning and care of young stock, castration of kids. Layout plans for goat farms and backyard unit. Profit work outs; Judging of goats for chevon; practical housing and feeding of goats and goat farm records maintenance; Marketing of chevon, milk and live goats; Visit to sheep and goat farms and demonstration centres; Individual goat dwells.

Reference

- Goat production-S.K. Jindal.Cosma Publication, New Delhi.
- Sheep production-William Haresign, Butterworth, London.
- A Textbook of Animal Husbandry-G.C. Banerjee. Oxford and IBH publishing Co.New Delhi.

SIXTH SEMESTER

Course Title: AVIAN PRODUCTION AND MANAGEMENT
Course Code: LPM-328
Cr. Hr.2+1=3 **Theory –50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Upon successful completion of the course students will be able to rear poultry and its managemant.

THEORY

Economic importance of poultry, development of poultry industry in Nepal, different breeds and varieties of chicken, ducks and turkeys; terms used in poultry science; how egg is formed - structure of eggs, formation of 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, constructional details of poultry houses and hatcheries, cost of construction, construction of budget poultry sheds for small, medium and large operators; layout plans for poultry farm of various sizes, poultry equipment: incubators, brooders, debeaker, trap nests, 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 implements and poultry houses. Disposal of poultry wastes. Utilities of poultry manure.
Economy in poultry production; Cost of production of table and hatching eggs, broiler meat, day old chicks; Preparation of project reports for broiler, layers, and hatchery. Cockerel 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 parts, identification of species, breeds and varieties of poultry. Reproductive and digestive systems of chicken, structure and composition of eggs and meat, poultry judging, selection and selling of poultry, candling of eggs for evaluation of quality, presence of blood and meat spots etc.; measuring the strength of eggs, grading of eggs and management of incubators; sexing of chicks, brooding of chicks, feeders, waterer, trap nests and poultry farm and hatchery equipments; different systems of housing and layout plans 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.

Reference

- Poultry production-R.A.Singh Kalyani publishers, New Delhi.
- Poultry husbandary-Morley A.Jull. Tata Mc Graw –Hill Publishing Co. Ltd. New Delhi.

SIXTH SEMESTER

Course Title: ABATTOIR PRACTICES AND ANIMAL BY-PRODUCTS TECHNOLOGY
Course Code: LPT-322
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Upon successful completion of the course students will be able to slaughter different types of meat animals and cut wholesale and retailer pieces of meat and judge the quality of meat.

THEORY

Organization, layout and management of slaughterhouses, pre-slaughter care, handling and transport of meat animals. Judging and grading of live meat animals. Ante-mortem and postmortem examination. Different slaughtering and dressing techniques followed for various kinds of meat animals in Nepal and abroad. Chilling, ageing and evaluation of dressed carcasses.

Disposal of animals suffering from notifiable diseases and condemned parts. Utilization of slaughter house byproducts. Organic wastes available through the animal industries, fallen and slaughtered affluents and glandular byproducts. Optimal harvesting of hides (ante-mortem care, proper de-skinning, salting, stacking and preservation).

PRACTICAL

Methods of slaughter- Ritual and Humane steps (stunning, slaughtering out of sight of live animal, isolation) in slaughter, flaying and dressing of food animals.

Judging of meat animals and carcass evaluation, slaughtering and dressing of different kinds of meat animals, estimation of meat yield and dressing percentage, maintenance of slaughterhouses and their sanitation. Yield estimation and utilization of certain slaughterhouse by- products. Identification, culture, induced fermentation by non-toxin producing harmless microorganisms.

Visit to leather processing unit, visit to slaughterhouses, meat plants and bacon factory to study their layout and organization, collection of samples etc

Reference

- Poultry product technology-J. Mountrey. The Avi. Publishing Company Inc.
- Meat Hygiene-ELBS.
- Wool Production and Management. R.A. Singh, Kalyani Publishers.

SEVENTH SEMESTER

Code	Course	Cr. Hrs
LPM-419	Livestock Production and Management (Cattle and Buffalo Production and Management)	1+1=2
VPH-413	Veterinary Public Health (Zoonoses and Human Health)	1+1=2
VPH-414	Veterinary Public Health & Enviromental Hygine	1+1=2
LPT-413	Livestock Product Technology (Meat & Meat Products Technology)	1+1=2
VSR-411	Surgery and Radiology (General Surgery and Anaesthesilogy)	2+1=3
VEP-411	Veterinary Epidemiology (Veterinary Epidemiology & Preventive Veterinary Medicine)	1+1=2
AHE-413	Veterinary & Animal Husbandry Extension (Extension Techniques in Veterinary Practice and Livestock Production)	1+1=2
VPT-413	Veterinary Pharmocology & Toxicology(Chemotherapy)	2+1=3
VBC-414	Veterinary Biochemistry (Veterinary Clinical biochemistry)	1+1=2
	Total	**11+9=20**

SEVENTH SEMESTER

Course Title: LIVESTOCK PRODUCTION AND MANAGEMENT (Cattle and Buffalo Production and Management)
Course code: LPM-419
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

The student will be able to recognized different breeds of cattle and buffalo.

THEORY

Introduction, census and status of indigenous and exotic breeds of cattle and buffaloes. Problems of international and national prospectus of dairying.

Buffalo

Origin and distribution of buffaloes, Economic traits, their selection and management. Breeds of buffaloes. Feeding, care and management of pregnant, milch, dry, heifer and newborn calf. Feeding and management of breeding bull and working bullock. Reproduction and breeding principles of buffaloes. Preparing and training of bulls for artificial breeding. System of housing and preparing animals for show. Health & hygiene of buffalo.

Cattle

Origin and distribution of cattle. Economic traits of cattle, their selection and management. Breeds of cattle feeding care and management of newborn calf, heifer, pregnant, milching and dry animals. Feeding and management of breeding bulls and working bullocks. Reproduction and breeding principles of cattle. Housing systems and preparing animals for show Health & hygiene of cattle.

Dairy farm management

Constructional details of dairy cattle & buffalo housing and dairy farms. Clean milk production, method of milking (merits & demerits). Routine dairy farm operation Account and recording system. Development of dairy milk supply schemes in the country. Lay out plans for back yard and commercial scale dairy farm. Factors affecting quality and quantity of milk operation of mixed dairy farm. Economics of dairy farming in urban and rural areas. Hygienic milk production system, dairy wares and equipments.

PRACTICAL

Identification & familiarization with various breeds of dairy animals. Lay out plans for a dairy farm. Economic calculation and estimation methods for cost effectiveness in dairy farm. Casting restraining of dairy animals. Familiarization of ear rings nose rings, mouth guaze. Tattooing, branding and tagging. Castration and dehorning. Familiarization of milking system and equipments. Physical and chemical methods of examination of milk for its quality. Assessments for microbial quality of milk. Operation, examination and analysis of farm records, ledger, and cashbooks. Preparation and examination of balance sheets. Feeding, housing, care and management of young and adult animals. Cleaning, sanitation and maintenances of dairying equipment and hygienic milk production storage & supply system of dairy products. Selection and culling of productive and unproductive animals. Vaccine and Vaccination Program, Administration of antihelminthic for parasite control program for dairy animals. Performance evaluation of dairy herds. Herd health management.

Reference

- Cattle Management - Cheryl May. Roston Publishing Company, Inc. Roston, Virginia.
- Textbook on Buffalo Production - C.K. Rajhan, N.N. Pathak, Vikas Publishing House Pvt.Ltd, New Delhi.
- Principle & Practices of dairy farm management - Jagdish Prasad
- A text book of animal husbandry- G.C. Banerjee.

SEVENTH SEMESTER

Course Title: VETERINARY PUBLIC HEALTH (Zoonoses and Human Health)
Course Code: VPH-413
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

This course will provide knowledge to students about different animals in transmission of zoonotic diseases and describe method of prevention, eradication, and control of zoonotic diseases.

THEORY

Definition, and objectives of zoonoses. Classification of zoonosis (e.g.Direct, Cyclo, meta, Sporozoonosis etc.). Mode of transmission of zoonotic diseases. Role of domesticated pets, various wild and cold blooded animals in transmission of zoonotic diseases. Study of important zoonotic diseases of the region. Methods of prevention, control and eradication of zoonotic diseases. Socio-economic condition and Human health zoonosis.

PRACTICAL

Isolation and identification of important pathogens of zoonotic importance. Sero-epidemiological studies of important zoonotic disease by FAT, HI, CPT etc. Study of rural environment and health status of rural community. Visit to primary health centers to study the common condition of rural population.

References

- Veterinary Medicine & Human Health .Cavin W. Schwabe.
- Parasitic Zoonoses - S.C. Pacija
- Veterinary medicine - Blood, Radostits *et. al*.,

SEVENTH SEMESTER

Course Title: VETERINARY PUBLIC HEALTH & ENVIROMENTAL HYGINE
Course code: VPH - 414
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVES

The student will be able to describe sources of contamination in water, air and their prevention.They will also be able to describe the waterborne disease of man and animals.

THEORY

Sources of water supply and their qualities, Sources of contamination of water and prevention. Bacteriology of water and air. Purification and sanitation of water. Disposal of sewage and farm refuses, their relation with animal and human health respectively. Sanitation of animal house, sources of air pollution in animal houses and its effect on animal health and production; method of prevention and control of air and water borne diseases of man and animal. Atmospheric pollution and methods of control, stray animal control; fallen animals and environment; radiation, drugs etc, as sources of pollution. Possibilities of recycling farm surplus/wastes etc.

PRACTICAL

Qualitative chemical examination of water; estimation of total hardness in water; estimation of air temperature and relative humidity. Pathogenic microbes in air, water and farm environment and application of disinfectants on farm . Demonstration of water purification plant, sewage disposal systems and carcass/fallen animal disposal methods. Study of various ventilation systems. Sampling of water for bacteriological & chemical examination. Coliform test to determine the potability of water; visit to recycling plants.

Reference

- Veterinary Medicine and human health- Cavin W. Schwabe
- Fundamentals of animal hygiene and epideminology - Thapliyal

SEVENTH SEMESTER

Course Title: LIVESTOCK PRODUCT TECHNOLOGY (Meat & Meat Products Technology)
Course code: LPT-413
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Student will be able to slaughter different types of meat animals and cut whole sale, retailer pieces of meat and judge the quality of meat.

THEORY

Development of meat industry, structure, composition, nutritive value, postmortem changes and eating quality of meat tissues. Principles of various preservation techniques like chilling, freezing ,curing,smoking,thermal ,processing, and canning and irradiation. Meat cutting and packaging. Microbial and other deteriorative changes in meat and their identification standards and quality control, measures adopted for meat and meat products in Nepal and aboard.

Meat food products order-eating quality of meat- sensory evaluation of meat food products-fraudulant substitution of meat and its recognition-physical , chemical and biological means for differentiation of meat.

Chemical composition and nutritive value of buff,chevon,mutton,chicken,pork and fish meat . Pre-slaughter care, handling and transport of meat animals. Antemortem and post-mortem examination of dressed poultry, Slaughtering techniques used for various types of meat animals. Preservation of poultry meat by chilling , freezing, curing ,smoking and irradiation. Preparation of poultry products. NSI and other legal standards for poultry and poultry products. Utilization of poultry industry by-products. Structure ,composition, nutritive value of eggs. Microbial spoilage of eggs. Preservation and maintenance of eggs. Principles involved in preparation of different poultry based foods. Role of meat and poultry products in human nutrition.

PRACTICAL

Preparation of different meat cuts. Estimation of meat bone ratio, chilling and ageing of meat. Preservation and packaging of meat. Preparation of certain meat products. Estimation of microbial load of meat. Identification of deteriorative changes in meat and meat products. Slaughtering and evisceration of different kinds of birds. Estimation of dressing percentage and yield. Grading of dressed chicken/poultry. Preparation of ready to eat meat, poulrty products. Microbiological sampling of meat,poultry products and eggs. Preparation of certain poultry by-products, Candling, grading and preservation of shell eggs.

Reference

- Meat Hygiene - By ELBS
- Poultry Product Technology - J. Mountrey. The Avi. Publishing Company Inc.
- Text book of meat inspection - Horace Thrnto

SEVENTH SEMESTER

Course Title: SURGERY AND RADIOLOGY (General Surgery and Anaesthesilogy)
Course code: VSR-411
Cr. Hr.2+1=3 **Theory –50**
Full Marks – 75 **Practical - 25**

OBJECTIVES

Students will be able to identify the general surgical conditions & familiar with different anesthetic agents and their proper uses in veterinary field.

THEORY
General Surgery

Introduction , history, classification and development of Veterinary Surgery. General surgical principles, pre-operative and post operative considerations. Importance of sutures, suturing materials and different knots. Asepsis-antisepsis, their application in veterinary surgery, sterilization of surgical materials and instruments. Inflammation, abscess, tumors, cysts, hernia etc. and their treatment. Wound: Classification, symptoms, diagnosis and treatment ,complications and their preventions and remedies. Haemorrhage and homeostasis, shock hematoma, necrosis, gangrene, burn and scald, frostbite, sinus and fistula. Surgical infections and their preventions and their management. Surgical affections of muscles, artery and vein. Fracture and dislocation and other affections of joints.

Anesthesiology

History and Importance of anaesthsia in Veterinary Surgery. General considerations, types of anaesthesia, definition and selection of anesthetic and methods of administration. Preparation of the patient for anaesthesia Local and regional anaesthesia (surface anaesthesia, infiltration, field block). Narcosis and premedication in domestic animals. General anaesthesia: definition, methods of inducing general anaesthesia, anaesthetic drugs. Parental, inhalation anaesthesia; its method of administration in horses, cattle and dog. Intravenous anaesthesia, dissociative anaesthesia, electro anaesthesia, accupunture, hypothermia etc (only awareness). Anesthetic complications, emergiencies and their remedies. Chemical restraint of wild/zoo animals. Anaesthesia of lab animals.

PRACTICAL

General surgery

1. Introduction to layout of operation theatre, common equipments, surgical instruments.
2. Restraint , positioning, bandaging, catheterization etc
3. Operation theatre routines.
4. Preparation of surgical pack, sterilization
5. Familirization with various sutures, suture materials.
6. Typing surgical knots, double hand , single hand etc
7. Tension sutures, bowel and uterine sutures (practical of anaesthesia)
8. Demonstration of surgical operation-control of haemorrhage, suturing etc.
9. Administration of drugs by different routes and different types of injections.

Anaesthesiology

1) Familiarization with anaesthetic apparatus. Endotracheal devices, laryngoscope, gadgets for monitoring.
2) Administration of inhalant anesthetics by various methods in small animals.
3) Methods of local infiltration (Ring Block, Diamond Block, T-Block, Inverted L-Block)
4) Epidural and Para vertebral analgesia in cattle.
5) Preparation, calculation of dose and induction of anaesthesia in large animals.
6) Regional block, intravenous retrograde, regional anaesthesia-cattle
7) Demonstration and monitoring of general anaesthesia and the management of anesthetic emergiencies. Use of artificial respiration etc.
8) Chemical restraint of lab and wild animals.

Reference

- Dolor's Veterinary surgery by J.J. O'conner (4th Edition)
- Essentials of Veterinary surgery by A. Venugopalan
- Veterinary Surgical Techniques (1st edition) By Amresh Kumar
- Veterinary surgery By E. R. Frank

SEMESTER VII

Course Title: VETERINARY EPIDEMIOLOGY (Veterinary Epidemiology & Preventive Veterinary Medicine)
Course Code: VEP-411
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVES

This course will provide knowledge to students and they will be able to describe different patterns of disease, its distribution in community and their prevention, eradication, and control.

THEORY

Definition, aim, objectives and applications of epidemiology and preventive medicine. Ecological concepts of epidemiology. Disease process and its spread. Pattern of disease distribution in the community. Types of epidemiological studies e.g. case, control, cohort disease. Investigation of an epidemic, prevention control and eradication of diseases. Laws regulating International Organization. Regulating, emerging and spreading disease of animals and birds. Office International Des Epizootic (O.I.E.), its categorization of disease that are transmissible and other regulations. Regulations, regulating handling, import and export of biomaterials.

PRACTICAL

Visit to primary health centre /infectious disease hospital/ hospital/ organized farms etc. for collection of data for epidemiological investigation. Processing and analysis of data. The Laboratory investigation related to epidemiological studies and its co-relation.

References :-

- Veterinary Epidemilogy - Martin, Meek, Williberg.
- Fundamental of animal hygiene and epidemiology – Thapliya
- Meat Hygiene - ELBS.
- Meat Laws - Published by TLDP

SEVENTH SEMESTER

Course Title: VETERINARY AND ANIMAL HUSBANDARY EXTENSION (Extension Techniques in Veterinary Practice and Livestock Production)
Course Code: AHE-413
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Students will be able to know about audio- visual equipments.

THEORY

Marketing methods of urban and rural societies and distribution of livestock and products. Various kinds of farming eg:- large and small scale farming, mixed farming, co-operative and collective farming. Economic principles underlying co-operative societies, co-operative milk activities in Nepal. Project – definition, need assessment and problem identification. Animal husbandry planning and programs, animal husbandry administration. First, second, third livestock Development project, community Livestock Development Project, Strengthning of Veterinary Livestock Development Services (SVLDS). Integrated Rural Development Program in Animal Husbandry Extension Programmes in goat, sheep, buffalo, cows, poultry, rabbit and piggery, development.

PRACTICAL
AUDIO-VISUAL EQUIPMENTS:
(1) Use and principles of overhead projector.
(2) Use and principles of multimedia.
(3) Use and principles of slide-projector.
(4) Use and principles of tape-recorder.

A. PRINCIPLES OF CONSTRUCTION AND USE OF:
(1) Poster making and use.
(2) Flash card making and use.

B. USE OF LITERATURE IN EXTENSION:
(1) Circular letter.
(2) Advisory letters, leaflets, pamphlets, folders etc.

C. GROUP DISCUSSION:
On different topics of animal health and husbandry
Awareness campaigns on different veterinary and animal husbandry practices such as, signs of diseases, preservation of eggs, clean-milk production, disbudding, controlling of ectoparasites, drenching in animals, control of tympanitis, pail feeding of calves, sexing and culling of birds, first aids for minor wounds, disinfection of barns, branding, use of horn-cauterisation, etc. Awareness campaigns on timely A.I., choice of good progeny care in pregnancy, infertility etc.
Awareness campaigns on environmental hygiene, pollutants.
Preparation of feed, feeding schedules, deworming routines, preventive hygiene, importance of diagnostics, vaccination etc.

D. PROJECT PREPARATION:
Different aspects of project preparation and planning, logical framework, planning tools, project appraisal, implementation, monitoring and evaluation, PCN preparation, research methodologies, report writing and data presentation.

Reference

- Principle of extension Education- B.B.S. Dangol, Niraj Narayan Joshi

SEVENTH SEMESTER

Course Title: VETERINARY PHARMOCOLOGY AND TOXICOLOGY (Chemotherapy)
Course Code: VPT-413
Cr. Hr.2+1=3 **Theory –50**
Full Marks – 75 **Practical - 25**

OBJECTIVE

Students will be able to understand about antibiotics, antibacterials, antifungals, anthelmintics, antiprotozoans, antineoplastics, ectoparasidals, hormones and indigenous drugs.

THEORY

Drug resistance and Multiple Drug Therapy.

ANTIBACTERIAL AGENTS: Classification, general principles in antibacterial chemotherapy, sulphonamides and their combination with trimethoprim; sulfones; nitrofurans.

ANTIBIOTICS: Penicillins and Cephalosporins. Aminoglycosides, tetracyclines, chloramphenicol, macrolides, polypeptides, fluroquinolones etc.; anti tuberculosis agents; miscellaneous agents; methelamine, nalidixic acid etc.

ANTIFUNGAL AGENTS: Topical and systemic agents including antifungal antibiotics.

ANTHELMINITHICS: Drugs used against cestodes, trematodes, nematodes, drug tolerance, and broad spectrum anthelminthics.

ECTOPARASIDAL AGENTS: Drugs used against external parasites.

ANTIPROTOZOAL AGENTS: Drugs used in trypanosomiasis, theileriasis, babesiasis, anaplamosis, malaria, coccidiosis, amoebiasis, giardiasis, trichomoniasis etc.

ANTIVIRAL AND ANTICANCER AGENTS:

ANTISEPTICS AND DISNFECTANTS:

HORMONES: hormone stimulating and inhibiting drugs: antagonists, hypoglycemic agent, prostaglandins, oxytocin and tocolytic drugs – galactagogues, anabolics, and corticosteroids.

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, anthelminithics, arthropode repellants).

PRACTICAL

Demonstration of various chemotherapeutic agents and their forms; estimation of the antibacterial agents viz. Sulphonamides, nitrofurans, penicillins, tetracyclines in water and blood of animals or birds. Bacterial sensitivity test for different chemotherapeutic agents.

Pharmacy Preparations: potassium permanaganate solution, lugol's iodine solution, trepan blue solution. Gentian violet solution, tincture iodine, tincture benzoin, boric acid ointment, zinc oxide ointment, ointment of salicylic acid with benzoic acid etc.

Reference

- Jones Veterinary Pharmacology & Therapeutics-Booth Nicholas H. & Mc Donald Leslie E.
- Veterinary Applied Pharmacology & Therapeutics-Brander G.C., Pugh D.M., Bywater R.J., Jenkin W. L.
- Antimicrobial Therapy in Veterinary Medicine -F. Prescott John & Desmond J. Baggot.
- Veterinary Pharmacology & Therapeutics-Adams.

SEVENTH SEMESTER

Course Title: VETERINARY BIOCHEMISTRY (Veterinary Clinical Biochemistry)
Course Code: VBC-414
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

The students will be able to determine health and disease conditions of animals.

THEORY

A. Biochemical process in conditions of health and disease.

1 Biochemistry of Respiration and acid base balance.
2 Biochemistry of renal function and acid base balance.
3 Biochemistry of stress and shock.
4 Biochemistry of digestive disorders.
5 Detoxification in the body; the metabolism of foreign compounds.

Biochemistry of Hormones: -
Structure and Metabolic role: -

1. Thyroxine, parathyroid hormone.
2. Insulin and glucagon.
3. Epinephrine and nor-epinephrine.

4. Glucocorticoids and Mineralocorticoids.
5. Testosterone and Estrogen.
6. Somatotropin.
7. Oxytocin and Vasopressin.

Diagnostic biochemistry:-

1. Role of Blood sugar as an aid todiagnosis.
2. Role of ketone bodies as an aid to diagnosis.
3. Role of blood urea nitrogen and uric acid as an aid to diagnosis.
4. Role of Enzymes for detection of tissue affection/organ affections (Scope and limitations).

Immunochemistry:-

Nature of antigen and antibody:-

1. Antigens, antigenic determinants.
2. Structure of Antibodies.
3. Immunopotency & various factors influencing immunopotency.

PRACTICAL: (to be conducted on clinical samples for assessment of health status/diagnosis.)

1. Biochemical estimation of plasma proteins.
2. Urine analysis.
3. Estimation of blood sugar.
4. Estimation of serum total cholesterol.
5. Serum Billirubin determination.
6. Blood urea estimation.
7. Glucose tolerance test.
8. Estimation of SGOT.
9. Estimation of SGPT.
10. Analysis of Transudates.
11. Analysis of Exudates

References

- Principles of Biochemistry-Lehninzer, Nelson & cox, CBS Publication, 1993.
- Textbook of Biochemistry with clinical correlationsThomas M. Delvin, Wiley Liss, Inc, 1997.
- Medical Biochemistry-Bhagwan
- Principles & Techniques of Practical Biochemistry-Wilson & Walker, Cambridge University Press 1975

EIGHTH SEMESTER

Code	Course	Credit hours
VPT-424	Veterinary Toxicology	2+1=3
VOG-421	Veterinary Gynaecology & Obstetrics	2+2=4
VSR-422	Radiology Regional and Clinical Surgery-I	2+2=4
VCM-421	Clinical Veterinary Medicine- I (General & Systemic)	2+2=4
VEP-422	Preventive Veterinary Medicine-I (Bacterial, Viral and Fungal diseases)	2+2=4
VFC-421	Project Work on Veterinary Field Clinic (Veterinary Practice and Management)	0+2=2
VLD -421	Project Work on Veterinary Laboratory Diagnosis-I (Clinics)	0+2=2
	Total	**10+13=23**

EIGHTH SEMESTER

Course Title: VETERINARY TOXICOLOGY
Course Code: VPT-424
Cr. Hr.1+1=2 **Theory –25**
Full Marks – 50 **Practical - 25**

OBJECTIVE

Students will be able to understand toxicology of metals non-metals, agrochemicals radioactive substances, toxins and plants.

THEORY

GENERAL TOXICOLOGY: Definition, scope of toxicology. Source of poisoning, mode of action of poisons. Factors modifying the toxicity.Collection, preservation and dispatch of materials for chemical analysis . Diagnosis of poisoning and line of treatment of the poisoned cases. Identification of commonly used antidotes**.**

TOXICITY CAUSED BY METALS AND NON-METALS: Arsenic, Lead, Mercury, Copper, Selenium, Phosphorus, Nitrates and Nitrities, Common Salt and Fluorosis**.**

PLANT TOXICITY: Cyanogeneic plants, Abrus, Jowar, Lantern, Ipomoea, Kanail, Dhatura, Nuxvomica, Castor, and Selenium-containing plants, Oxalate producing plants etc.

TOXICITY CAUSED BY COMMONLY USED DRUGS: Tranquilizer, Sedatives, Hypnotic, Analgesics, Anthelmintics, Antibiotics, Antibacterials, Antihistaminics, Antiseptics, and Disinfectants. Coccidiostats, Digitalis, Purgatives Quinuronium derivatives, Hormones, Vitamins, CNS stimulants.

TOXINS: Mycotoxins and Bacterialtoxins, Ergot, Aflatoxins, Botulinum toxin etc.

TOXICITY CAUSED BY AGROCHEMICALS: Insecticides, including Organosphosphates, Carbamates and Chlorinated hydrocarbons, Herbicides, Rhodenticides.

VENOMUS BITES AND STINGS: Snake bite, Toads, Scorpion, Bee and Wasp stings.

ENVIORNMENTAL TOXICITY: Air pollutants, Water pollutants, Food toxicants etc.; Radiation hazards and toxicity. Toxicity caused by Food additives and Preservatives.

PRACTICAL

Demonstration of toxic weeds and plants; Detection of Arsenic, Antimony, Lead, Mercury, Nitrates and Nitrites, Fluoride etc; detection of Alkaloids, Glycosides, Tannins, Resins etc; Identification of antidote & their use in toxicological cases, Diagnosis of poisonous cases by lab findings. Demonstration of insecticides; toxicity and their treatment; calculation of LD_{50} and ED_{50}; Demonstration of drug toxicity.

Reference

- Jones Veterinary Pharmacology and therapeutics by Booth Nicholas H. and Mc Donald Leslie.
- Veterinary Applied Pharmacology and Therapeutics by Brander G.C; Pugh D. M., Bywater R.J. Jenkins W.L.
- Medicinal plants of Nepal by HMG , Nepal
- Pharmacology and Therapeutics in the Millenium by Gupta.
- Veterinary Toxicology by Clarke, E.G.C and Myra L. Clarke.
- Veterinary Toxicology by Garg

EIGHTH SEMESTER

Course Title: VETERINARY GYNAECOLOGY AND OBSTETRICS
Course Code: VOG-421
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Students will be able to describe the structure of reproductive system and understand the role of hormones on reproductive system along with gynaecological disorders and their corrective measures.

THEORY

Introduction, development of female genitalia and description of pelvis in domestic animals; growth, puberty, sexual maturity in relation to reproduction. Role of hormones in various phases of reproduction in females. Symptoms of oestrus and oestrous cycle in domestic animals and factors affecting oestrous cycle. Palpation of genital organs for changes during oestrus cycle, synchronization of oestrus cycle; ovulation. Transportation of sperms; fertilization and attachment; development of foetus. Foetal membranes of placenta. Types and functions of placenta, gestation duration and stages of gestation in domestic animals. Superfoetation and superfecundation. Superovaluation and embryo transfer. Abnormalities of fertilisation and foetal development.

Pregnancy diagnosis, pregnancy examination - physical, biological, chemical, hormonal, ultrasonic and radiographic methods. Differential diagnosis of pregnancy.

Diseases and accidents during gestation, Prolonged gestation; premature birth, early embryonic mortality, abortions in domestic animals, causes and treatment. Intrautreine death of foetus; mummification; maceration, pyometra.

Fertility, infertility and sterility; functional infertility, anoestrus, ovarian hypoplasia, cystic ovary, adrenalvirilism. Fertilization failure and repeat breeding. Infectious infertility. Specific and non specific infections affecting genital organs. Sexual health control and herd reproductive health program. Antepartum fetal membrane, twins and multiple birth, ectopic pregnancy.

Parturition in domestic animals, causes and stages of parturition. Expulsion and retention of after birth. Parturition hygiene, care and management of new born and dam. Udder health care. Post partum diseases and complications Cervicovaginal prolapse, uterine prolapse. Vaginitis, cervicitis, metritis, pyometra, postpartum paraplegia, milk fever, Clinical uses of hormones and prostaglandins.

Intrauterine presentation of foetus, eutocia, dystokia. Types of dystokia, general handling of dystokia. Diagnosis and treatment of dystokia cases. Obstetrical operations. Mutation and forced extractions. Fetotomy and caesarian section.

PRACTICAL

Study of female genitalia, palpation technique. Heat detection in farm animals and companion animals. Collection and examination of vaginal mucus by various techniques. Pregnancy diagnosis and differential diagnosis. Use of gynaecological instruments and appliances. Evaluation of female animals for breeding purpose. Sexual Health control, life history card for the female, recording system for reproductive performance.

Study of pelvis, pelvimetry, use of obstetrical instruments, manipulation of fetal malpresentation in Phantom boxes. Attending cases of normal parturition. Fetotomy, epidural anesthesia in obstetrical practices. Approach to obstetrical cases; post operative care and treatment of obstetrical cases.

Reference

- Veterinary Obstetrics and Genital Diseases-Stephen J . Roberts
- Veterinary Reproduction and Obstetrics-G. H Arthur.
- Reproduction in Farm Animals -E.S.E. Hafez
- Reproductive Physiology of Mammals and Birds-A.V. Nalbandov.
- Physiology of Reproduction and AI in Cattle-Salisbury G.W. and N. L. Yendermare.
- Reproduction in Farm Animals-Asdell
- Animal Reproduction Principles and Practices -A.M.Sorenson Jr.
- Reproduction in Farm Animals-H.H Cole and P.T.Cupps.
- Artificial Insemination of Farm Animals-Enos J. Perry.

EIGHTH SEMESTER

Course Title: RADIOLOGY, REGIONAL AND CLINICAL SURGERY – I
Course Code: VSR-422
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Student will be able to take X-ray of affected organs and explain about radiological hazards and preventive technique. And will be able to diagnose and correct different surgical cases.

THEORY

Radiology

Brief historical backgrounds of invention of X-ray. Scope, history and development of Veterinary Radiology. Production and properties of X-rays. Factors influencing production of radiograph (radio-graphic factors, geometric factors, photographic factors) density, detail and contrast.X-ray accessories: filters, restrictors, collimator, grid etc. X-ray film and its processing. Intensifying screen, its use, advantages and disadvantages. Flouroscopy. Principle of viewing and interpreting X-ray films. Classification of radiographic lesions. Contrast Radiography – classification, material used, indications and contra-indications. Biological effects of radiation; measurement of radiation; radiation hazards and their prevention by adoption of safety measures. Principle of ultrasonography in veterinary practice. Principles of radiation therapy; Isotopes and their uses in diagnosis and therapy. Principle of physical therapy, its classification, scope and limitation. Mechanism, applications, indications and contra-indications of medical galvanism and other electrical stimulation's for diagnosis and therapy. Mechanisms, applications, indications and contra-indications of cold and heat therapy, massage hydrotherapy, infrared and ultraviolet therapy. Mechanism, applications, indications and contra-indications of short wave, microwave, diathermy and ultrasonic therapy.

Regional Surgery

Affections of the lips and cheek and their treatment. Affections of tongue and their treatment: strangulation, smooth tongue, tumours of tongue, Ranula, snake bites, trauma, gangrene, sublingual abscess, glossoplegia, actinobacillosis. Milk suckling (Surgical treatment) Affections of the palate and treatement: Lampas, cleft palate, palatine tumours, protusion, and strangulation of soft palate. Affection of nose and treatment: Atheroma, nasal polyps, resection of the nasal septum, necrosis of the turbinates and parasites in the nasal chambers. Affection chambers of the guttural pouch, empyema, chondritis, tympanitis, sinusitis, pus in the sinus.Affections of the horn and their treatment: Avulsion of the horn, broken horn. Horn cancer. Fracture of the horn and fistula in horn, debudding, and amputation of the horn. Affections of the teeth and their treatment: congenital abnormalities, irregular molars (shear mouth, sharp teeth, wave form mouth, stepformed mouth, smooth mouth, premature water mouth), dental tartar and dental caries, dental tumour (odontoma, adamentenoma), periodontal disease. Bishoping.Affections of salivary glands and their treatment: Trauma, sialoliths, salivary cysts, salivary fistula, neoplasm, sub-parotid abscess. Congenital affections of lower jaw and treatment, paralysis of lower jaw, gnathits, lymphadenitis of jaw, injuries and fracture of hyoid bone and crib biting. Affections of the ear and their treatment: examination of ear, haematoma of ear, ear cropping, necrosis of conchal cartilage, drooping of ears, ulceration of conchal cartilage, conchalfistula, otitis externa, otitis media, chronic otorrhoea, tumour in the ear and F.B. Tympanitis.Eye: Anatomical considerations and examination of the eye. Surgical affections of the eye: entropion, ectopion, growths and tumours of eyelid and conjunctiva, conjunctivitis; occlusion of nasolacrymal duct, squint.
Eye ball: Affections of cornea, ciliary apparatus, lens traumatic affections of the eye. Hydroopthalmia, glaucoma, tumours of eye, panopthalmia, retinal detachment. Injuries and infections of anterior and posterior chambers. Affections of Neck: yolk gall, yolk abscess, yolk tumours, torticolis; affections of withers. Affections of oesophagus: oesophageal ulcers, oesophageal stenosis, dilation and diverticulum; chocking. Tracheal injuries, collapse of trachea and tracheal tumours. Affections of Pharynx and Larynx: Foreign bodies; Abscess, traumatic injuries, fistulae.

PRACTICALS

Radiology

Familiarization with and operation of the X-ray equipment, X-ray accessories and dark room equipments. Positioning and radiography of different parts of the body in small and large animals. Adoption of safety measures Film processing. Handling, viewing and interpretation of an X-ray film. Familiarization with film contrast, density and detail; spot film viewing, common defects of X-ray films. Interpretation of classified lesions. Radiographic pathology of the skull- large and small animals (clinical cases/ transparencies).Radiographic pathology of bones and joints -small and large animals. Radiographic pathology of thorax. Radiographic pathology of abdominal cavity. Demonstration of contrast techniques of small animals.Familiarisaiton with fluoroscopic examination and ultrasonography.Techniques and application of diathermy, electrical stimulators, ultrasonic therapy. Use of hot and cold applications, massages and planned exercise. Infra-red and ultraviolet rays etc; their precautions.

Regional Surgery

Exploration of the mouth and use of various mouth gags. Amputation of tongue, partial glossectomy for milk suckling in cattle (operation for crib-biting).Resection of nasal septum in cattle, puncturing nasal septa for nose-ring, trephining of sinuses in various species (bovines and equine).

Amputation of horn (flap method and saw method) debudding.Ligation of Stenson's duct.

Tooth rasping; Otoscopy in dog and cattle. Operation for ear haematoma and ear cropping in dog. Zepp's operation in dog. Drainage of chronic otitis in cattle. Tracheotomy and tacheostomy, tracheoscopy and bronchoscopy. Oesophagoscopy and oesphagotomy.Opthalmoscopy and tonometry; tests for blindness; operation for ectropion and entropion).Keratocentesis, operation for corneal ulcer (conjunctivo keratoplasty). Protection and bandaging of eye.Enucleation of the eye, extirpation of the eye. Amputation of tail. Operation for draining the guttural pouch; Hyovertebrotomy.

Reference

- Veterinary Radiology (Basic principles and radiographic positioning) by A.P. Singh and Jit Singh.
- Ruminant Surgery, by R.P.S.Tyagi and Jit Singh.
- Surgical principle and techniques by W.F. Guard.
- Essentials of Veterinary Surgery by A. Venugopalan.
- Dollar's Veterinary Surgery by J.J.O's Conner (4^{th} edition).
- Veterinary Clinician's Guide by Harpal singh, Amresh Kumar and P.C.Chaudari.

EIGHTH SEMESTER

Course Title: CLINICAL VETERINARY MEDICINE-I (General and Systemic)
Course Code: VCM- 421
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVES

Students will be able to examine the sick animals, diagnosies and treat the diseases of different body systems.

THEORY

History and scope of medicine, concept of health and diseases-introduction, diagnosis, differential diagnosis, prognosis. Definition, etiology, clinical symptoms, pathogenesis, clinical pathology, diagnosis, and treatment, prevention and control of diseases of cattle, buffaloes, equine, sheep/goat, pigs, and pet animals. General systemic states, hyperthermia, hypothermia, fever, septicemia, toxaemia, shock and dehydration. Diseases of digestive system with special reference to rumen dysfunction and diseases of stomach in ruminants. Affections of peritoneum, liver and pancreas: Diseases of respiratory and cardiovascular systems including blood and blood forming organs, uro-genital system, nervous system, skin, lymphatic system, musculo skeletal system and sense organs.

PRACTICAL

Clinical examination and diagnosis-Methods of clinical examination of individual ailing animals including history taking. Patient data and disease history (both present and past viz, morbidity and mortality rates, incidence, prior treatment, prophylactic and control measures adopted earlier if any, manage mental condition, history of nutrition, general management and agro climatic conditions, of the area etc. Examination of the patients including behavior and general appearance i.e. demeanour, voice, eating, drinking, defecation, urination, posture, gait, condition of skin, and body coats.

Inspection of body, examination of head and neck, thorax, respiratory rates, rhythms, respiratory depth, type of respiration normal and abnormal respiration and cardiac sounds, chest symmetry, abdomen, external genitalia, mammary glands, and limbs.

Physical examination: Temperature taking, palpation and tactile percussion. Percussion and auscultation (instruments used -immediate percussion-mediate percussion, Acoustic and pain seeking percussions-field of percussions-normal and abnormal sounds, Combined percussion and auscultation-instruments used-fields-sounds etc

Examination of the body systems

Examination of the ears, eyes, conjunctiva, eyeballs, mouth, sub maxillary lymph node and other superficial lymph nodes, jugular furrow, esophagus, trachea. Passing of stomach tube for locating obstruction if any and medication or collection of rumen fluid. Examination for specific conditions of thorax like pneumothorax, haemothorax, and hydrothorax. Percussion/Auscultation of lung and cardiac areas. Examintion of abdomen, ruminal motility, consistency, microbial population and their motility in the ruminal fluid, pH and cellulose digestion test of ruminal fluid, use of trochar and canula. Examintion of liver and kidneys in livestock and pet animals, liver biopsy function test. Collection of materials like urine, faeces, skin scrapping, blood, serum, milk and other body fluids for laboratory tests in the livestock and pet animals (and birds). Clinical case records.

References

- A Textbook of the Diseases of Cattle, Sheep, Goats, Pigs, and horses by D.C. Blood and O. M. Radostis.
- Textbook of Clinical Veterinary Medicine by Amalendu Chakrabarti.
- Disease of animal in tropical countries -Edmonds.
- Large animal internal medicine-Bradford.

EIGHTH SEMESTER

Course Title: PREVENTIVE VETERINARY MEDICINE I (Bacterial, Viral, Fungal)
Course Code: VEP-422
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVES

Student will be able to assess the status of bacterial, viral and fungal diseases prevalent in livestock and poultry and be able for diagnosis and treatment of common infectious diseases.

THEORY

Principles and concept of general epidemiology, general modes, principles of prevention and control of infectious diseases. Periodicity of diseases, occurrence and dynamics of diseases transmission. Definition: incidence, etiology, epidemiology, patho genesis, transmission, clinical findings, clinical pathology, diagnosis, treatment. Prevention and control of mastitis, joint ill, anthrax, ulcerative lymphangitis, glanders, strangles, black quarter, braxy, tetanus, enterotoxaemia, bacillary haemoglobinurea, botulism, colibacillosis, pullorum disease, fowl typhoid, salmonellosis, pasteurellosis, brucellosis, tuberculosis, listerosis, capylo bacterosis (Vibriosis), Para tuberculosis, actinomycosis, actinobacillosis, erysipelas and leptospirosis, Degnala disease, Mad cow disease, of cattle, horses, pigs, sheep, goats, pet animals and poultry. Foot and mouth disease, PPR, vesicular stomatitis, vesicular exanthema, rinderpest, mucosal diseases, malignant head, catarrh, ephemeral fever, infectious bovine rhinotracheitis, leucosis, viral pneumonia, swine fever, hog cholera; African swine fever, African horse sickness, rabies, pseudorabies, scrapie, looping ill, equine encephalomyelitis, infectious equine anemia, equine influenza, canine distemper, infectious canine hepatitis, pox diseases, infectious gastroenteritis of viral etiology parvo, papilloma, fowl plague, ranikhet disease, Marek's disease, avian leucosis complex, infectious bronchitis, infectious lyrngotracheitis, Avian encephalomyelitis, EDS-76, Ringworm, favurs, histoplasmosis, sporotrichosis, cocididomycosis.

PRACTICAL

Collection, preservation and dispatch of material for laboratory examination (blood, urine, faeces, skin scrapings/biopsy, other body fluids etc) Culture and sensitivity of isolates, demonstration identification of fungi and other pathogens. Screening of livestock through tests, mass diagnostic campaigns. Vaccination and other disease prevention and control programme in the field.Case record of 10 cases.

Reference

- A text book of the disease of cattle, sheep, pig , goat, horses- D.C. Blood and O.M.Radostis
- A text book of preventive medicine –Amlendu Chakravarti.
- The Merck Veterinary Manual
- Diseases of poultry-B.W. Calnek, H.John Barnes, C.W.Beard, W.M.Reid, H.W.Yode
- Disease of poultry and their control-Chandra.

EIGHTH SEMESTER

Course Title: PROJECT WORK ON VETERINARY FIELD CLINICS-I
Course Code: VFC-421
Cr. Hr.0+2=2 **Theory –00**
Full Marks – 50 **Practical - 50**

OBJECTIVES

Student will be able to handle different cases in the field and also preparation of clinical records.

PRACTICAL

Visiting to clinical centers/village carry out surveillance work. Handling and examination of sick animals. Primary diagnosis and treatment of simple cases. Referring complicated cases for specialized diagnosis and treatment. Preparation and presentation of group case study reports depending upon the number and type of cases. This course will be carried out by the students with the help of concerned teachers.

EIGHTH SEMESTER

Course Title: PROJECT WORK ON VETERINARY LABORATORY DIAGNOSIS-I
Course Code: VLD-421
Cr. Hr.0+2=2 **Theory –00**
Full Marks – 50 **Practical - 50**

OBJECIVES

Student will be familiar with the different lab test and able to relate test with the diseases.
Handlings of cases brought at veterinary teaching hospital. Examining, diagnosing and treating primary cases of sick animals at the clinics/ Hospital. Collection of sample skin scraping, biochemical, parasitological, pathological and microbiological) analysing and correlating with clinical findings and preparation of clinical records. The students with the help of concern teachers will carry this course.

NINTH SEMESTER

Code	Course	Credit hrs
VOG-512	Andrology and Artificial Insemination	2+2
VSR-513	Regional & Clinical Surgery-II and Lameness	2+2
VCM-512	Clinical Vet. Medicine-II	2+2
VCM-513	Vet. Ethics and Jurisprudence	1+0
VEP-513	Preventive Vet. Medicine-II	2+2
VLD-512	Project work on Veterinary Laboratory Diagnosis-II	0+2
VFC-512	Project work on Veterinary Field Clinic-II	0+2
CAVM-511	Alternative Veterinary Medicine	Non-credit
	Total	**9+12=21**

NINTH SEMESTER

Course Title: ANDROLOGY AND ARTIFICIAL INSEMINATION
Course Code: VOG-512
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Upon successful completion of this course the students will be able to sterilize A.I. equipments and collection, evaluation, preservation of semen and conduct artificial insemination.

THEORY

Introduction, development, comparative study of male genitalia and gonads. Growth, puberty, sexual maturity, libido. Endocrine control of reproduction in the male domestic animals. Factors affecting maturity and sex drive in bulls. Sexual behavior in males.

Forms of male infertility. Factors affecting infertility in male, its treatment and diagnosis. Diseases, abnormalities and malformations of male genitalia, their diagnosis and treatment of coital injury and infections. Testicular hypoplasia and degeneration. Diseases of the accessory sex glands.

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; preservation of semen at different temperatures. Storage and shipment of semen. Semen metabolism. Biochemistry of semen.

PRACTICAL

Andrological investigations of breeding bulls. Assessment of sires. Physical examinations – observing sexual behavior, palpation of scrotum, spermatic chord, seminal vesicles and ampullae. Examination for sperm activity, morphology and diagnosis of reproductive disorders in bulls.

Preparation of A.V., collection of semen, evaluation, dilution, preservation techniques at different temperature. Freezing of semen. Insemination techniques in chilled and frozen semen.

Planning and organisation of A.I. center. Selection, care, training and maintenance of breeding bulls for A.I. Recording systems. Care, sterilization, storage and upkeep of equipment used for Artificial Insemination.

Embryo transfer technique

Reference

- Physiology and Reproduction and AI in Cattle-Salisbury G.W. and N.L. Yendermare.
- Artificial Insemination of Farm Animals –Enos J. Perry.
- Reproduction in Farm Animal- ESE Hafez

NINTH SEMESTER

Course Title: REGIONAL AND CLINICAL SURGERY II AND LAMENESS
Course Code: VSR-513
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVES

Upon successful completion of this course, student will be able to diagnose and correct the fracture, surgical problems of eye and GI tract of different animals.

THEORY

Surgical approaches to the thorax, general consideration for thoracic surgery. Contusion and fracture of rib, injuries of coastal cartilage, fracture of sternum, perforated wounds, sternal fistula, and pneumocoele. Surgical approach to Traumatic pericarditis of cattle, heartworm disease in dogs. Surgical approach to the abdomen in various species of animals. Hernia, its classification, etiology, diagnosis and treatment in various species. Specific herniae: umbilical, perineal (other) ventral, inguinal, and crural, pelvic and diaphragmatic hernia in large and small animals. Surgical affections of the stomach (in dog) cardia, pyloric stenosis, torsion of stomach, gastric ulcerations, tumours, foreign bodies in the stomach. Surgical treatment for the affections of stomach in ruminants, ruminal impaction, traumatic reticulitis, abomasal displacement, omasal impaction. Surgical infections of intestine, colic, intestinal obstruction, intussusception, strangulation volvulus (in large and small animals). Caecal dilatation, torsion, typhlitis perforation of intestine, perforating wounds and fistula of abdomen. Affections of rectum-prolapse, tumours, tear of the rectum, atresia ani, atresia ani- et - recti et - coli, affections of anal glands. Abscess (supra-rectal), rectovaginal fistula, paralysis of rectum, haemmorides, stenosis of rectum and anus. Surgical affection in liver, spleen, pancreas. Surgical affections of kidney, ureters, urinary bladder. Congenital malformation. Urolithiasis and urethral stenosis, their sequele and surgical treatment. Surgical affections of penis and sheath, affections of testicle, scrotum; castration in large and small animals. Spaying in various species; their purpose, techniques and complications. Surgical affections of udder and teat. Affections of tail.

SURGERY OF LOCOMOTOR APPARATUS/LAMENESS

Lameness, its definition and classification. Body confirmation in relation to lameness (trunk and forelimb). Body confirmation in relation to lameness (Hind limb) Diagnosis of lameness, General methods of therapy in lameness. Specific joint diseases in large animals and treatment. Specific joint disease in dogs and their treatment (intervertebral disc protrusion; spondylitis; elbow and hip dysplasia; rupture of cruciate ligament etc. Application of external and internal immobilization for fracture, their advantages and disadvantages. Rehabilitation. Shoulder slip (Sweeny) bicipital bursitis. Omarthritis, caped elbow, radial paralysis, carpitis, bent knee, knock-knee. Hygroma of knee, open knee, joint, blemished knee. Fracture of carpal bone, fracture of accessory carpal, contraction of digital flexors. Splints; sore shin. Tendinitis, wind puffs, sesamoiditis. Osslets, ringbones, quittor, sidebones, navicular disease, pyramidal disease; fracture of extensor process. Laminitis, sand crack, seedy toe, fractures of third phalanx, pedal osteitis. Canker, thrush and corn. Monday morning diseases, cording up, myositis of Psoas muscle, iliac thrombosis. Crural paralysis, sub-luxation of sacro-iliac ligament, rupture of round ligament, trochantric bursitis. Femoral nerve paralysis, upward luxation of patella, stringhalt. Gonitis, chondromalacia of patella, fracture of fibula, rupture of tendo-achilles, rupture of peroneus tertius, Fibrotic myopathy and ossifying myopathy. Thoroughpin, Bog spavin, Spavin, Curb. Bovine lamenesses: contusions of sole, ulceration of sole. Septic laminitis, chronic laminitis, avulsion of hoof and declawing. Interdigital fibroma, cyst, sand crack, hoof deformities. Therapeutic shoes and corrective shoeing. Examination of animals for soundness and preparation of soundness certificate.

PRACTICAL

Familiarization with the landmarks for the approach to various visceral organs, thoraco-centesis abdomino-centesis. Laparotomy and visualization of viscera - (Gastrotomy in dogs) small animals. Laparotomy and palpation of viscera-large animals. Urethrotomy. Castration, vasectomy, caudectomy. Ovario-hysterectomy. Thoracotomy (demonstration). Cystotomy and Cystorraphy (demonstration). Splenectomy.

Surgery of Locomotor Apparatus/Soundness

1. Examination of the horse for confirmation of body (head, trunk, fore limb and hind limb) and diagnosis of lameness.
2. Plaster of paris cast of limb in dogs.
3. Plaster of paris bandage in calves.
4. Familiarization with various orthopaedic instruments, hanging pin cast, transfixation pining.
5. Intramedullary pinning in dog (Demonstration)
6. Application of k-nail in calves
7. Neurectomies of forelimb.
8. Neurectomies of hind limbs.
9. Demonstration of corrective shoeing, Examination and preparing of bovine foot (Demonstration)
10. Amputation of hoof in calves.
11. Amputation of limbs.

12. Demonstration of various surgical shoes and their uses. Examination of horse for soundness and preparation of certificate for soundness.
13. Tenotomies, suturing of tendon, shortening of tendon. Medial patellar desmotomy.

Reference

- Ruminant Surgery, by R.P.S.Tyagi and Jit Singh.
- Surgical principle and techniques by W.F. Guard.
- Essentials of Veterinary Surgery by A. Venugopalan.
- Dollar's Veterinary Surgery by J.J.O's Conner (4^{th} edition).
- Veterinary Clinician's Guide by Harpal singh, Amresh Kumar and P.C.Chaudari.
- Techniques in Large Animal Surgery by A.Simon Turner and C.Wayne Mellwraith.
- Veterinary Surgical Techniques (1^{st}edition) by Amresh Kumar.
- Handbook of Small Animal arthopedics and fracture treatment by W.O.Brinker, D.L. Piermattei, G.L. Flo

NINTH SEMESTER

Course Title: VETERINARY ETHICS AND JURISPRUDENCE
Course Code: VCM-513
Cr. Hr.1+0=1 **Theory –25**
Full Marks – 25 **Practical - 00**

OBJECTIVE

Upon completion of this course student will be able to know about the ethics, duties and Laws related to Veterinary practices and practice different acts related to Veterinary Science/services.

THEORY
Y
Legal duties of Veterinarians. Forensic and State Medicine Laws. Common offences against animals and Laws related to these offences. Legal point and examination of living and dead animals in criminal cases. Mischief, Killing, Maiming and poisoning. Cruelty to animals and Bestiality. Legal aspects of: -Examination of animals for soundness. Examination of injuries. Post-mortem examination: Causes of sudden death in animals. Collection and dispatch of materials for chemical examination. Detection of frauds. Alternation of description, bishoping, etc. to mask a disease. Sale of unfit meat, buffalo slaughter. Evidence procedure in court. Provisions in the Nepali rules and regulations relating to animals. Slaughter Act relating to animals. Concept relating to offences affecting public health, poisons and adulteration of drugs. Livestock Importation concept. Evidence Liability. Insurance. Code of Conduct and Ethics for Veterinarians - the regulations made under Nepal Veterinary Council Act.

Reference

- Bulletin of Animal Health and Livestock services act 2055 publ. By Directorate of Animal Health.
- Veterinary Jurisprudence and postmortem-Dabas and Saxena.
- Veterinary Ethics and Jurrispundence – Kirti Dua

NINTH SEMESTER

Course Title: PREVENTIVE VETERINARY MEDICINE-II
Course Code: VEP-513
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVE

Student will be able to evaluate the occurrence of common protozoal and parasitic diseases of livestock and poultry and identifying techniques for their control.

THEORY

Definition, incidence, etiology, epidemiology, pathogenesis, transmission, clinical findings, diagnosis, treatment, prevention and control of Amphstomiasis. Gastrointestinal nematodiasis, schistosomiasis, verminous bronchitis, echinococcosis, coenurosis, tapeworm infestations.

Protozoal diseases (Theileriosis, babesiosis, toxoplasmosis, trypanosomiasis, coccidiosis.
Trichomoniasis) Rickettsial diseases (anaplasmosis, Ehrlichiosis), tick bite fever.

Common poisonings: HCN, nitrate, strychnine, mercury, lead, arsenic, organophosphates, chlorinated hydrocarbons, salt poisoning in pigs. Snake bite

PRACTICAL (Rural clinical work - surveillance, health test, vaccination)

Collection, preservation and dispatch of materials from ailing animals. Preparation of smear and demonstration of organisms in stained smears and their identification. Survey of incidence, occurrence, out break etc. and correlate the ecobiology, climatology with the disease; draw out possible disease predictions on the basis of pre-dispositions and allied precipitating factors.

Biological inoculation of suspected materials into different laboratory animals. Serological tests, vaccinations for prophylaxis and control of diseases. Collection, preservation and dispatch of materials for identification of ecto and endoparasites, protozoa, rickettsia and chlamydias etc. Record of cases of livestock and poultry.

Reference

- A text book of the disease of cattle, sheep, pig , goat, horses- D.C. Blood and O.M.Radostis
- A Text Book of Preventive Medicine –Amlendu Chakravarti.
- The Merck Veterinary Manual
- Diseases of poultry-B.W. Calnek, H.John Barnes, C.W.Beard, W.M.Reid, H.W.Yode
- Disease of poultry and their control-Chandra

Course Title: CLINICAL VETERINARY MEDICINE II
Course Code: VCM-512
Cr. Hr.2+2=4 **Theory –50**
Full Marks – 100 **Practical - 50**

OBJECTIVES

Upon completion of this course the student will be able to understand different metobalic diseases, deficiency diseases, d/s of neonates and able to cure them.

THEORY

Definition, etiology, clinical symptoms, pathogenesis, clinical biochemistry, clinical pathology, diagnosis, treatment, prevention and control of:

a) Metabolic diseases-Milk fever, acute parturient hypocalcaemia in goats, sows and bitches (Eclampsia in bitches), osteodystrophy fibrosa, lactation tetany in mares, downer cow syndrome, ketosis, hypomagnesaemia, nutritional haemoglobinurea in cattle and buffalo, azoturia in equines, hypothyroidism and diabetes in dogs.

b) Diseases caused due to deficiency of iron, copper, cobalt, zinc, manganese, calcium, phosphorous, magnesium, vit.A & D, Selenium, vit.E, vit.B complex, vit.K & C in Domestic animals and poultry.

c) Diseases of neonates.

PRACTICAL

Clinical examination of sick animals suffering from metabolic deficiency and toxic diseases. Collection of ruminal fluid, blood and blood serum for computing metabolic profile test which includes blood glucose, glucose tolerance packed cell volume, haemoglobin, blood urea nitrogen, serum inorganic phosphate, magnesium, calcium, potassium, sodium, total proteins, albumin and globulinase etc. Collection, preservation and dispatch of materials for the estimation of microminerals and enzymes with special reference to the soil, plants and animals relationship for the causation of diseases. Test therapy and examination of blood, urine, milk for ketone bodies. Enlisting of vitamin and mineral rich diets and their feeding schedules in growing; working, pregnant, lactating and diseased animals. Collection, evaluation, cross matching and transfusion of blood in anaemic patients. Collection and examination of cerebrospinal fluid, bone marrow and lymph node biopsy. Collection of material for laboratory evaluation, vetero legal/chemical examination. Preparation of case records, follow-up records. Treatment of casualties and other emergencies in farm-stock companion animals and birds.

Reference

- A Textbook of the Diseases of Cattle, Sheep, Goats, Pigs, and horses by D.C. Blood and O. M. Radostis.
- Textbook of Clinical Veterinary Medicine by Amalendu Chakrabarti.
- Disease of animal in tropical countries -Edmonds.
- Large animal internal medicine-Bradford.

NINTH SEMESTER

Course Title: PROJECT WORK ON VETERINARY FIELD CLINICS-II
Course Code: VFC-512
Cr. Hr.0+2=2 **Theory –00**
Full Marks – 50 **Practical - 50**

OBJECTIVES

Student will be able to handle different cases in the field and also preparation of clinical records.

PRACTICAL

Visit to clinical center/village to carry out the surveillance work. Examination of sick animals, primary diagnosis and treatment of simple cases and referring the complicated cases for specialized diagnosis and treatment. Preparation and presentation of group case study reports depending upon number and type of cases. Organization of Animal health camp during this course the student will carry to work independently. Students need to compile, analyze and submit the report.

NINTH SEMESTER

Course Title: PROJECT WORK ON VETERINARY LABORATORY DIAGNOSIS-II
Course Code: VLD-512
Cr. Hr.0+2=2 **Theory –00**
Full Marks – 50 **Practical - 50**

OBJECTIVE

Student will be familiar with the different lab test and able to relate test with the diseases.

PRACTICAL

Visit to clinics/Hospitals. Examination of patient. Collection of biochemical, pathological, parasitological and microbiological samples. Analyzing and correlating with clinical findings and interpreting the results. During this course, the students will carry the work independently. Students need to compile, analyze and submit the report.

NINTH SEMESTER

Course Title: ALTERNATIVE VETERINARY MEDICINE
Course Code: CAVM- 511
Non-Credit Hours

OBJECTIVES

Students will be familiar about the nutraceutical medicine, Physical medicine, Energetic medicine, Botanical Medicine, Homeopathy, Miscellaneous therapies, Holistic Veterinary Medicine, Ethnoveterinary Medicine, and their application in field level.

THEORY

Introduction, history, philosophy, controversies and prospects.

Nutraceutical Medicine: Preventive Nutrition for animals. Role of specific nutrients, need, dose, balance, and rationales for use. Therapeutic Nutrition for animals: Nutrients with therapeutic applications, use and effectiveness of nutritional therapy, safety considerations. Glandular Therapy and Cell Therapy: Absorption of large molecules, tissue specificity of glandular materials, whole glandular material as a source of different biochemical activities, recent advances in cell therapy and prospects. Orthomolecular medicine: Basic principles, possible indications and applications.

Physical Medicine: Traditional Chinese Medicine (TCM). Acupuncture: its scientific basis and clinical applications in veterinary practices. Chiropractic Care: Rationale, examination technique, chiropractic technique, therapeutic consideration and role in animal health. Physical Therapy: Theories and applications, Therapeutic Heat, Therapeutic Cold and Compression and Stretching. Electrical application, Iontophoresis, Ultrasound, and Therapeutic Laser. Massage Therapy: Basic principles, techniques and contraindications.

Energetic Medicine: Bioenergetic medicine. Low Energy Photon Therapy (LEPT): Background information, LEPT induced phenomena, applications in veterinary practice, limitations, side effects and complications. Magnetic Field Therapy: Basic concepts, theory and applications, clinical indications and contraindications.

Botanical Medicine: Indigenous Herbal Medicine: Traditional Materia Medica. Western Herbal Medicine and Chinese Herbal Medicine: Pharmacological basis and clinical applications. Ayurvedic Veterinary Medicine: Ayurvedic concepts in health and disease, Ayurvedic principles of diagnosis and treatment, Herbs of Ayurvedic tradition and Ayurvedic Materia Medica.

Homeopathy: Veterinary Homeopathic Medicine: History, theoretical basis of homeopathy, philosophic aspects, scientific evidences and clinical research. Applications, selection of remedy, dosage, administration and clinical indications of veterinary homeopathy. Homeopathy in food animals practice and companion animals practice.

Miscellaneous Therapies: Environmental Medicine for veterinary practitioners: Definition, total load, nutrition, food allergy, inhalant allergies, chemical sensitivity, and occupational hazards of veterinary practice. Aroma Therapy: Essential oil chemistry, pharmacopoeia, potential clinical uses and contraindications. Bach Flower Therapy: Overview, history, traditional theory and material medica.

Holistic Veterinary Medicine: Incorporation of Complementary Veterinary Therapies into conventional small animal practices and exotic species practices. Incorporation of Holistic Medicine into food animals and equine practice.

Ethnoveterinary Medicine: Ethnoveterinary research, development, and extension, rationale, subject matters, principles and practices.

PRACTICAL

Preventive and Therapeutic diet and feeding program for different food animals and companion animals. Demonstration of Glandular materials as a source of peptides and oligopeptides, enzymes, lipids and steroids. Acupuncture points in different animal species. Demonstration of techniques and instrumentation of Acupuncture and Acutherapy. Study of Chiropractic examination techniques. Demonstration of Electrical stimulation, Heat, Cold and Compression as tools of physical therapy. Demonstration of Acupressure Massage, Ice Massage, Friction Massage and Cupping. Use of Laser and Magnetic Field Therapy in veterinary practice. Identification and clinical usage of Indigenous Herbs. Study of Ethnoveterinary practices under Nepalese context. Selection, dosage, administration and clinical indications of commonly available Homeopathic Medicines in veterinary practices. Acquaintance with occupational hazards of veterinary practice. Study of some of the commonly Integrated Practices of conventional therapies with complementary therapies in veterinary science.

TENTH SEMESTER

Code	Course	Credit hrs
VIP-520	Veterinary Intership Programme	0 + 8

TENTH SEMESTER

Course Title: VETERINARY INTERNSHIP PROGRAMME
Course Code: VIP - 520

Credit Hours: 0+8
(Field Works: 0+6 Seminar Presentation: 0+2)

OBJECTIVES

Students will be able to learn the practical aspects of the veterinary medical practices, farm management, management of the biological products, artificial insemination and analytical skills to develop the communication skills. By the end of the internship programme students will be able to deliver a seminar on their findings.