Introduction of BV.Sc. & A.H. Program

Introduction

Livestock is an integral part of the Nepalese farming system. In 21st centuary the farming system is changing from subsistence to commercial. Thus, the need of veterinarian is increasing day by day. To produce competetant veterinary graduates B.V.Sc.&A.H. program should have following departments:

1. Veterinary Anatomy
2. Veterinary Physiology
3. Veterinary Biochemistry
4. Veterinary Pharmacology and Toxicology
5. Veterinary Parasitology
6. Veterinary Microbiology
7. Veterinary Pathology
8. Veterinary Epidemiology and Public Health
9. Theriogenology
10. Veterinary Medicine
11. Veterinary Surgery and Radiology
12. Animal breeding and genetics
13. Animal Nutrition
14. Livestock production and Management
15. Animal Product Technology
16. Veterinary and Animal Husbandry Extension
17. Veterinary Clinics

Instructional Livestock Farm Complex (ILFC)

The Instructional Livestock Farm Complex shall be a separate unit under the independent charge of a Faculty Member of the rank of a Professor or associate professor with specialization in any of the Animal science and Veterinary science. The farm complex shall be for teaching in rearing of livestock species including poultry with the following facilities:

i) housing, feeding, breeding and management of large and small ruminant units, piggery, poultry and equine
ii) record keeping
iii) storage facilities for feed and fodder
iv) production facilities for fodder crops
v) suitable- housing for managerial and technical staff

Being a round the clock service there shall be residential accommodation and suitable accommodation for staff and students on duties.

All the concerned staff on duty in the Instructional Livestock Farm Complex shall be responsible for management including emergencies of the animals in the livestock Farm. They shall arrange and supervise the routine managemental practices from time to time and shall maintain record for the same. They shall also be responsible for production activity in each of the units .

Veterinary Teaching Hospital (VTH)

(a) Veterinary teaching hospital will be a separate unit under the independent charge of a Faculty Member of the rank of a Professor or associate professor with specialization in any of the clinical or paraclinical subjects.

(b) VTH shall be recognized only if it has an average minimum of 500 outdoor cases and 10 indoor cases in a month.

(c) The teaching veterinary hospitals should have properly built in-door wards, client accommodation, emergency service and the necessary facilities to conduct and demonstrate/ train all medical, surgical and gynaecological cases and separate "in Health" care facilities like artificial insemination, pregnancy diagnosis, health verification tests, prophylaxis etc.

(d) Being a round the clock service there shall be residential accommodation for clinical and hospital staff and suitable accommodation for students on emergency/night duties and cafeteria/canteen for staff, students and clients.

(e) All the concerned staff on duty in the teaching veterinary hospital shall be responsible for the treatments and allied public services and would invariably attend the clinics including emergencies/ night duties and on Sundays/ holidays. The staff as well as students should be properly attired and equipped for the performance of clinical duties.

(f) The hospital shall maximally utilize the animal/patient information observing all the time the principles of animal welfare and ethics, and arrange:

i) The teaching material in the form of clinical cases in sufficient number, variety and species.

ii) Subsidized treatment to encourage larger attendance in teaching veterinary, hospitals.

iii) Procure or provide free maintenance to, cases of academic interest or typical' cases of teaching value so that students can benefit from them.

iv) In the case of death/ euthanasia detailed necropsy be demonstrated and specimens preserved.

The following activities should be conducted to complete the five years B.V.Sc. and A.H. Program

(1) **Tracking Programs**

These programs have been developed to allow students to exercise more control over the specific direction of their profession and motivate them for self-teaming through virtual classroom, distant learning, internet etc. A student has to compulsorily take any two programs of two credits each (2x2=4 credits) any time (one semester duration each) during second year to fifth year of B.V.Sc. & A.H. Degree Course under the supervision of one faculty member as designated by the Dean of the Faculty or head of veterinary program. Evaluation of the students for this program shall be done internally on Grade basis (AExcellent. B-Good, C-Average). In case of unsuccessful candidates, the program can be carried over to the next semester/year.

List of the Tracking Programs are given below:

i) Feline Medicine

ii) Cryobiology of Gametes

iii) Neurosciences

iv) Clinical/ Interventional Nutrition

v) Dermatology/integument Science

vi) Alternate Veterinary Medicine
vii) Ophthalmology
viii) Anesthesiology
ix) Small Animal Critical Care
x) Non-Mammalian Medicine
xi) Sports Animal Medicine
xii) Drug designing
xiii) wild life medicine

These will be Non-Credit courses but shaft be mentioned in the Degree Transcript along with the grades obtained.

2) Study Circles

Each student of B.V.Sc. & A.H. degree course shall have to enroll himself/herself for at least two Study Circle activities daring the B.V.Sc. & A.H. degree course out of the proposed Study Circles-as listed below:

i) Livestock and Livelihood Study Circle
ii) Production Systems Study Circle
iii) Ecosystems and Livestock Study Circle
iv) Equine Study Circle
v) Canine Study Circle
vi) Diagnostic Study Circle
vii) Alternate Animal Use Study Circle
viii) Fun/Sport Animal Study Circle
ix) Law and Veterinary Science Study Circle

The Faculty Dean shall designate an Advisor for each of the above Study Circle activities who shall supervise, guide, monitor and evaluate the activities of the Study Circles. Each enrolled student shall have to present a Seminar on the topics of his/her Study Circle any time during the Semester. The date and time of the Seminar shall be notified inviting participation of all students. The Study Circle shall also put up news, wall papers, drawings, exhibits of their subject in the Faculty buildings. The Dean of the Faculty shall coordinate the activities with the Advisors for each of the above Study Circles. The evaluation of the student for each of the registered Study Circles shall be done by the Advisor who will grade them as A-Excellent, B-Good, C-Average as per their performance. The same shall be recorded in the Degree. Transcript along with the grades obtained. No student shall be allowed to change the Circles during the professional year.

(3) Entrepreneurial Training

Each student of B.V.Sc. & A.H. degree course shall be required to compulsorily undertake one of the activities of Entrepreneurial Training as listed below. This training is aimed at developing entrepreneurial skill for self employment. The university shall provide interest free loans out of a revolving fund (Rs. 2 lakhs) to student groups (team of up to five students), technical support and infrastructure for these activities. Inputs, day-to-day work and financial accounting shall be undertaken by the students. The profits/loss, if any, shall be kept/borne by the students. However, in case of loss, the Dean or head of institute of the Faculty through the Entrepreneurship Committee consisting of four faculty members (at least one

subject matter specialist) may evaluate the reasons of such loss and provide compensation in case it is found that the loss has been inadvertent .Proposed list of 17 Entrepreneurial activities is as follows:

(i) Goat Production
(ii) Sheep Production
(iii) Pig Production
(iv) Broiler and Egg Production
(v) Pet Production
(vi) Dairy Production
(vii) Meat Production and Processing
(ix) Feed Production-Mineral Mixture
(x) Milk Products
(xi) Food safety-residue Analysis
(xii) Clinical Investigatory laboratory
(xiii) Quality Control-Evaluation (Microbial)
(xiv) Shoeing and Shoe Manufacture
(xv) Production of Diagnostic
(xvi) Pharmaceutical Formulations,
(xvii) Fish Production

Besides, the Faculty may also offer the facilities for Entrepreneurial Training involving the activities of regional interest

Internship

(a) Eevery student of B.V.Sc. &A.H. degree course shall be required after passing all courses to undergo compulsory rotating internship to the satisfaction of the University for a minimum period of six calendar months so-as to be eligible for the award of the degree of B.V.Sc & AH. and full registration with the Council.

(b) Compulsory rotating internship shall include a full time training in veterinary and animal husbandry services {including emergencies and night duties, Saturday and holidays). The intern will devote whole time to the training and will not be allowed to accept a whole time or part time appointment paid or otherwise,

(c) Internship shall be undertaken only after completion of all credit requirements of veterinary curriculum including Tracking Programs, Study Circles, Entrepreneurial Training-and Sports and games as prescribed under these regulations.

(d) The university shall issue a provisional course completion certificate of having passed all the professional examinations and having successfully completed course work.

(e) The Veterinary Council of Nepal will grant provisional registration to the candidate on production of provisional B.V.Sc. & A.H. course completion certificate. The provisional registration will be for a minimum period of six months.

(f) After provisional registration with the Veterinary Council of Nepal, the candidate shall register for internship of six calendar months.

(g) Interns will be actively involved in rendering veterinary service under the supervision of an experienced teacher.

(h) They shall assist the teacher in all activities of the units they are posted in.

(i) During the period of internship, they shall be" provided remuneration in the form of internship allowance as may be decided by internship committee.

(j) Attendance will be compulsory. The candidate will be entitled for 10 days casual leave. The leave cannot be claimed as a matter of right until and unless the sanctioning authority sanctions it. If an intern will fully absent from the training program even if for part of a day or during off hours duty (including Sundays/holidays) he/ she may be treated absent for that day. The candidate will be required to undergo training for the additional days in lieu of the absence period and internship allowance will not be paid for these additional days.

(k) The internship program shall be monitored by a Committee constituted by the Dean under his/her chairmanship including among others the Director of VTH and Director of ILFC as members. This Committee shall monitor effective implementation of the internship training program from time to time. The member secretory would be the Director of VTH or the Departmental Heads.

(l) In case of unsatisfactory work/ performance and/or shortage of attendance, the period of compulsory rotating internship shall be extended by not more than two months by the appropriate authority If this period is more than two months, the intern has to re-register afresh for internship program for entire six calendar months including registration with the Nepal Veterinary Council.

(m) Internship allowance will be paid only for six calendar months. No internship allowance will be paid for the period of absence/unsatisfactory performance/extended period.

(n) The compulsory rotating internship for six calendar months shall be done in teaching and approved Veterinary Polyclinics/Veterinary Hospitals, Veterinary Biological Centres, Farms and Veterinary Disease Investigation Centers. The internship program can be undertaken at approved veterinary institutions in Nepal.

(o) The compulsory rotating internship shall be in the following areas:

(i) Clinical training covering veterinary medicine, surgery and radiology,animal reproduction, gynaecology and obstetrics, clinical emergencies, indoor ward care, hospital management record keeping etc. for three months.

(ii) Livestock production and management training, covering farm routines of cattle and buffalo farms, piggery/rabbitary, sheep and goat farms, and equine/ camel unit etc. for one month.

(iii) Poultry production and management covering layer and broiler production, hatchery and chick management quail, turkey, duck units etc. as well as fishery or any other recycling unit where feasible, for one month.

(iv) Livestock technology and service' covering familiarization in biological product units, disease control campaigns (disease investigation and sample collection and dispatch, vaccination, mass testing etc.) in plant training in meat plants, milk plants, etc. training in zoo/ wild life center/ national parks, for one month.

(p) Details of day to day work, posting and duration needs to be worked out by the Veterinary Institution as per its needs and infrastructure facilities,

(q) Where an Intern is posted to a recognized Veterinary hospital for training, a Representative of the Faculty and the Director of the Veterinary Teaching Hospital shall regulate the training of such interns,

(r) Every Intern shall render professional veterinary service, skill and knowledge under supervision and guidance of a registered veterinary practitioner working in the approved Veterinary Institution.

(s) Function, responsibilities and duties of Interns:

(i) Participation with clinical faculty in the hospital practice.

(ii) Shares the emergency and night duties on rotation in the larger and small' animal hospitals including Sundays & holidays.

(iii) Participation with staff of the place of posting in Veterinary Practice (production or technology).

(iv) The intern responsibilities include hands-on diagnostic and treatment procedures for hospitalized cases under the supervision of the attending veterinarian.

(v) Participation in the tutorial instructional program of the Veterinary Faculty.

(vi) The intern will administer primary care to emergency cases and participate in service such as anaesthesia, radiology, ultrasonography, endoscopy, laboratory and diagnostic procedures. Medicine and Surgery rounds are held periodically allowing the interns to present cases and participate in topic discussion.

(t) The training shall be supplemented by weekly sessions of clinical conference, farm operation and data analysis, preparation of feasibility reports, project report, campaigns/ discussions in, clinical training, farm training and technology and services respectively.

(u) For the purpose of internship all necessary inputs like accommodation, transport, adequate clinical facilities etc. shall be provided.

(v) The intern shall maintain a log book of day to day work which may be verified & certified by the supervisor under whom he/she works. In addition, the interns will prepare a brief project report on the basis of his/ her case study/ case analysis, survey reports etc. This shall be based on his/ her own study during the internship. Such reports can be supervised by more than one teacher, if required. The interns shall present such report in seminar organized for the purpose.

(w) The grading shall be based upon the evaluation of log book, their performance reports from all the minimum prescribed training postings, project report and comprehensive examination in core competence in veterinary skills conducted at the end of the program by an Evaluation Committee comprising of the faculty representing the concerned departments appointed by the Dean for this purpose.

(x) Every Intern shall have to submit an Entrepreneurial Project during theInternship Program.

(6) Comprehensive Examination on Core Competence in Veterinary skills:

The competence in veterinary skills examination shall be based on an evaluation of core competence in professional skills as detailed below;

(i) Restraint of cow, sheep, horse, dog and pig. Haltering, snaring, muzzling, tad switch, bandaging of horse for exercise and stable bandaging

(ii) Animal identification, Dentition and ageing of animals

(iii) Housing layout/requirements of livestock and poultry

(iv) Computation of ration of livestock of different breeds and age groups in health and disease

(v) Fodder management and interpretation of feed quality evaluation

(vi) Physical evaluation of livestock health parameters (auscultation, percussion, recording of temperature, pulse, heart rate, respiration rateetc.)

(vii) Recording and interpretation of cardiovascular response

(viii) Testing of milk and milk products for quality, clean milk production

(ix) Carcass quality evaluation (ante-mortem & post-mortem examination)

(x) Specific diagnostic tests for zoonotic diseases

(xi) Sample collection, handling-and dispatch of biological materials for laboratory examination
(xii) Staining techniques for routine clinico- pathological examinations
(xiii) Relating post-mortem lesions to major livestock diseases
(xiv) Haematological evaluation (total leukocyte count, differential leukocyte count, haemoglobin, packed cell volume, erythrocyte sedimentation rate etc.) and interpretation
(xv) Tests and their interpretation for haemoprotozoan diseases
(xvi) Body fluids collection, examination and interpretation as an aid to diagnosis
(xvii Urine evaluation procedures and interpretation as indicators for diagnosis of diseases
(xviii) Fecal examination- procedures and interpretation
(xix) Examination of skin scrapings and interpretation
(xx) Interpretation of blood chemistry profile in diseases
(xxi) Deworming procedures and doses for different species of animals/birds
(xxii) Managing an outbreak of infectious/contagious disease
(xxiii) Approach to diagnosis of a given disease condition
(xxiv) Pre-anesthetic administration and induction, maintenance of general anesthesia and dealing with anesthetic emergencies
(xxv) Local anesthetic administration
(xxvi) Nerve blocks-sites, functional application
(xxvii) Suture material, suture pattern and tying knots
(xxviii) Common surgical procedures including dehorning, docking, caesarian section, ovariohy sterectomy, castration, rumenotomy
(xxix Application of plaster cast/splint for racture immobilization and other bandaging procedure in large and small animals.
(xxx) Soundness in horses
(xxxi) Rectal examination - palpation of pelvic/abdominal organs in cattle/ horses/ buffaloes,
(xxxii) Detection of oestrus, artificial insemination, pregnancy diagnosis,
(xxxiii) Management of vaginal/uterine prolapse and dystocia
(xxxiv) Andrological examination of bull, handing, preservation and evaluation of semen
(xxxv) Vaccination procedures, vaccination schedules and vaccine types for different diseases
(xxxvi) Handling of radiograph, interpretation of a given radiograph of large and small animals
(xxxvii) Client management
(xxxviii) Managing a clinical practice, ambulatory van, transporting a sick animal requirements, etc.
(xxxix) Dosage regimens of important drugs
(xl) Drug administration techniques in different species of animals-oral, parenteral, rectal, intra-peritoneal and intra-uterine
(xli) Identification of major livestock/poultry breeds
(xlii) Measuring climatic parameters and their interpretation
(xliii) Communication technology tools

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List of courses for B.V.Sc. and A.H

1st Semester

Course Code	Name of the subject	Credit Hours
VAN 101	Gross Anatomy I (Osteology, Arthrology and Biomechanics)	1+2
VAN 102	Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)	2+2
BCH 101	Veterinary Biochemistry	2+1
LPM 101	Ruminant Production and Management	2+1
ANU 102	Principles of Animal Nutrition	1+1
VPY101	Physiology I(Locomotor, Cardiovascular, Blood and Respiratory)	2+1
	Total	10+8

2nd Semester

Course Code	Name of the subject	Credit Hours
VAN 103	Veterinary Histology and Embryology	2+2
ANU 101	Principles and Practices of Fodder Production and Pasture Management	2+1
LPM102	Non ruminant Production (Pig and Poultry)	2+1
BCH 102	Physiological Biochemistry	2+1
EXT 101	Sociology and Principles of Vet. and A. H. Extension	1+1
LPM 103	Animal Housing and Sanitation	1+1
AST 302	Biostatistics and Computer Application	2+1
AEC 402	Farm Management and Production Economics	2+1
	Total	**14+9**

3rd Semester

Course Code	Name of the subject	Credit Hours
VAN 204	Splanchnology and Applied Anatomy	2+2
VPA 201	Parasitology I (General Veterinary Parasitology and Cestode Parasites)	2+1
VPY 202	Physiology II (Digestive Excretory and Nervous System)	2+1
VPP 201	General Pathology	2+1
ANU 203	Applied Animals Nutrition I (Ruminant)	1+1
VMI 201	Microbiology I (General Veterinary Microbiology)	2+1
LPM 204	Bee, Pet and Lab Animal Management	1+1
ANB 201	Principles of Genetics and Animal Breeding	2+1
VPT 201	General and Systemic Pharmacology	2+1
	Total	16 +10

4th Semester

Course Code	Name of the subject	Credit Hours
VPY 203	Physiology III(Reproduction, Lactation and Endocrinology)	2+1
VPA 202	Parasitlogy II (Helminthology and Leeches)	2+1
VPT 202	Veterinary Neuropharmacology	2+1
VMI 202	Microbiology II (Veterinary Immunology and Serology)	2+1
VPP 202	Systemic Pathology	2+1
ANU 204	Evaluation of Feed Stuff	1+1
ANU 205	Applied Animals Nutrition II (Non- ruminant)	1+1
ANB 202	Animal Breeding and Biotechnology	2+0
AQU 201	Principles of Aquaculture	1+1
	Total	15+8

5th Semester

Course Code	Name of the subject	Credit Hours
VPT 303	Veterinary Chemotherapy	2+1
VPY304	Physiology IV (Growth Environment and Climatology	1+1
VPH 301	Environmental Hygiene	1+1
ANU 306	Applied Human Nutrition	2+0
VMI 303	Microbiology III (Systematic Veterinary Bacteriology and Mycology)	2+1
VPA 303	Parasitology III (Veterinary Entomology and Acarology)	1+1
EXT 302	Extension Techniques in Veterinary Practices and Livestock Production	1+1
VPP 303	Special Pathology I	2+1
LPT 301	Abattoir Practices and APT	1+1
	Total	13+8

6th Semester

Course Code	Name of the subject	Credit Hours
BCH 303	Clinical Biochemistry	1+1
VPH302	Veterinary Epidemiology	2+1
VPA 304	Veterinary Protozoology	2+1
VMI 304	Microbiology IV (Systematic Veterinary Virology)	2+1
VPP 304	Special Pathology II (Poultry, Fish and Diagnostic Pathology)	2+1
VOG 301	Theriogenology I (Animal Reproduction and Endocrinology)	2+1
VMC 301	Internal Medicine I (Systemic)	2+1
VCS 301	Veterinary Clinical Service I	0+1
VPT 304	Veterinary Toxicology	2+1
	Total	15+9

7th Semester

Course Code	Name of the subject	Credit Hours
VOG 402	Theriogenology II (Gynaecolgy and Obstetric)	2+1
VSR 401	Anaesthesiology	1+1
VSR 402	General Surgery	2+1
VMC 402	Internal Medicine II (Metabolic and Deficiency)	2+1
VMC 403	Preventive Medicine I (Bacterial, Fungal and Rickettsial)	2+1
VCS 402	Veterinary Clinical Service II	0+2
AQU 402	Fish Diseases	2+1
LPT 402	Milk and Milk Product Technology	1+1
VPH 403	Milk and meat Hygiene, food safety and Public Health	2+1
	Total	**14+10**

8th Semester

Course Code	Name of the subject	Credit Hours
LPT 403	Meat, Meat Products Technology	1+1
VOG 403	Theriogenology III (Animal Infertility)	2+1
VSR 403	Radiology and Diagnostic Imaging	1+1
VSR 404	Regional and Clinical Surgery I	2+1
VMC 404	Preventive Medicine II (Viral, Protozoal and Parasitic Diseases)	2+1
VMC 405	Ethics and Jurispredence	1+0
VCS 403	Veterinary Clinical Service III	0+2
BCH 404	Molecular Biology and Biotechnology	2+1
AEC 401	Agriculture Marketing and Cooperatives	2+0
	Total	**13+8**

9th Semester

Course Code	Name of the subject	Credit Hours
VPH 504	Zoonosis and Public Health	1+1
ANB 503	Livestock and Poultry Breeding	2+1
VOG 504	Theriogenology IV (Veterinary Andrology and Reproductive Techniques)	1+1
VSR 505	Regional and Clinical Surgery II	2+1
VMC 506	Animal Welfare	1+0
VCS 504	Veterinary Clinical Service IV	0+2
VMC507	Wildlife, Pet and Lab Animal Medicine	1+1
EXT 503	Social Mobilization and Community Development	2+1
LPM 505	Wildlife Production and Management	1+1
VCS505	Veterinarian in Society	1+0
	Total	**12+9= 21**

Total Credit Hours: 122+79=201

Course Code: VAN 101
Course Title: Gross Anatomy I (Osteology, Arthrology and Biomechanics)
Credit Hours: 3 (1+2) Full Marks: 75 Theory: 25 Practical: 50

Objectives
Upon the completion of the course, students will be able to apply their knowledge in the field of veterinary osteology, arthrology and biomechanics and will be able to identifty different bones, joints with their kinetics of locomotion.

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

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

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Definition of the terms used in Veterinary Anatomy in general and osteology in particular	1
2.	Classification, physical properties, chemical composition and structure of bones of domestic animals and birds.	1
3.	Gross study of bones of appendicular and axial skeleton of Ox / Buffalo and comparison with Horse, Sheep / Goat, Dog, Pig and Fowl	
	(A) Appendicular Skeleton	
	(a) Bones of the thoracic limb of fore limb:	
	Thoracic Girdle (Shoulder)/Pectoral Girdle, Humerus,	1
	Radius/ulna, Carpus,	1
	Metacarpus, and Digits	1
	(b) Bones of the pelvic limb or hind limb:	

	Pelvic Girdle	1
	Femur, Tibia / Fibula, Patella,	1
	Tarsus, Metatarsus, and Digits	1
	(B) Axial Skeleton	
	Skull,	1
	Vertebral column,	1
	Ribs, and sternum	1
4.	Introduction and classification of joints	1
5.	Different terms used in Arthrology	1
6.	Study of joints of head, neck, trunk, tail, thorax, forelimb, hindlimb and vertebral column	1
7.	Biomechanics and its application	1
	Total	15

Practical

S.No.	Topic	No. of Practicals
1.	Gross study of individual bones of appendicular and axial skeleton of bovine and their comparison with other species	
	(A) Appendicular Skeleton	
	(a) Bones of the thoracic limb of fore limb:	
	Thoracic Girdle (Shoulder)/Pectoral Girdle,	1
	Humerus,	1
	Radius/ulna,	1
	Carpus,	1
	Metacarpus, and	1
	Digits.	1
	(b) Bones of the pelvic limb or hind limb:	
	Pelvic Girdle,	1
	Femur,	1
	Tibia / Fibula, Patella,	1
	Tarsus,	1
	Metatarsus,	1
	Digits	1
	(B) Axial Skeleton	
	Skull,	2
	Cervical Vertebra,	1
	C. Thoraaic Vertebra,	1
	Lumbar Vertebra,	1
	Sacral Vertebra,	1
	Coccygeal Vertebra,	1
	Ribs,	1
	Sternum	1
2.	Gross study and description of different types of joints of bovine and their comparison with other species	
	Head	1
	Neck,	1
	Trunk,	1

	Tail,	1
	Thorax,	1
	Fore limb,	1
	Hind limb,	1
	Vertebral column	1
3.	Biomechanics and kinetics of locomotion.	1
	Total	**30**

Reference

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Neil, D.S. May.1977. The Anatomy of Sheep, 3rd Edition, University of Queensland Press, Sydney.

Sisson, S. and J.D. Grossman 1977. The Anatomy of the Domestic Animals. 5th edition, MacMillan, India Vol. 1 & 2.

Sisson, S. and J.D. Grossman. 1975. The Anatomy of the Domestic Animals, Robert Getty, 1975. Vol. 1 & 2, 5th Edition, W.B. Saunders Company Philadelphia, London, Toronto.

Course Code: VAN 102

Course Title: Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)

Credit Hours: 4 (2+2) Full Marks: 100 Theory: 50 Practical: 50

Objectives

The course will enable the students to apply their knowledge in the field of mycology, neurology, angiology and anesthesiology with particular emphasis on dissection and identification of different muscles, network of blood and nerve supply to the different parts of aninmal body and to observe the gross structures of sense organs and common integuments to know the mechanism of sense.

Syllabus

Myology: Structural and functional classification of muscles. Gross study of skeletal muscles of head, neck, thorax, abdomen, pelvis, tail, fore limb and hind limb with their origin, insertion and action and their structural and functional importance from clinical and production point of view in Ox / Buffalo as a type species. Dissection of muscles of all body regions of Ox/Buffalo, their location, functional role in the body and comparison with other species.

Neurology: Study of central, peripheral and autonomic nervous system. Gross study of meninges, brain, spinal cord, cranial and spiral nerves and their functional importance from clinical and production point of view. Study of brain and spinal cord in different domestic animals.

Angiology: Gross morphology of heart and disposition of arteries, veins and lymphatic of head, neck, thorax, abdomen, pelvis, tail, forelimb and hind limb in Ox / Buffalo as type and comparison with that of Sheep / Goat, Pig, Horse, Dog and Fowl. Their importance from clinical and production point of view. Study of heart and major blood vessels in different species of animals. Demonstration of palpable Lymph nodes of the body.

Anesthesiology: Gross morphological study of the eye, ear, nose, hoof, horn and skin in Ox / Buffalo. Their functional importance and comparative study in other domestic animals. Dissection for study of eye, ear, nose, hoof and horn.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction and classification of muscle	1
2.	Gross study of different muscles of	
	Head,	1
	Neck,	1
	Thorax,	1
	Abdomen,	1
	Pelvis,	1
	Tail,	1
	Fore limb, and	1
	Hind limb	1
3.	Introduction and classification of nervous system	1
4.	Gross study of Brain,	1
	Spinal cord,	1
	Cranial nerves,	1
	Spinal nerves, autonomic nervous system,	1
	Brachial plexus,	1
	Lumbo-sacral plexus	1
5.	Gross study of heart, blood vessels and lymphatics of	
	Heart,	1
	Head, Neck,	1
	Thorax, Abdomen,	1
	Pelvis, Tail,	1
	Forelimb,	1
	Hind limb	1
	Systemic and foetal circulation, &	1
	Lymph circulation.	1
6.	Gross study of sense organs and common integuments	
	Eye,	1
	Ear,	1
	Nose,	1
	Tongue,	1
	Skin, &	1
	Horn and Hoof.	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Dissection of muscles of all body regions of bovine, their location, and comparison with other species.	
	Muscles of head,	2
	Neck,	2
	Thorax,	2
	Abdomen,	1
	Pelvis,	1
	Tail,	1
	Fore limb,	2
	Hind limb	2
2.	Dissection and study of brain, spinal cord, spinal nerve and major nerve trunk in different domestic animals.	
	Gross study of Brain,	2
	Spinal cord,	2
	Spinal nerves,	1
	Brachial plexus,	1
	Lumbo-sacral plexus	1
3.	Dissection and study of heart and major blood vessels in different species of animals	
	Gross study and major blood vessels of Heart,	1
	Head,	1
	Neck, Thorax,	1
	Abdomen,	1
	Pelvis, Tail,	1
	Fore limb,	1
	Hind limb.	1
4.	Dissection and study of sense organs and common integuments of	
	Eye, Ear,	1
	Nose, Tongue,	1
	Skin, Horn and Hoof.	1
	Total	**30**

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McLeod, W.M. 1964. Bovine Anatomy, 2nd Edition, Burger Publishing Company.

Neil, D.S. May.1977. The Anatomy of Sheep, 3rd Edition, University of Queensland Press, Sydney.

Sisson, S. and J.D. Grossman 1977. The Anatomy of the Domestic Animals. 5th Edition, MacMillan, India Vol. 1 & 2.

Sisson, S. and J.D. Grossman. 1975. The Anatomy of the Domestic Animals, Robert Getty, 1975. Vol. 1 & 2, 5th edition, W.B. Saunders Company Philadelphia, London, Toronto.

Course Code: BCH 101
Course Title: General Biochemistry
Credit Hours: 3(2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

The main objective of this course is to teach the students about the biochemical composition of prokaryotic and eukaryotic cells, biomolecules and their functions with respect to animal and veterinary sciences.

Syllabus

Scope and importance of biochemistry, structures and functions of cell organelles and biological membranes and transport across membranes. Aqueous system and buffer system, functions of Donnan membrane equilibrium. Dissociation of acids, pH, buffer systems, Henderson-Hasselbalch equation and thermodynamic concept of biological reactions. Biological significance of important monosaccharides (ribose, glucose, fructose, galactose, mannose and amino sugars), disaccharides (maltose, isomaltose, lactose, sucrose & cellobiose), polysaccharides, (starch, dextrins, dextrans, glycogen, cellulose, inulin, chitin), and mucopolysaccharides including bacterial cell wall polysaccharides. Structures and functions of fatty acids, properties and biological significance of simple, compound and derived lipids and lipoproteins. Structure and functions of prostaglandins and bile acids. Classification, structures, properties and biological significance of proteins and amino acids. Chemical reactions and buffering actions of amino acids. Chemistry of purines, pyrimidines, nucleosides and nucleotides. Biological significance of nucleosides & nucleotides. Structures and functions of deoxyribonucleic acid (DNA) and a typical ribonucleic acid (RNA). Structures and biological functions of water soluble and insoluble vitamins. Classification, kinetics, and inhibition of enzymes. Classification, structure, and functions of animal hormones. Biochemistry of poisoning of snakes and insects. Biochemical techniques (principle and instrumentation of centrifuge, spectrophotometry, chromatography and electrophoresis).

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Introduction of biochemistry and its scope with respect to veterinary sciences.	1
2.	Structures and functions, composition of bacterial cell wall and related enzymes of cell organelles and of biological membranes and transport across membranes.	3
3.	Aqueous system, Donnan membrane equilibrium. Ionization of water, dissociation of acids, pH, buffer systems, Henderson-Hasselbalch equation and thermodynamics concept of biological reactions.	3
4.	Biochemistry of carbohydrates: Biological significance of monosaccharides (ribose, glucose, fructose, galactose, mannose and amino sugars), disaccharides (maltose, isomaltose, lactose, sucrose & cellobiose), polysaccharides, (starch, dextrins, dextrans, glycogen, cellulose, inulin, chitin), and mucopolysaccharides including bacterial cell wall polysaccharides.	3
5.	Biochemistry of lipids: Structures and functions of fatty acids, properties and biological significance of simple, compound and derived lipids and lipoproteins. Structure and functions of prostaglandins and bile acids.	3
6.	Biochemistry of proteins: Classification, structures, properties and biological significance of proteins. Amino acids: classification and structure of neutral, basic and acidic amino acids. Properties of amino acids: amphoteric nature, optical activity, and peptide bond formation. Chemical reactions and buffering actions of amino acids.	3
7.	Biochemistry of nucleic acids: Chemistry and biological significance of purines, pyrimidines, nucleosides and nucleotides. Structures and functions of deoxyribonucleic acid (DNA) and a typical ribonucleic acid (RNA).	3
8.	Structures and biological functions of water soluble and insoluble vitamins.	2
9.	Classification, kinetics, and inhibition of enzymes.	3
10.	Classification, structure, and functions of animal hormones. Biochemistry of poisoning of snakes and insects.	3
11.	Biochemical techniques (principle and instrumentation of centrifuge, spectrophotometry, chromatography and electrophoresis).	3
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Introduction and uses of laboratory equipments and glass wares.	1
2.	Preparation of normal and molar solutions of acids and alkali solution and standardization by titrimetric method.	1
3.	Preparation of buffer solutions and determination of pH.	1
4.	Preparation of colloidal solutions.	1
5.	Titration curve of amino acids versus acids and bases.	2
6.	Tests of mono-, di-, and polysaccharides and their identification.	1
7.	Estimation of lactose in milk.	1
8.	Determination of acid number of oil.	1
9.	Colour reactions of proteins.	1
10.	Precipitation reactions of proteins.	1
11.	Estimation of amino acids (Sorensen's method.	1
12.	Biochemical techniques spectrophotometry, chromatography, (centrifugation, electrophoresis).	3
	Total	**15**

References

Lehninger, D.L. Nelson, and M.Cox Michael. Lehninger Principle of Biochemistry latest Edition. Macmillan Worth Publisher.

Voet Donald, and Voet Judith G. Fundamentals of Biochemistry. Life at the Molecular level. Latest Edition. John Wiley & Sons, Inc.

Course Code: LPM 101
Course Title: Ruminant Production and Management
Credit Hours: 3(2+1) Full Marks : 75 Theory : 50 Practical : 25

Objectives

Upon the successful completion of the course students will be able to identify and recognize different breeds of cattle, buffalo, sheep and goats. They will also be acquainted with the principles of housing systems and art of commercial rearing of ruminant animals.

Syllabus

Introduction, terminology, prominent Exotic and indigenous breeds of cattle, buffalo, sheep and goat. Classification of Indian cattle breeds. Principle and types of housing for ruminant's animal. Care and management of cattle, buffalo, sheep and goat. Artificial raising of calf and orphan lambs/kids. General management such as grooming, dehorning, identification, castration, barn sanitation, milking methods and practices, docking, dipping and drenching judging and selection dairy animal.

Course Breakdown

Theory

S. No.	Topic	No. of Lectures
1	Introduction:	
	a. Historical back ground of ruminant production	1
	b. Future scope, importance and present situation of ruminant and their production	2
	c. Terminology, zoological classification and constraints of ruminants' production in Nepal.	2
2	Breeds and their characteristics	
	a. Exotic cattle breeds and their characteristics • jersey, Holstein Friesian, Brown Swiss, ayrshire	2
	b. Indigenous cattle breeds and their characteristics • Hariyana, sahiwal, Red Sindhi, Siri, Achame, Yak Nak and chauri	2
	c. Indigenous buffalo breeds and their characteristics • Murrah, Surti, Jaffarabadi, Nili-rabi, lime, parkote and Gaddi	2
	d. Exotic sheep breeds and their characteristics • Merino, Rambuillet, Romney, Suffoclk, Sannan, Damascus	2

	e. Indigenous goat breeds and their characteristics • Barbari, Beetle, Jamunapari, Kasmiri, Khari, singal chyngra and Anglo-nubion • Bhyanglung, Kage, Baruwal, Lampuchre	
3.	Housing	
	a. Selection of site for establishing new livestock farm	1
	b. Housing system for cattle and buffalo. • Merit and demerit of housing system • Provision of housing system • Building requirements	2
	c. Housing for sheep and Goat	
4.	Care and management a) Care and management of pregnant cattle/buffalo/sheep/goat b) Care and management of animal during giving birth c) Management of newly born calf d) Weaning and raising young calf artificially e) Management of lactating cow/buffalo f) Dry cow/buffalo management g) Heifer management h) Managing lambs/kids from weaning to market i) Bull and buck management j) use of draft animal in Nepalese agriculture system	6
5	Nature and grading of wool and factors affecting the value/quality of wool	2
6	Shearing care , storing and marketing of wool	1
7	Judging and selection of ruminant	2
	Total	**30**

Practical

S. No.	Topic	No. of Lectures
1	A visit to AFU livestock farm	1
2	A visit and study of LPM lab equipments	1
3	Identification of farm animals a. Tagging b .Branding c. Tattooing etc	2
4	Castration a) Blood les methods b) Surgical method	1

5	Dehorning/disbudding in calf	1
6	Grooming in lactating cattle/buffalo	1
7	Barn sanitation	1
8	Study of milking methods and practices	1
9	Study of wool shearing steps and practices	1
10	Judging and selection of cattle/buffalo	2
11	Docking practices	1
12	Dipping and drenching	2
13	Preparation of farm records	1
	Total	**15**

References

Banerjee, G. C.1991. A Text Book of Animal Husbandry. Oxford and IBH Publishing, New Delhi (7^{Th} Edition)

Jagdish Prasad, 2004. Principle and Practices of Dairy Farm Management. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata

Jagdish Prasad, 2001. Animal Husbandry and Dairy Science. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata

Course Code: ANU 101
Course Title : Principal and Practices of Fodder Production and Pasture Management
Credit Hours : 3(2+1) Full Marks: 75 Theory: 50 Practical : 25

Objectives

The main objectives of this course is to provide basic knowledge on principal and practices of fodder production including cultivation practices; pasture species establishment and their management considering it's practical application for feeding livestock.

Syllabus

Terminology of fodder and pastures. Climate and soil type. Factors affecting chimical compoisition and nutritive value of folder. Fodder plant growth development and yield morphology of forage grasses. Principle of grass seed production. Cultivation practices of common annual and perennial fodder legumes and grass. Common pasture species and their management. Pasture establishment, cultivated seed beds and nutrition of grazing animals. Pasture and soil fertility. Preservation and conservation: hay and silage making .Silvi-pastoral system and its importance.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	1.1 Intrdouction:feeds and feeding situation in Nepal common terminology of folder and pasture	1
2.	2.1 Edaphic factors affecting pasture and fodder crops	
	2.1.1Climate and its variation	1
	2.1.2soil types	1
	2.2 Factors associated with folder production	
	2.2.1 .Chemical composition and nutritive value	1
	2.2.2.Species and varietal differences	1
3.	3.1 Fodder plant growth , development and yield	1
	3.2 Morphology of forage grasses: vegetative grass tiller, and reproductive growth in forage grasses	1
4.	4.1 Principle of grass seed production	1
	4.1.1. Reproductive development	
	4.1.2. Component of seed yield ,and Actual seed yield	

5.	5.1 Cultivation Practices of common annual and Perennial fodder /grasses and legumes.	
	5.1.1.Oats	1
	5.1.2.Jawar,Bajra	1
	5.1.3.Teosinte, Maize	1
	5.1.4. Napier, Blue Panic	1
	5.1.5. Siratro,Centrocema	1
	5.1.6. Molases, Mulato	1
	5.1.7.Berseem,Lucern	1
	5.1.8.Joint vetch,Desmodium	1
	5.1.9.Stylosanthes, Forage Peanut	1
	5.1.10.Butterfly pen, Glycine	1
6.	6.1.Cultivatinon, establishment and yield of common pasture species:	
	6.1.1 Perennial ryegrass, cocksfoot	1
	6.1.2 Tall fescue, Phalaris	1
	6.1.3 White clover	1
	6.1. 4 Red clover, Lotus	1
7.	7.1. Pasture establishment : seed quality , sowing ,	1
	soil environment	1
	7.2 Cultivated seed beds and management of pasture	1
	7.3. Nutrition of grazing animal , nutritive value of pasture, herbage intake and composition	
8.	8.1 Pasture and soil fertility	
	8.1.1 Nutrient cycling pasture growth and fertilizer	1
	8.1.2 N fixation and grass/legume balance	1
9.	9.1 preservation and conservation of foldder /forage	
	9.1.2 Hay making ,steps , advantages and disadvantages	1
	9.1.2 Silage making,process,steps,advantages and limitatations	1
10.	10.1 Silvi-pastoral system concept and importance	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
	Common features used in identifying vegetative grasses	1
	Identification of seasonal fodders (grasses and legumes) at IAAS and vicinity	1

Identification of some common pasture grasses	1
Identification of some common pasture legumes	1
Identification of fodder trees and common tree fodder	1
Preparation of herbarium sheet	1
Cultivation of seasonal fodder covering winter and summer	2
Forage fodder sampling	2
Proximate analysis	3
Determination of green and dry matter yield	1
Determining/estimating botanical composition of the pasture mass	1
Total	**15**

References

Bayer,W.and A.W.Bayer.1998.Tropical Agriculture Forage Husbandry.ICAR,MacMillan.

Devkota,N.R.2005.A Practical Manual on Basics of Pasture Research and Study.Devkota and Devkota family ;Publishing, kathmandu, Nepal.P50.

Pandey, R.S.1997.fodder and Pasture development in Nepal.Udaya R.D. Service (p.) Ltd.kathmandu Nepal.Pandey ,K.k 1982. Fodder tree and tree fodder in Nepal. Swiss Federal Institute of Forestry Reasearch. Birmensdrof , Switzerland.

Pathak, N.N.and R.C jakhmila. 1983. Forage and livestock production .Bikash publishing house. New Delhi.

Course Code: EXT 101

Course Title: Sociology and Principles of Veterinary and Animal Husbandry Extension

Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

The main objective of this course is to develop student's understanding of the sociological concepts, and their contribution and application in veterinary and animal husbandry development and the field of animal husbandry extension system.

Syllabus

Sociology- the concept and importance of study of sociology for veterinary extension worker, basic concept of sociology and rural sociology as applied to extension education; Principles of extension in relation to animal husbandry; extension teaching methods, communication to innovation; programme planning; livestock marketing extension; sharing and linkage with actors and their relationship to animal husbandry extension.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
	Introduction to sociology Definition of Sociology Nature and importance of the study of sociology for Veterinary extension worker Relationship of sociology with other social sciences	2
	Rural sociology as applied to extension education Primary concepts of rural sociology Social group organization Social stratification Leaders and leadership Cultural factors in society Social norms, value and belief system Social institutions, function and interrelationship Social problems and social control Social process Social change	5
	Principles of extension in relation to livestock husbandry Concept of veterinary and animal husbandry extension Principles of extension Philosophy of extension Sharing and linkage partnerships an emerging concept in animal husbandry development and the extension service of DLS	2
	Extension teaching methods focusing to livestock husbandry Individual teaching method Group teaching method	1

Mass teaching methods		
Communication to innovation		2
Types of communication		
The communication process		
Adoption process		
Adopters categories		
Programme planning and development	1	
Principles of programme planning		
Abilities needed in extension personnel		
Livestock marketing extension	2	
The role of livestock in development paradigm		
Types of farming and system of farming		
Livestock product's marketing extension		
Total		**15**

Practical

S.No.	Topic	No.of Practicals
Introductory visit of a given rural community with livestock as a dominating occupation		1
Study about livestock rearing pattern of a given society		2
Preparation of individual farm level production plan in livestock production		1
Interaction meeting/ visit with DLS and study their planning process and plan of work and calendar of operation and organizational mechanism		1
Assessing the livestock man relation, sentiments, fads etc		1
To study the methods of working through functional leaders in a given community		2
Identify social research issue focusing to livestock husbandry and veterinary practices		1
Questionnaire design: types and process		1
Data editing, coding, entry and analysis		1
Data analysis: classification, tabulation and application of statistical tools		1
Report writing		2
Presentation of report		1
Total		**15**

References

Malhialagan, P. (2007). Text Book of Animal Husbandry and Livestock Extension: Third Revised and Enlarged Edition. International Book Distribution Co, India.

Bhusan, V. and D. R. Sachdeva (2000). An Introduction to Sociology. Kitab Mahal, Allahabad, India.

Harlambos and Holborn (2000). Sociology. Themes and Perspectives. Collins Educational Harper Collins Publishers Limited, London.

Rao, S.C. N. (2005). Sociology: Principles of Sociology with and Introduction to Sociological thought. S. Chand and Company Ltd.: New Delhi.

Ban, A. W. Van Den and H. S. Hawkins (1998). Agricultural Extension. S. K. Jain for CBS Publishers and Distributors, New Delhi.

Course Code : VAN 103
Course Title : Histology and Embryology
Credit Hours : 4 (2+2) Full Marks: 100 Theory: 50 Practical: 50

Objectives

This course will enable the students to learn about normal cell, basic tissue, embryogenesis, microscopic structure and development of organs of different systems of animal body.

Syllabus

General Histology: Structure of animal cell and basic tissues and their functional activity. Epithelia and their modifications. Connective tissue and its components including blood and bone. Muscular tissue types and their functional peculiarities. Neuron, nerve fibre and ganglion. Comparison of light and electron microscopy. Histological techniques, Processing of tissues for paraffin sectioning and Haematoxylin and Eosin staining. Microscopic examination and identification of basic tissue and their components. Systemic Histology: Study of microscopic structure of the organs of digestive, respiratory, urinary, reproductive, nervous, cardiovascular, endocrine and lymphoid systems, sense organs of domestic animals and birds. Examination of histological sections of various organs/systems of domestic animals and birds. Embryology: Gametogenesis, fertilization, cleavage, gastrulation, and the development of foetal membranes in birds and mammals. Structure and types of mammalian placenta. Development of the organs of digestive, respiratory, urogenital,cardiovascular,nervous and locomotor system and organs of special sense and endocrine glands. Fetal circulation. Study of structure of mammalian ova, spermatozoa and egg of fowl. Study of serial sections of avian and mammalian embryo / foetus at different stages of development.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Animal cell, cell structure	1
2.	Basic tissues	
	Epithelial tissue	1
	Connective tissue	1
	Muscular tissue	1
	Nervous tissue	1
3.	Definition, embryology, Gametogenesis, ovulation	1
4.	Fertilization, cleavage, gastrulation,	1
5.	Formation of germ layers	1

6.	Foetal membranes and placenta	1	
7.	Development of digestive and respiratory system	1	
8.	Development of cardiovascular system	1	
9.	Development of uro-genital system	1	
10.	Development of nervous system	1	
11.	Development of muscular and locomotory system	1	
12.	Development of special sense organs and endocrine system	1	
13.	Histology of digestive system		
	Oesophagus, stomach, intestine	1	
	Liver, pancreas,salivary gland	1	
14.	Histology of respiratory system		
	Pharynx,larynx, trachea	1	
	Bronchi, bronchiole, lungs	1	
15.	Histology of cardiovascular system		
	Heart	1	
	Artery, vein, capillary	1	
16.	Histology of urinary system	1	
17.	Histology of reproductive system		
	Male reproductive system	1	
	Female reproductive system	1	
18.	Histology of nervous system		
	Brain	1	
	Spinal cord	1	
19.	Histology of endocrine system		
	Pituitary, adrenal	1	
	Thyroid, parathyroid, pineal	1	
20.	Histology of lymphoid system	1	
21.	Histology of sense organs	1	
	Total		**30**

Practical

S.No.	Topic	No.of Practicals
1.	Study of compound microscope and its parts	1
2.	Histological techniques	2
3.	Study of blood cells	1
4.	Microscopic study of basic tissues	4
5.	Microscopic study of sperm and ovum of mammals	1
6.	Study of fertilized and unfertilized eggs of fowl	1
7.	Study of serial sections of chicks at different stages of development	5
8.	Microscopic study of digestive system	2
9.	Microscopic study of respiratory system	2
10.	Microscopic study of cardiovascular system	1
11.	Microscopic study of urinary system	2
12.	Microscopic study of reproductive system	3
13.	Microscopic study of nervous system	1
14.	Microscopic study of endocrine system	1
15.	Microscopic study of lymphoid system	2
16.	Microscopic study of sense organs	1
	Total	**30**

References

Dellmann, H.D. and E.M. Brown. 1976. Text Book of Veterinary Histology. Lea and Fiebiger, Philadelphia.

Noden, D. M. and A.D. Lahunta. 1985. The Embryology of Domestic Animals. Developmental Mechanisms and Malformations.

Trautmann, A. and J. Fiebiger. 1952. The Histology of Domestic Animals.

William, J. Bacha, Jr. Linda M.Wood. Colour Atlas of Veterinary Histology

Course Code: VPY 101
Course Title: Physiology I (Locomotor, Cardiovascular, Blood & Respiratory System)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of this course student will be able to understand physiology of locomotor system and muscle contraction as well as cardiovascular and respiratory system.

Syllabus

Introduction and vocabulary related to physiology. Types of muscle and its contraction. Rigormortis and fatigue. Composition of muscle, physiological properties of muscle. Blood, blood volume, homograph, erythrocyte, origin, maturation, fate, hemoglobin and its metabolism, anaemia, leucocytes classification, formation of thrombocytes, blood plasma, composition of plasma protein, coagulation of blood, lymph composition formation and flow, cerebrospinal fluid and synovial fluid. Heart and conduction system, electrocardiogram, cardiac cycle,Heart beat and sound, cardiac output, coronary circulation. Nervous and chemical regulation of heart, cardiac arrhythmias vascular system, blood flow, blood pressure, pulse, vasomotor control, pulmonary circulation, shock. Adaptation during exercise, fluid and electrolyte balance. Respiratory apparatus, mechanism of respiration, types of breathing, volume of air respired, intrapulmonic and intrathoracic pressure, composition of inspired and expired air, gas laws, transport of blood gases, exchange of gases in lungs and tissues, anoxia, regulation of respiration, respiratory reflexes, adaptation of respiration during muscle exercise, role of respiration in acid base mechanism and respiration in birds.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Introduction and vocabulary related to veterinary physiology.	1
2.	Structure of different types of muscles, mechanism of contraction. Muscle excitation and electrical stimulation. All or non law, Isotonic and isometric contraction. Rigormortis and fatigue of muscle.	2
3.	Composition and physiological properties of muscle	1
4.	General function of blood, blood cell plasma and serum, anticoagulant, blood volume estimation,	2
5.	Erythrocytes formation, maturation and fate. Life span of RBC and its fragibility	1
6.	Chemical structure of hemoglobin, its synthesis, catabolism and absorption and anaemia	1

7.	Formation of leucocytes and their classification and role or leucocytes in immunity	1
8.	Formation of leucocytes and their classification and role or leucocytes in immunity	1
9.	Thrombocytes formation, maturation and fate and its role in blood coagulation. Blood coagulation	1
10.	Chemical composition of blood plasma and its protein.	1
11.	Composition of lymph and its flow. Cerebrospinal fluid and synovial fluid.	1
12.	Heart structure, phenomenon of conduction, and cardiac cycle. Electrocardiogram	1
13.	Neuro chemical regulation of heart and arrhythmias	1
14	Vascular system and blood circulation, veinous and arterial pressure	2
16	System of pulmonary circulation	1
17	Adaptation of blood flow, pressure during muscle exercise. Mechanism of fluid and electrolyte balance	2
18	Respiratory apparatus, mechanism of respiration and type of breathing	1
19	Respired air volume, composition of inspired and expired air	1
20	Intrapulmonary and intrathoracic pressure and their role in respiration	1
21	Gas law, mechanism of gases transported	1
22	Regulation of respiration, respiration centre and anoxia	1
23	Physiology of respiratory reflexes, adaptation during muscle exercise	1
24	Role of respiration in the balance of acid-base	1
25	Respiration in birds	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Collection of blood samples from various animals and birds, Separation of serum and plasma	1
2.	Enumeration of erythrocytes, leucocytes, differential leucocyte count, platelet count	1
3.	Erythrocyte sedimentation rate, hematocrit, packed cell volume, Estimation of haemoglobin	1
4	Blood coagulation time and bleeding time	1
5	Blood grouping	1
6	Recording of normal heart beat of frog	2
7	Demonstration of effect of temperature(heat and cold) and drugs on heart	1
8	Demonstration of ECG in various farm animals	1

9	Recording of respiratory movement and estimation of lung volume	1
	Total	**15**

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Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.

Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson. Arthur C. Guyton.Text Book of Medical Physiology

Ganong, W.F. 1991. Review of Medical Physiology,15th Ed., Prentice- Hall International Inc.

Course Code: LPM 102
Course Title: Non- ruminant Production (Pig And Poultry)
Credit Hours: 3 (2+1) Full Marks : 75 Theory : 50 Practical: 25

Objectives

Upon completion of this course, students will be able to identify different breeds of pig and poultry and rear them with the application of scientific management practices.

Syllabus

Importance, constraint, scope and statistics of pig and poultry in Nepal. Prominent breeds of pig and poultry (Local, Exotic; Berkshire, Yorkshire, Hampshire, Duroc Jersey landrace, Tamworth) Housing, feeding and management of pig and poultry. Hatching, Brooding, selection and grading of egg. Selection and culling of Layers. Maintenance of bio-security in a commercial farm.

Course Breakdown

Theory

S. No.	Topic	No. of Lectures
1	Introduction and Terminology related to Pig and poultry	1
2	Present status, future and importance of pig and poultry industry in Nepal.	2
3	Care and management of new born piglet, gilt and sow, pregnant and breeding boar	2
4	Housing and housing system of pig and poultry: needs of housing, site selection, housing requirement, house equipment, system of housing, advantage and disadvantage.	3
5	Nomenclature and breads of fowl; classification of fowl and their characteristics (Aseel and Ghagus, white leghorn, Rhode Island Red, Plymouth Rock, Australorp, Sussex, New Hampshire and commercial breed layers and broiler)	3
6	Breed of pig (Nepali local; Berkshire, Yorkshire, Duroc Jersey, Hampshire, landrace, Tamworth)	3
7	Brooding and rearing chicks: System of brooding (advantage and disadvantage); management of chicks in brooder	2
8	Care of the chicks during summer; effect of summer heat; physiological mechanism by which chicken adjust rising temperature, Effective manage mental practices (Housing, water management feed and nutrition, medication and other managerial practices)	1
9	Care of the chicken during monsoon; maintenance of poultry house, feed storage, improvement of water quality, care of poultry excreta)	1
10	Formation, structure, food value, and chemical composition of eggs.	2

11	Collection, handling, grading and egg quality parameters(quality parameters; exterior quality factors; interior egg quality)	3
12	Hatching of egg (selection and care of good hatching egg, abnormal egg, Methods of hatching; natural and artificial; advantage and disadvantage. Factors effecting hatching Management of incubator during incubation.	2
13	**Selection and culling of chickens: The points consider during disqualifying the birds, Meat production standards, Egg production standards, Additional standards of good strains, culling the growing stock:**	2
14	Care and management of broilers, pullet, breeding and laying hen.	2
15	Maintenance of bio-security in a commercial	1
	Total	**30**

Practical

1	Study the external body parts of pig and poultry	1
2	Identification of pig tagging and ear notching	1
3	Castration of piglet	1
4	Needle teeth clipping of piglet	1
5	Breed identification of pig and poultry	1
6	Debeaking and canonization poultry	2
7	Study of pig and poultry farm record	1
8	Vaccination of poultry	1
9	Study the housing pig and poultry	1
10	Calculation of average egg production per bird	1
11	Feed formulation and feeding of pig and poultry	2
12	Selection of layers and non layers	1
13	Grading of egg	1
	Total	**15**

References

Banerjee, G. C.1991. A Text Book of Animal Husbandry. Oxford and IBH Publishing, New Delhi (7^{Th} Edition)

Prasad and Niraj 2012. Poultry Production and management. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata

Panda, P. C. 1995. Text Book on Egg and Poultry Technology. Vikas Publishing House Pvt Ltd576, Masjid Road, Jangpura, New Delhi-110014

Course Code: BCH 102
Course Title: Physiological Biochemistry
Credit Hours: 3 (2+1) Full Marks 75 Theory: 50 Practical: 25

Objectives

The main objective of this course is to teach the students about the metabolism systems related to animal physiology.

Syllabus

Enzymes: Definition and classification, EC numbering of enzymes. Coenzymes, cofactors and iso-enzymes. Properties: Protein nature, enzyme-substrate complex formation, modem concept of the active center of enzyme. Specificity of enzyme action: Substrate specificity, group specificity, stereo or optical specificity. Factors influencing enzyme action: Effects of temperature, pH, concentration of substrate and enzyme. Enzyme units: International Units, katal, turnover number & specific activity. Enzyme inhibition: Competitive, non-competitive, uncompetitive inhibition & suicidal inhibition. Allosteric enzymes. Biological oxidation: Enzymes and coenzymes involved in oxidation and reduction viz. Oxidoreductases, oxidases, oxygenases, dehydrogenases, hydroperoxidases & cytochromes. Respiratory chain/ electron transport chain, oxidative phosphorylation, inhibitors, uncouplers and other factors influencing electron transport chain. Carbohydrate metabolism: Glycolysis, Kreb's cycle, glyoxylate cycle, HMP shunt, gluconeogenesis, Cori cycle, glycogenesis, glycogenosis, hormonal control of carbohydrate metabolism & regulation of blood sugar Bioenergetics of carbohydrate metabolism. Lipid metabolism: Beta oxidation of fatty acids, ketone body formation, biosyntheses of fatty acids, triacylglycerol, phospholipids & apoprotein metabolism. Bioenergetics of lipid metabolism. Protein metabolism: Biosynthesis and degradation of proteins. Deamination, transamination and decarboxylation of amino acids. Ammonia transport and urea cycle. Nucleic acids: Metabolism of purines and pyrimidines. Biosynthesis of DNA & RNA. Integration of metabolism. Metabolic functions of macro and micro nutrients, Metabolic functions of lipid and water soluble vitamins. Uses of isotopes in metabolic studies.

Course Breakdown

Theory

S.No	Topic	No.of Lectures
1.	Definition and classification, EC numbering of enzymes.	1
2.	Coenzymes, cofactors & iso-enzymes	1
3.	Protein nature, enzyme-substrate complex formation, modern concept of the active center of enzyme.	1

4.	Specificity of enzyme action: Substrate specificity, group specificity, stereo or optical specificity.	1
5.	Effects of temperature, pH, concentration of substrate and enzyme.	1
6.	International units, katal, turnover number & specific activity of enzyme.	1
7.	Allosteric enzymes, Biological oxidation and enzymes and coenzymes involved in oxidation and reduction reactios.	2
8.	Oxidoreductases, oxidases, oxygenases, dehydrogenases, hydroperoxidases & cytochromes.	2
9.	Respiratory chain/ electron transport chain, oxidative phosphorylation, inhibitors, uncouplers and other factors influencing electron transport chain.	1
10.	Glycolysis, Kreb's cycle, glyoxylate cycle, HMP shunt, gluconeogenesis, Cori cycle, glycogenesis, hormonal control of carbohydrate metabolism & regulation of blood sugar, bioenergetics of carbohydrate metabolism.	3
11.	Beta oxidation of fatty acids, ketone body formation, biosyntheses of fatty acids, triacylglycerol, phospholipids & Apoprotein metabolism. Bioenergetics of lipid metabolism.	3
12.	Biosynthesis and degradation of proteins. Deamination, transamination and decarboxylation of amino acids. Ammonia transport and urea cycle.	3
13.	Metabolism of purines and pyrimidines	2
14.	DNA & RNA biosynthesis	2
15.	Integration of metabolism	3
16.	Metabolic functions of macro and micro nutrients	1
17.	Metabolic functions of lipid and water soluble vitamins	1
18.	Uses of isotopes in metabolic studies.	1
	Total	**30**

Practicals

S.No.	Topic	No.of Practicals
1.	Introduction and uses of homogenizer, centrifugation, pH meter, rotary evaporator, spectrophotometer, micropipette, microfilter, lyophilizer etc.	1
2.	Determination pH of biological fluids.	1

3.	Determination effect of pH, temperature and concentration on enzyme activity.	1
4.	Qualitative estimation of urine constituents.	1
5.	Qualitative estimation of serum proteins.	2
6.	Qualitative estimation of blood glucose.	1
7.	Qualitative estimation of cholesterol.	1
8.	Qualitative estimation of bilirubin.	1
9.	Qualitative estimation of enzymes in serum.	1
10.	Separation of amino acids, proteins by paper chromatography.	2
11.	Qualitative estimation of blood urea	1
12.	Extraction and separation of DNA	2
	Total	**15**

References

Bernard L. Oser. 1979. Hawk's Physiological chemistry. Fourth Edition, Tata Mc-Graw Hill Publishing Company Ltd., New Delhi.

Robert K. M, D. K. Granner, P.A. Mayes, V. W. Rodwell. 2003. Harper's Illustrated Biochemistry. Twenty-sixth edition. Lange Medical Books/McGraw-Hill.

Course Code: ANU 102
Course Title: Principle of Animals Nutrition
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon the completion of the course students, will be able to understand the basic principles of animal nutrition and will be able to recongnize the function and deficiency symptoms of nutrients.

Syllabus

Role of Animals nutrition in Animals husbandry and its scope in Nepal .Comparative composition of plant and animals cells and tissues .Feed stuffs and their nutrition content with utilization characteristics functions and classification of carbohydrates,protein,lipid and fats function of water in animals body characterizes and nutritional imporatnces of minerals and vitamins feed additives and their role.Digestion,absorption and metabolism and various nutritents ruminants non ruminants and birds feeding standard in different species and age group of animals.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Introduction about animal nutrition and its role in animal husbandry.	1
2.	Comparative composition plant and animal cell and tissues.	1
3.	Feed stuff and feeding gradients with nutrient contains utilization and characteristics of energy rich feeding gradients.	1
4.	Protein rich feeding gradients.	1
5.	Function of water in animals' body	1
6.	Classification function and food source of protein	1
7.	Classification function and feed source of carbohydrates	1
8.	Classification functions and feed sources of lipid.	1
9.	Function deficiency symptom and requirement of micro minerals.	1
10.	Function deficiency symptom and requirement of micro minerals.	1
11.	Function deficiency symptom and requirement of water soluble vitamins.	1
12.	Function deficiency symptoms and requirement of fat soluble vitamins.	1
13.	Digestion of food nutrition in ruminants.	1
14.	Metabolism of food nutrient.	1
15.	Feed additives used in animals feeding.	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Sampling of feed ingredients far froximate analysis	1
2.	Identification of energy rich feedingredients.	1
3.	Identification of protein rich feedingredients.	1
4.	Preparation of standard solution of chemical analysis.	1
5.	Determination of dry matter.	1
6.	Determination of ether extract.	1
7.	Determination of crude fiber.	1
8.	Determination of crude protein.	1
9.	Digestion process.	1
10.	Distilation process.	1
11.	Determination of nitrogen free extract.	1
12.	Determination of gross energy.	1
13.	Feeding standard for cattle and buffalo.	1
14.	Feeding standard for cattle and pig.	1
15.	Feeding standard for cattle and birds.	1
	Total	**15**

References

Benerrgye, G.C .1984 AText Book of Animalhusbandry: published by Mohan primalani, oxford and IBH publishing company PVT.Ltd.

Benerjee, G.C 1986 AText Book of Animals Nutrition

Morision, F.B 1984.feeds and feeding

CBS publishers and distributors jain

Bhwan Bhola nath Nagar, New Delhi, India

Ranjhan, S.K.1993.Animals nutrition and feeding

Practice in India,Vikash publishing

house.Pvt.Ltd, India

Ranjhan S.K.1993.Animals nutrition in the tropics Vikash publishing

House Pvt. Ltd ,India.

Course Code: LPM 103
Course Title: Animal Housing and Sanitation
Credit Hours: 2(1+1) Full Marks : 50 Therory : 25 Practical :25

Objectives

Upon the completion of the course students, will be able to construct houses for farm animals and poultry and also they will be able to maintain sanitation on the farms.

Syllabus

Housing of Animals: General principle, affecting design and construction of buildings for housing animals and poultry. Site selection, traditional housing, use of local construction materials, conventional housing systems of housing, tail to fail and head to head, advantages and disadvantages. Poultry housing, deep, litter, cage, battery branding. Housing of small ruminants and swine.

Sanitation: Water supply, fanctions, deticiency symptoms sources, quality and mean of pollution and purification water requirements and supplies. Sanitation and ventilation, diseases associated with water, air and environment costing, site selection design familiarization with different housing water supply and ventilation.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1. Housing:	Type of housing for farm animals and poultry	1
2.	Selection of site	1
3.	Type of buildings	1
4.	Building materials and quality	1
5.	Traditional (rural) animal housing	1
6.	Conventional (urban) animal housing	1
7.	Systems of housing (head to head and tail to tail, advantages and disadvantages)	1
8.	Housing for small ruminants	1
9.	Housing for swine	1
10.	Housing for poultry(deep litter ,cage system, battery brooding etc)	1
11. Water:	Importances, major functions and some water	1
12.	Requirement of water for various speciesof farm animals and poultry birds	1
13. Sanitation:	Drainage, disposal of cowdung, urine and farm animals washings	1
14. Ventilation:	Importance of ventilation and its types and requirements	1
15.	Diseases associated with water, poor housing and ventilation.	1

Total	**15**

Practical

S.No	Topic	No. of Practicals
1.	Familiarization with the various types of animal housing	1
2.	Housing of poultry	1
3.	Housing of swine	1
4.	Cost estimation for large ruminants	1
5.	Costing of poultry housing	1
6.	Costing of swine housing	1
7.	Design of housing of small ruminants	1
8.	Preparation of compost	1
9.	Use of cow dung for biogas production	1
10.	Familiarization of rural and commercial housing	1
11.	Familiarization with poultry housing	1
12.	Brooding of clay-old chicks	1
13.	Study of calf sheds	1
14.	Study of water quality and water supply schemes	2
Total		**15**

References

Ranjhan, s.k. and N.H Pathak .1991.Text Book on Buffalo Production. Vikas Publishing House Pvt. Ltd. New Delhi.

May, Cherye.2010. Cattle Management, Roston, publishing Co, Irc.Roston, Virginia USA.

Course Code : AST 302
Course Title : Biostatistics and Computer Application
Credit Hours : 3(2+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon the completion of this course, the students will be able to organize and analyze the data, and interpret the result, also they can use computer for statistical analysis.

Syllabus

Basic statistics

An overview of statistics- introduction and importance, Frequency distribution, Measures of central tendency &dispersion, Probability & Probability distributios, correlation & Regression, Tests of significance (Z,t, F & $\chi 2$) , Elements of vital statistics – Rate & Ratio- mortality, fertility , incidence & prevalence rates – Standardized rates.

Computer application, Introduction to personal computer, operating system data management and analysis, use of LAN & other networking statistical computation of different parameters and analysis, Introduction with programming C.

Course Breakdown

Theory

S.No.	Topic	No of Lectures
1.	Introduction to statistics, Definitions, scope and limitations.	1
2.	Definition of a population, sample; characteristics of a good sample, sampling methods-simple random sampling – sample selection from an agricultural field by simple random sampling, probability proportional to size, stratified random sampling, systematic sampling, cluster sampling, multistage sampling, sampling error.	1
3.	Measures of central tendency, Definition of Arithmetic mean, Median Mode with merits, demerits and uses, properties of an ideal measure of central tendency, partition values- quartiles, Deciles and percentiles.	1
4.	Frequency Distribution – presentation and summarization of data by different classification methods- Exclusive and inclusive, Diagrammatic – Bar and Pie, and graphical methods- Histogram, Frequency polygon, Frequency curve, Ogives (cumulative frequency curves).	1
5.	Measures of dispersion, Range, Quartile deviation, Mean Deviation, Standard Deviation and Variance, Coefficient of variation. Moments-	1

	Measures of skewness and kurtosis	
6.	Probability – Definitions of random experiment, sample space, events – independent and dependent, trial, mutually exclusive events, exhaustive events, equally likely events, simple and compound events, Definitiions of probability (classical and statistical), simple problems based on probability. Addition and Multiplication theorems, conditional probabilities.	1
7.	Probability distributions- Binomial distribution, properties and simple problems, Poisson distribution and its properties and problems. Normal distribution with its properties and problems. Sampling distributions of mean and differences	1
8.	Correlation – Definition, types of correlation, scatter diagram, Karl Pearson's coefficient of correlation (linear correlation), properties,	1
9.	Regression (linear), Regression equations of y on x and of x on y. Relation between correlation coefficient and regression coefficients.	1
10.	Tests of significance – introduction, definition of hypothesis, null and alternative hypotheses, degrees of freedom, levels of significance and types of error. Significance of means – one sample and two sample means in large samples (Z-test).	2
11.	Significance of means in small samples (t-test)- one sample, two samples and two related samples mean test (paired t-test), test for correlationh coefficient, F test, χ^2 (chi-square) test – test of independence and goodness of fit.	2
12.	Elements of vital statistics: Rate & Ratio- mortality, fertility, incidence & prevalence rates, 2 standardized rates.	2
	Total	**15**

Practical

S.No.	Topic	No of Practicals
1.	Introduction to personal computer and its peripherals	1
2.	Operating systems (DOS and Windows)	2
3.	Introduction to Database Management system-	2
4.	Introduction to data analysis software package-	2
5.	Use of LAN and other networking system	1
6.	Statistical computation: Mean, Mediam standard deviation, correlation, regression	2
7.	Statistical analysis – t –test, χ^2 test	3
8.	Introduction with programming C	2
	Total	**15**

References

Agrawal, B.L. 1996. Basic Statistics (3rd Edition), New Age Internatiional Pvt. Ltd. New Delhi.

Chandel, S. R.S. 1984. A hand Book of Agricultural Statistics, Achal Prakashan Mandir, Kanpur, India.

Gupta, S. C. and V. K. Kapoor. 1988. Fundamentals of Applied Statistics, Chand and Com. New Delhi.

Singh, S. and R.P.S. Verma. 1982. Agricultural Statistics, Rama Publishers Meerut.

Tripathi, P.N. 1991. A Manual on Introductory Agricultural Statistics, Tribhuvan University, IAAS, Chitwan Nepal. Kalicharan, N. 2001. An Introduction to Computer Studies. Cambridge University Press. Taxali, R. K. 2001. Software Made Simple. Tata McGRaw Hill Publishing Company Limited.

Course Code: VAN 204
Course Title: Splanchnology and Applied Anatomy
Credit Hours: 4 (2+2) Full Marks: 100 Theory: 50 Practical: 50

Objectives

Upon the completion of the course, students will be able to understand the visceralorgans, their location and relation with other structures. It also enable the students todissect specimens, identify the sites for surgical operations and conduct post-mortem.

Syllabus

Splanchnology: Gross morphological and topographical study of various organs of digestive, respiratory, urinary, reproductive, lymphatic and endocrine systems, Pleura and Peritoneum in Ox, Buffalo as a type species and their comparison with that of Sheep/Goat, Pig, Horse, Dog and Fowl. Dissection and study of organs of digestive, respiratory, urinary, reproductive, lymphatic and endocrine systems of Ox /Buffalo and their comparative anatomy in other species.

Applied Anatomy: Different Terminology used in applied Anatomy. Palpable Anatomical body structures, peripheral lymphnodes and their use in health and disease. Learning different anatomical methods of approaching different sinuses in life. Applied anatomy of sites for laparotomy, oesophagotomy, rumenotomy, gastrotomy, tracheotomy, cystotomy, urethrotomy, palpation of anatomical structures in the abdominal and perineal regions. Radiographic visualisation of gross anatomical features of various regions of the body.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction, body cavity, peritoneum	1
2.	Gross study of digestive system and their comparison with other species	
	Mouth cavity and associated organs	1
	Pharynx, oesophagus	1
	Stomach (rumen, reticulum, omasum, abomasum)	1
	Small intestine (duodenum, jejunum, ileum)	1
	Large intestine (ceacum, colon, rectum)	1
	Liver	1
	Pancreas	1
	Spleen	1

	Salivary gland	1
3.	Gross study of respiratory system and their comparison with other species	
	Nasal cavity / mouth cavity and pharynx	1
	Larynx	1
	Trachea	1
	Bronchi and lungs	1
4.	Gross study of urinary system and their comparison with other species	
	Kidney	1
	Ureter	1
	Urinary bladder	1
	Urethra	1
5.	Gross study of male genital system and their comparison with other species	
	Testicle	1
	Epididymis	1
	Ductus deferens	1
	Urethra, Penis	1
	Seminal vesicle, prostate gland, bulbo-urethral gland	1
6.	Gross study of female genital system and their comparison with other species	
	Ovary	1
	Uterine tube / fallopian tube	1
	Uterus	1
	Vagina, Vulva	1
	Mammary gland	1
7.	Gross study of endocrine system	
	Pituitary, adrenal	1
	Thyroid, parathyroid, pineal	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Dissection and study of entire visceral organs	
	Study of organs of digestive system	3
	Study of organs of respiratory system	2
	Study of organs of urinary system	2
	Study of organs of male genital system	3

	Study of organs of female genital system	3
	Study of endocrine system	2
2.	Introduction and importance of applied anatomy	1
3.	Post mortem technique	1
4.	Learning different anatomical methods of approaching different sinuses in life	1
5.	Salivary glands and their ducts specially the parotid or stenson duct	1
6.	Study of male and female genitalia of farm animals	2
7.	Study of location of visceral organs, peripheral lymphnodes, surface veins and palpatable arteries	1
8.	Study of sites and tissues encountered during amputation of horn and tail	1
9.	Laprotomy, oesophagotomy, rumenotomy, gastrotomy, tracheotomy, cystotomy, urethrotomy,	3
10.	Caesarian section, vasectomy and castration in cattle and other species	1
11.	Nerve block, extirpation of eyeball, medial patellar desmotomy	1
12.	Study of organs of various regions of body through radiography	1
13.	Study of developing organs of foetus of cow and other species	1
	Total	**30**

References

Bhardwaj, R.L., Rajesh Rajput, and K.S. Roy. Applied Anatomy of Domestic Animals.

Dyce, K.M., W.O. Sack and C.J.G. Wensing 1996. Text Book of Veterinary Anatomy, 2nd Edition, W.B. Saunders Company

Sisson, S. and J.D. Grossman. 1975. The Anatomy of the Domestic Animals, Robert Getty, 1975. Vol. 1 & 2, 5th Edition, W.B. Saunders Company Philadelphia, London, Toronto.

Tyagi, R. P. S. and J. Singh. 1995. Ruminant Surgery. A text Book of surgical diseases of cattles, buffaloes, camels, sheep, and goats, 1st edition, CBS Publishers and distributors, New Delhi.

Ommer, P. A. and K. R. Harshan. Applied Anatomy of the Domestic Animals.

Course Code: VPA 201
Course Title: Parasitology I (General Parasitology and Cestode Parasites)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of this course, student will be able to assess the knowledge about identification of eggs, adult cestode parasites, their pathogenesis and drugs used in their control.

Syllabus

Introduction to parasitology- Parasites and parasitism, Animal association, Types of hosts, Types of parasitism, Host parasite relationship, Mode of transmission of parasites and methods of dissemination of the infective stages of the parasite, Parasite specificity in relation to species, breed, sex and location. Tissue reaction caused by parasite to the host. Resistance of hosts to parasitic infections/infestation. Immunity against parasitic infections. Standardized Nomenclature of Animal Parasitic Diseases (SNOAPAD). General description of helminth parasites affecting domestic animals and birds.

Classification of helminthes, characteristics of phylum (Platyhelminthes, Nemathelminthes and Acanthocephala). Salient morphological features of diagnostic importance. Lifecycle of the cestode parasite in relation to transmission, pathogenesis, epidemiology, diagnosis, general control measures of following cestode parasite of animals and birds.

Cestodes: Mesocestoides, Equine tape worms (Anoplocepahala, Paranocephala), Ruminant tapeworms (Moniezia, Avitelina, Stilesia), Dog tape worms (Dipylidium, Taenia, Multiceps and Echinococcus), Poultry tape worms (Davainea, Cotugnia, Raillietina, Amoebotaenia), Dwarf tape worm (Hymenolepis nana) and Fish tape worm (Diphyllobothrium).

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Introduction (definition of parasitology, terms use in parasitology, short history of parasitology)	2
2	Animal association (Phoresis, Mutualism, symbiosis, commensalism and parasitism, Types of host and parasites	1
3	Host parasite relationship, tissue reaction caused by parasites to their hosts, Mode of transmission of parasites	3
4	Resistance of host to parasitic infection/infestation Immunity against parasitic infections	3

5	Standardized Nomenclature of Animal Parasitic Diseases (SNOAPAD)	2
6	Classification of helminths and characteristics of various phyla Protozoa, Platyhelminthes, Nemathelminthes, Acanthocephala, Annelida and Arthropoda	3
7	Morphological features, mode of transmission, life cycle, pathogenesis, symptoms, diagnosis, treatment and control measures. Mesocestoides, equine tapeworm (Anoplocephala, Paranophlocephala)	3
8	Ruminant tapeworm (Avitellina, Stilesia, Moniezia)	2
9	Dog tapeworm (Dipylidium, Taenia hydatigena, Multiceps, Echinococcus)	3
10	Human tapeworm (Taenia spp., Hymenolepis sp.)	3
11	Poultry tapeworm (Davainea, Cotugnea, Railletina, Amoebotinia)	3
12	Fish tapeworm (Diphyllobothrium)	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Collection, fixation, and preservation of cestode parasites and their larval stages.	3
2	Demonstration of lesion of the cestode or their larval stages cause by adult parasite and their larval stages.	3
3	Visits laughter house to observe adult and larval stages of cestode parasites.	3
4	Demonstration of the types of final host and their intermediate hosts.	3
5	Faecal examination methods and identification of eggs of cestode parasites.	3
	Total	**15**

References

Change, T.C. 1973. General Parasitology. Academic Press, Florida, USA (1st Edition).

Levine, N. D. 1983. Text Book of Veterinary Parasitology. CBS Publishers and Distributers (1st Indian Edition).

Soulsby, E. J. L. 1986. Helminths, Arthropods and Protozoa of Domesticated Animals. The English Language Book Society and Bailliere Tindall and Cassell Ltd (7th Edition).

Urguhart, G. M. 1996. Veterinary Parasitology. Blackwell Science Ltd (2nd Edition).

Course Code : VPY 202
Course Title : **Physiology II (Digestive, Excretory and Nervous System)**
Credit Hours : 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of this course, students will be able to understand physiology of digestion and absorption in monogastric, ruminants as well as chickens including excretory system and excretion in birds.

Syllabus

Prehension of food, mastication, salivation, deglutition and digestion in simple stomach, stomach movement, hunger, digestion in rumen, digestion and absorption in small and large intestine, pancreatic and intestinal secretion. Liver bile and detoxification. Intestinal movement, defecation, nervous control of digestive processes, digestion in poultry. Kidney, urine formation and composition, renal secretion. Skin- Sebaceous gland and their secretion, water loss through sweat and insensible perspiration, regulation of body temperature. Nervous system, neurons, synapses, receptors, all or none character of nerve impulses. Cutaneous receptor organs, peripheral nerves, spinal cord and reflex action, cerebellum, thalamus, hypothalamus, pons, medulla and spinal cord, cranial and spinal nerve reflexes. Autonomic nervous system. Vision, hearing, taste and smell.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Functional anatomy of digestive tract: monogastric and ruminant animals.	1
2.	Prehension, mastication, deglutition, movement of stomach, small intestine and large intestine- rumination, defecation, hunger contraction thirst and vomition	2
3.	Saliva and its composition, secretion and function, pancreatic juice, bile, intestinal juices- their regulation, composition and function	1
4.	Digestion in ruminant stomach, microbial activities in the stomach and intestine	2
5.	Absorption of food stuffs, places of absorption, mechanism of absorption, absorption of carbohydrate, protein, fats and water	1
6.	Digestion in poultry	1
7.	Kidney structure of nephron, histological peculiarities blood supply of kidneys, determination of glomerular filtration rate (GFR)	1

8.	Physical characteristics and composition of urine in health and disease	1
9.	Role of kidney in acid base and electrolyte balance	1
10.	Excretion of urine in birds	1
11.	Skin function sebaceous and sweat gland and their function, thermoregulation, maintenance of body temperature regulation against heat and cooling	1
12.	Nervous system: neurons, structure of nerve fibres, degeneration and regeneration of nerve fibres	1
13.	Synapse and transmission of nerve impulses, all or non character of nerve impulse, transmission of excitatory state from nerve to effector tissues	1
14	Cutaneous receptor organs, peripheral nerves, spinal cord and reflex action	2
15	Brain stem and cerebellum, cerebral hemisphere condition reflex, wakefulness and sleep	2
16	Autonomic nervous system, general arrangement and chemical transmission	1
17	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	2
18	Ear: Structure of ear and mechanism of hearing physiology of olfaction and taste	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Counting of rumen motility, estimation of volatile fatty acids and ammonia in rumen, bacterial count, protozoal count	3
2.	In vitro action of proteolytic enzymes- pepsin and trypsin, recording of rumen movements- reticular sound	3
3.	Physiological constituent of urine- estimation of titrable acidity in urine	3
4	Nerve muscle preparation- simple muscle curve- in vivo muscle stimulation- effect of heat cold and load- effect of fatigue	3
5	Demonstration of kidney function tests, intestinal motility- urine secretion- excretory system of bird	3
	Total	**15**

References

Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.

Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson.

Ganong, W.F. 1991. Review of medical physiology,15th Ed., Prentice- Hall International Inc.

Arthur C. Guyton Text Book of Medical Physiology

Course Code: VPP 201
Course Title: General Pathology
Credit Hours: 3(2+1) Full Marks: 75 Theory:50 Practical:25

Objectives

Upon completion of the course, student will be able to understand the basic disease processes that affect tissues of animals, will gain appreciation of the relationship between clinical manifestations of disease processes and their underlying biochemical and morphologic abnormalities, will be expected to describe pathological changes, understand the pathogenesis of specific disease processes, make a morphological diagnosis based on the gross and/or histological findings presented and students are expected to learn and use medical terminology.

Syllabus

Introduction to pathology, Introduction to concepts of disease. Mechanisms of disease caused by viruses, bacteria and other agents. Cellular injury, degeneration and necrosis including mechanisms of cell injury, alteration to cells, the response of cells, Pigments and other tissue deposits, Circulatory and vascular changes including fluid and hemodynamic derangement associated with diseased or inflamed tissues, thrombosis, embolism, infarction, and shock, Inflammatory processes, including acute and chronic inflammation, and their systemic affects, healing and tissue repair, including regeneration, wound healing and modification of the repair response. Immune mechanisms, immune-related diseases. Developmental disturbances. Classification, nomenaclature, types, and Immunity against tumor. Structure, appearance, growth, spread, Diagnosis and systemic effect of cancer.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Introduction, definitions, history, language of pathology and scope of pathology	1
2	Definition of homeostasis cellular adaptation, cell injury, necrosis and apoptosis	1
3	Cellular adaptation of growth and differentials (atrophy, hypertrophy, hyperplasia, hypoplasia, aplasia, metaplasia and dysplasia)	1
4	Causes of cell injury	1
5	Mechanism of cell injury (general and biochemical)	1
6	Ischemic and hypoxic cell injury	1
7	Chemical injury	1

8	Morphology of reversible cell injury (cell swelling and fatty changes)	1
9	Morphology of irreversible cell injury (necrosis, apoptosis and gangrene)	1
10	Lipid, protein and glycogen accumulation, endogenous pigments (lipofuscin, ceroid, melanin, copper, hemosiderin, bilirubin, hematoidin and acid hematin	1
11	Pathological calcification, amyloid, amyliodosis, crystal (oxalate, urates, uric acid, cholesterol clefts), exogenous pigments(anthracosis, silicosis and asbestosis)	1
12	Edema (types, causes and pathophysiology)	1
13	Hypermia,and congestion, dehydration	1
14	Ischemia, hemostasis, hemorrhage, thrombosis and embolism	1
15	Infarction and DIC	1
16	Shock	1
17	definition, classification and cardinal signs of inflammation	1
18	Acute inflammation(chemical mediators and exudation)	1
19	Cells of acute inflammation, fever	1
20	Hypersensitivity and autoimmune disease mechanism	1
21	Chronic inflammation (cells involve, mechanism, types)	1
22	Repair and fibrosis mechanism	1
23	Wound healing, granulation tissue	1
24	Healing in kidney, lungs, brain and heart	1
25	Classification and nomenaclature and types of tumor	1
26	Structure, appearance, growth and spread of tumor	1
27	Etiology of cancer	1
28	Immunity against cancer and systemic effect	1
29	Diagnosis of cancer (cytology, molecular tools, tumor markers and staging)	1
30	Agenesis, aplasia, hypoplasia, atresia, fissure, fussion of sex character and monster	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Collection of specimens for histopathology, and fixation of tissues	1
2	Methods of processing of tissue for histopathology	1
3	Methods of section cutting and staining	1
4	Collection of gross pathological specimens and gross	1

	morphological diagnosis	
5	Collection of gross pathological specimens and gross morphological diagnosis	1
6	Collection of gross pathological specimens and gross morphological diagnosis	1
7	Technique of post mortem examination of large animals	1
8	Technique of post mortem examination of small animals	1
9	Study of histopathological slide showing growth disturbances (hypertrophy, hyperplasia, atrophy, metaplasia, dysplasia)	1
10	Study of histopathological slide showing circulatory disturbances (congestion, hemorrhage, edema and hyperemia)	1
11	Study of histopathological slide showing degenerative process (hydropic degeneration, and fatty degeneration)	1
12	Study of histopathological slide showing necrotic condition	
13	Study of histopathological slide showing acute infammation	1
14	Study of histopathological slide showing chronic infammation	1
15	Collection, preservation and dispatch of morbid animals	1
	Total	**15**

References

Blood, Studdert, Gay,2006.Saunders Comprehensive Veterinary Dictionary, 3rd Ed.

Kierszenbaum, 2007. Histology and Cell Biology - An Introduction to Pathology, 2nd Ed.

Meuten DJ.2003. Tumors in Domestic Animals. Iowa State Press, 4th Ed.

Robbins & Cotran, 2009. Pathologic Basis of Disease, Kumar, et al. 8th Ed.

Slauson and Cooper, 2002. Mechanisms of Disease, *3*rd Ed.

Zachary & McGavin. 2012. Pathologic Basis of Veterinary Disease, *5*th Ed.

Course Code: ANU 203
Course Title: Applied Animals Nutrition. I [Ruminant]
Credit Hours: 2(1+1) Full Marks: 50 Theory : 25 P ractical :25

Objectives

Upon the completion of this Course students will be able to recognize the different chambers of the digestive system of ruminants, and feeding of ruminants.

Syllabus

Digestion, absorption and metabolism of nutrients in ruminants. Evaluation of foods: Digestibility, measureless of digestibility, factors affecting digestibility, system of expressing the energy value of foods. breeding standards: for maintenance and growth, reproduction, milk production, MRC, ARC, and India feeding standard Balance ration a feeding of livestock: Breeding dairy cattle and buffaloes, feeding goats for meat and milk production. Feeding of sheep, Racing cattle and buffaloes for meat production. Feeding ruminants during scarcity periods.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Digestion, absorption and metabolism of nutrients in ruminants	2
2.	Feed evaluation: a. Measurement of digestibility, various method of determining, digestibility's. Invitro and non-vivo digestibility. Limitation of digestibility cofficiency. Factors affectingdigestibility cofficiency. Determination TDN and DCP b. systems of expressing the energy and protein value of foods: Total digestibility, nutrients the stores equivalent;Partation of foods energy within the animals utilization of metabolization energy. Animals colorimetory: Methods for measuring heat production and energy retention.	2
3.	Feeding standards for maintenance and growth,reproduction,lactation and wool production various methods of feeding standards.NRC,ARC and India feeding standards.	2
4.	Feeding dairy cattle and buffalos,goats,sheep,yak and nak.	2
5.	Feeding of young calves,kids and lambs	1

6.	Raising cattle and buffaloes for meat production	1
7.	Feeding ruminants during scarcity periods: Urea -molasses liquid feeds Urea- molasses minerals blocks Urea- treatments of straws	2
8.	Preparation of Hags, silages and treatments of inferior quality roughages.	3
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Computation of ration for cattle, buffalo and calves, sheeps and goats.	3
2.	Methods of determining digestibty cofficents: digestion trail.	2
3.	Urea - treatment of rice and wheat straw	2
4.	Urea molasses mineral blocks preparation	2
5.	Urea molasses liquid feeding	2
6.	Preparation of concentrate mixture	2
7.	Preparation of hays	1
9.	Prepration of silase.	1
	Total	**15**

References

Animal nutrition and feeding practices, s.k. Ranjhan , Bikas publishing House Pvt. Ltd..1993.

A text Book of Animal Husbandry G. C. Bqnerjee, 1998, oxford and IBH publishing Co. Pvt. Ltd. 66 janpath, New Delhi.

Animals Nutrition:P Mcdonald.RA Edwards,SRD Greenhalgh LBs with longman.1995.

Principle of animal Nutrition and nutrition Dynamics: Sp Aroro; Harjit Kaur.

Course Code: VMI 201
Course Title: Microbiology I (General Veterinary Microbiology)
Credit Hours: 3 (2+1) Full marks 75 Theory: 50 Practical: 25

Objectives

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

Syllabus

History, development and concepts of Microbiology with special emphasis on Bacteria. Definition and general properties of Bacteria. Differentiation of prokaryote from eukaryote. Morphology, microscopic and ultramicroscopic structures including their composition and function of Bacteria. Nutrition, cultivation and growth of Bacteria. Physiology and metabolism of Bacteria. Bacterial genetics: Replication of DNA and RNA, plasmid, gene transfer (transformation, conjugation, transduction, F-factor, C-factor and R-factor) mutation and their effects. Pathogenic microorganisms and their relationship to diseases; Mechanisms of infection. Microbial virulence: Factors influencing virulence, Koch's postulate.Toxins: Exotoxin, endotoxin and their effect on host tissues; role of antitoxin against toxins. Sterilization and disinfection: Methods of sterilization, types of disinfectants and their characteristics. Classification of bacteria. History of Virology, definition, general properties of Virus and differentiation of Virus from other Microorganisms. Composition and functions of viral structures, antigenic determinants or epitopes. Physical, chemical and biological properties of Viruses. Nomenclature and classification of Viruses. Viral genetics: Scope, Genetic map and viral genome organization. Inactivation and preservation of Viruses. Purification of Viruses. Replication of Viruses and their effects on host at cellular and multi-cellular level. Molecular Virology: Definition and scope of Molecular Virology. Viral DNA and RNA, PCR, RT-PCR, Gel electrophoresis, Pulse-field gel electrophoresis, Recombinant DNA technology: Cloning and gene expression, Hybridization techniques, SDS-PAGE, Western blotting and Immuno-chemiluminescent assay. Bacteriophage. Epidemiology of Viral Infection. Resistance to Viral infection and immunity: Interference phenomenon and interferon. Viral vaccines and chemotherapy. Persistent Viral infection and slow Viruses.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Highlight on developmental history of veterinary cum medical	1

	microbiology	
2.	Microscopy-bright field, dark field, ultraviolet, fluorescent, phase contrast and electron microscope	1
3.	Microbiology of unicellular organisms and their classification	1
4.	Classification and nomenclature of bacteria, Identification of bacteria	1
5.	Bacterial and colonial morphology and structure/anatomy of bacteria	1
6.	Cell wall, capsule, nucleus, cytoplasmic inclusion, flagella, motility	2
7.	Endospores, sporulation, vegetative reproduction	1
8.	Bacterial stains, principles of Gram, acid fast, flagellar and capsular staining	1
9.	Cultivation (aerobic and anaerobic) of bacteria, nutritive requirement of bacteria	1
10.	Culture media, bacterial growth, growth curve, continuous culture, measurement of growth	1
11.	Bacterial pure culture, culture characteristic	1
12.	Sterilization, disinfection, factors influencing sterilization and disinfections	1
13.	Break in asepsis and defective sterilization, aseptic handling of sterilized materials. Life of sterile status, HACCP	1
14.	Energy relationship, sources of energy and catabolism	1
15.	Dissimilation of carbohydrates, proteins and fats	1
16.	Antibiotics, drug resistance and antimetabolites	1
17.	Bacterial genetics, Plasmid, mutation and variation associated with virulence	1
18.	Introduction, morphology, classification of fungi	1
19.	Growth, nutrition, reproduction of fungi	1
20	Pathogenic fungi	1
21	General properties of virus, morphology and electron microscopy	1
22	Classification, cultivation and replication of viruses	1
23	Viral genetics, cellular changes caused by viral infection, interference, interferon, inclusion bodies	1
24	Bacteriophage, viral proteins, nucleic acid and lipids	1
25	Viral haemagglutination, and antiviral therapy	1
26	Oncogenic and latent viruses	1
27	Introduction of dairy (Udder sanitation/sterilization, microbiology of milk), fish and food Microbiology	3
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Identification to the laboratory instruments and equipments	1
2.	Introduction of Lab and does and don't in lab	1
3.	Microscopy and micrometry (sizes and shapes of microorganisms)	1
4.	Sterilization (Autoclaving, Hot air oven, boiling, red hot) and disinfection	1
5.	Preparation of reagents and media plates (BHIA, MAC, BHI)	1
6.	Preparation of Blood agar, Antibiotic media	1
7.	Culture techniques and study of colony characteristics	1
8.	Aseptic technique and transfer of microorganisms	1
9.	Isolation and maintenance of pure culture	1
10.	Staining- Gram's, Acid-fast, capsular, spore	1
11.	Finding Colony Formation Unit (CFU) in liquid and food.	1
12.	Identification of bacteria through biochemical testing, motility test	1
13.	Antibiotic sensitivity test	1
14.	Slide preparation of fungi	1
15.	HA and HI	1
	Total	**15**

References

Buxton, A. and Frazer, G. 1977. Animal Microbiology, Vol. 1. Blackwell Scientific Publication.
Davis, B.D. 1980. Microbiology. Harper and Row Publication.

Freeman, BA. 1979. Burrows TextBook of Microbiology. 1st Edition. W.B. Saunders Company; Philadephia. London, Toronto.

Kumar, H.D. 2000. Molecular Biology. 2nd. Edition. Vikas Publishing House. Pvt. Ltd.

Marchant, I. A. and Packer, R.A. 1967.Veterinary Bacteriology and Virology. 7th Edition. The Lows state University Press, Ames, lowa, USA.

Course Code : LPM 204
Course Title: Bee, Pet Lab Animal Management
Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon Completion of this course students will able to recognize bee, pet and lab animals and their proper care and management.

Syllabus

Introduction to agriculture and its prospects in Nepal. Common bee races its morphology and anatomy. Management honey bee products and its extraction. Disease, insects and other enemies of honeybees. Introduction importance of pet animals in Nepal. Common breeds pet animals/birds (dogs/cats) Vices of pet animals and their control measures care and management of pet animals. Method of restraining and controlling of dog and cats. Selection of pup, habitat, food and feeding of pets. Common parasites and diseases with their control measures. Importance of laboratory animals. Care and housing standard of lab animals eg.mice, rats and guinea tigs etc.general consideration on feeding and nutritional requirements, important consideration in breeding of lab animals.Propphylactic measures against common disease of lab animals. Hygienic care and control parasites.

Course Breakdown

Theory

S.No	Topic	No. of Lectures
1.	Introduction of agriculture and its prospects in Nepal	1
2.	Common bee races, its morphology and anatomy	1
3.	Management-seasonal management of honey bees	1
4.	Honey bee products and its extraction	1
5.	Disease, insects and other enemies of honey bee and their control measures	1
6.	Introduction and importance of pet animals in Nepal	l
7.	Common breeds of pet animals (dogs, cats, etc) and birds	1
8.	Vices of pet animals and their control measure, restraining and controlling of pet animals	1

9.	Care and management, selection of pup, habitat, food and feeding of pet.	2
10.	Common diseases and parasites of pets with their control.	1
11.	Introduction and importance of lab animals.	1
12.	Care and housing system and space requirement for lab animals.	1
13.	Computation and compound of balanced diet for lab animals mainly Mice, rates, guinea pig and rabbit	1
14.	Prophylactic measure against common disease and hygienic care and control of parasites	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Anatomical and morphological stady of honey bee.	1
2.	Types of bee hives.	1
3.	Honey bee extraction.	1
4.	Bee forages	1
5.	Mites and insect pests of honeybee.	1
6.	Handling of pet animals for examination (dog/cats)	1
7.	Deticking and dewarming	1
8.	Detection of heat, mating, whelping (through film or real)	1
9.	Care of new bron (nail and tooth care)	1
10.	Administration of medicines.	1
11.	Identification of body parts and handling of lab animals	1
12.	Marking for identification of lab animals	1
13.	Selection of breeding stock of lab animals	1
14.	Balanced ration for lab animals	1
15.	Common disease and parasites of lab animals	1
	Total	**15**

References

Abrol, D.P. 1997 Bees and Beekeeping in India.
Kalyani publishers, New Delhi, India.
Chabrabarti amalandu, Dog care and management.
Prof.Dr.K.P.budras, Dr P.H .MC.carthy that my of dogs-an illustrated text.

Course Code : ANB 201
Course Title : Principles of Genetics and Animal Breeding
Credit Hours : 3(2+1) Full Marks : 75 Theory : 50 Practical : 25

Objectives

Upon the completion of this course, students will be able to understand basic principles and fundamentals of medallion, molecular population and quantitative genetics to understand application of animal breeding (selection and mating system)

Syllabus

Animal cell, gametogenesis, chromousomalstudy: Karyotyping chromosomal variation and abbretation. Mendalian genetics: Experiment principles and extension of Mendelian genetics (Gene action and interaction) linkage, crossing -over, recombination, gene mapping. DNA and its structure, replication, transcription and translation, gene regulation and expression. Population genetics: gene frequency, hardy and Weinberg law, causes of changing the gene and genotypic frequency and quantitative genetics: phenotypic variantion causes of variations, estimation and concept of heritability and repeatability, Concept of selection and mating system, traits of economic importance of different livestock species, estimation of different genetic parameters.
Practical: Problems related to theory topics, calculation of gene and genotypic frequency, linkage, crossing over etc.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Animal cell and cell division	2
2.	Gametogenesis	2
3.	Chromosomal study: karyotyping, chromosomal variation and abbretation	3
4.	Mendalian genetics: experiment, principal and extension	3
5.	Gene interaction and epistasis	2
6.	Linkage, crossing over, recombination and gene mapping	3
7.	DNA and its structure, DNA replication, transcription, translation and expression	3
8.	Proteins and Gene regulation	2
9.	Population genotypic frequency, hardy and Weinberg law, causes of changing gene and genetics frequency in the population	2
10.	Quantitative genetics: phenotypic variation, estimation and concept of	

	heritability and repeatability	3
11.	Concept of selection and mating systems	2
12.	Animal genetic resources and their conservation in Nepal	3
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1.	Demonstration of cell and cell division	1
2.	Calculation of linkage map, coincidence, interference	2
3.	Demonstration of DNA structure, DNA replication, transcription and Translation	2
4.	Calculation of gene and genotypic frequency: complete dominant, Incomplete dominant, sex linked gene, multiple genes, selection, mutation, migration	3
5.	Estimation of repeatability	2
6.	Estimation of heritability	2
7.	Estimation of selection parameters	2
8.	Estimation of heterosis	1
	Total	**15**

References

Strickberger, Genetics
Gardaner, Principle of Genetics
Suziki et.al.An Introduction to Genetics
Hutt, F.B.1982. Animal Genetics
Sunstand and Simmons, 2000.Principle of Genetics

Course Code: VPT 201
Course Title: General and Systemic Pharmacology
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of the course, student will be able to understand pharmacokinetics, pharmacodynamic properties of drugs, drugs acting on different system, and will be able to prepare drugs in pharmacy as per prescription.

Syllabus

Historical development branches and scope of Pharmacology, Sources and nature of drugs. Pharmacological terms and definitions. Principles of drug activity: Pharmacokinetics - Routes of drug administration, 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. Fundamentals of drug/screening and assay of drugs. Adverse drug reactions, drug interaction, drug- designing and development, bio prospecting of drugs. Introduction to biopharmaceutics and gene therapy. Drugs acting on digestive system: Stomachics, antacids and antiulcers, prokinetics, carminatives, antizymotics, emetics, antiemetics, purgatives, antidiarrhoeals, cholerectics and cholagogues. Rumen pharmacology.

Drugs acting on Cardiovascular system: cardiac glycosides, antiarrhythmic drugs, vasodilators and antihypertensive agents, haematinics, coagulants and anticoagulants. Drugs acting on respiratory system: Expectorants and antitussives, respiratory stimulants, bronchodilators and mucolytics. Drugs acting on urogenital system: Diuretics, urinary alkalizers, and acidifiers, fluid therapy, ecbolics and tocolytics.

Pharmacotherapeutics of hormones and vitamins.

Drugs acting on skin and mucous membranes: Emollients, demulcents and counter irritants. Bio-enhancers, Immunostimulants and immunosuppressants. New drugs and drug formulations.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1	Historical development, Branches and scope of Pharmacology, Pharmacological terms and definitions.	1

2	Sources and nature of drugs	1
3	Pharmacokinetics - Routes of drug administration, absorption, distribution, biotransformation and excretion of drugs.	4
4	Pharmacodynamics-Concept of drug and receptor, dose-response relationship, terms related to drug activity and factors modifying the drug effect and dosage.	4
5	Fundamentals of drugs screening and assay of drugs.	1
6	Adverse drug reactions, drug interaction, drug- designing and development, bio prospecting of drugs. Introduction to biopharmaceutics and gene therapy.	2
7	Drugs acting on digestive system: Stomachics, antacids and antiulcers, prokinetics, carminatives, antizymotics, emetics, antiemetics, purgatives, antidiarrhoeals, cholerectics and cholagogues. Rumen pharmacology.	4
8	Drugs acting on Cardiovascular system: cardiac glycosides, antiarrhythmic drugs, vasodilators and antihypertensive agents, haematinics, coagulants and anticoagulants.	4
9	Drugs acting on respiratory system: Expectorants and antitussives, respiratory stimulants, bronchodilators and mucolytics.	2
10	Drugs acting on urogenital system: Diuretics, urinary alkalizers, and acidifiers, fluid therapy, ecbolics and tocolytics.	2
11	Drugs acting on skin and mucous membranes: Emollients, demulcents and counter irritants.	2
12	Immunostimulants and immunosuppressants. New drugs and drug formulations.	1
13	Pharmacotherapeutics of hormones and vitamins.	2
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1	Pharmacy appliance, Principles of compounding and dispensing	1
2	Metrology: systems of weights and measures, pharmacy calculations. Pharmaceutical processes	2
3	Pharmaceutical dosage forms	1
4	Prescription writing, incompatibilities	1
5	Drug standards and regulations,	1

6	Compounding and dispensing of powders, ointments, ,	3
7	Mixtures, liniments, lotions, liquors	3
8	Tinctures, emulsions, and electuaries.	3
	Total	**30**

References

Brander, G.C., Pugh, D.N., Bywater, R.J. and Jenkins, W.L., 1991. Veterinary Applied Pharmacology and Therapeutics. Bailliere Tindal, London.

Gooodman Gilman A., Rali, T.W., Nies, A. S and Taylor P. (1992). The Pharmacological basis of Therapeutics, Mcgraw-Hill, Singapoore.

Richard H. Adams.2001. Veterinary Pharmacology and Therapeutics. 8th Edition. IOWA State University Press, USA.

Course Code : VPY 203
Course Title : Physiology III (Reproduction, Lactation and Endocrinology)
Credit Hours : 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

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

Syllabus

Endocrine system: general organization and methods of study; Hormones: definition, classification, general mode of action and regulation; Endocrine physiology of hypothalamus, hypophysis, thyroid, parathyroid, adrenal, pancreas, pineal body and thymus glands, local hormones, Interrelation of endocrine and nervous system, interrelation of genetics and endocrinology. Male and female reproductive organs: puberty sexual maturity, role of hormones on sexual development, oestrus, patterns of oestrus cycle in different animals and birds. Oogenesis, follicular development, ovulation, fertilization, pregnancy and physiology of parturition, Functional anatomy of male reproductive organs; Spermatogenesis, Endocrine physiology of testes; thermoregulation of testes, sexual behavior, avian reproduction. Mammary gland: functional organization, structure and development; endocrine control of initiation and maintenance of lactation; colostrum; composition of milk.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Endocrine system: general organization and method of study	1
2.	Hormones: definition, classification, general mode of action and regulation	2
3.	Endocrine physiology of hypothalamus, Hypophysis Thyroid, Parathtroid, Adrenal, Pancreas, Pineal body, Thymus glands	2
4.	Local hormones: prostaglandins, hormones of gastrointestinal tract	1
5.	Interrelation of endocrine and nervous system	2
6.	Interrelation of genetics and endocrinology	2
7.	Puberty and sexual maturity	1
8.	Role of hormones on sexual development	2
9.	Oestrus, patterns of oestrus cycle in different animals and birds	2
10.	Oogenesis, follicular development, ovulation, fertilization	2
11.	Pregnancy and physiology of parturition	2

12.	Endocrine physiology of ovary, Hormones present in biological fluids during pregnancy and their use for the diagnosis of pregnancy	2
13.	Functional anatomy of male reproductive organs	1
14	Spermatogenesis	1
16	Endocrine physiology of testes	1
17	Thermoregulation of testes, sexual behavior	1
19	Avian reproduction	1
20	Mammary gland: Functional organization, structure and development	2
21	Endocrine control of initiation and maintenance of lactation	1
22	Colostrum, composition of milk	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Study of endocrine organs and reproductive organs of mammals and birds	1
2.	Rectal palpation of reproductive organs,Determination of oestrus	2
3.	Demonstration of let down of milk	1
4	Parturition stages, Demonstration of parturition in various animals (live or video film)	2
5	Effect of heat and cold on scrotum	1
6	Observation of sperm motility	1
7	Sperm count, live and dead sperm count	2
8	Pregnancy diagnosis test	1
9	Determination of lactose in milk	2
10	Estimation of progesterone and oestrogen by RIA and ELISA techniques	2
	Total	**15**

References

Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.

Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson.

Ganong, W.F. 1991. Review of Medical Physiology,15th Ed., Prentice- Hall International Inc.

Arthur C. Guyton Text Book of Medical Physiology

Course Code: VPA 202
Course Title: Parasitology II (Helminthology and Leeches)
Credit Hours: 3(2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

The main objective of this course is to enable students to identify the trematodes, nematodes, acanthocephalan and leeches parasites and their eggs their larval stages and their control measures.

Syllabus

General description of trematodes, nematode, acanthocephala, leeches which affected animals and birds. Classification and characteristics of Platyhelminthes, Nemathelminthes, Acanthocephala and annelids. Salient morphological features of diagnostic importance, life cycle, mode of transmission, pathogenesis, epidemiology, diagnosis, treatment and control measures of following helminthes of animals and birds.

Trematodes: Liver flukes (Dicrocoelium, Fasciola and Opisthorchis), intestinal flukes (Fasciolopsis), blood flukes (Schistosoma i.e., S. nasalis and other schistosomiasis, and Ornithobilharzia), Amphistomes/immature amphistomiasis (Paramphistomum, Gigantocotyl, Gastrothylax, Cotylophoron, Gastrodiscus, Gastrodiscoides, Pseudodiscus), Lung flukes (Paragonimus) and Oviduct flukes (Prosthogonimus) their importance in the diagnosis.

Nematodes: Ascaris, Parascaris, Toxascaris, Ascaridia, Heterakis and Oxyuris, Bursate Worms (Strongyloides, Strongyles, Chabartia, Syngamus, Oesophagostomum), Kidney worms (Stephanurus, Dioctophyma), Hook worms (Ancylostoma, Agriostomum, Bunostomum, Trichostrongylus, Ostertagia, Cooperia, Nematodirus). Stomach worms (Haemonchus, Mecistocirus), Tissue roundworms (Habronema, Thelazia, Spirocerca, Gongylonema, Gnathostoma), Filarial worm (Dirofilaria, Parafilaria, Onchocerca, Setaria, Stephanofilaria), Lung worms (Dictyocaulus, Mullerius and Protostrongylus), guinea worms (Dracunculus). Spiny headed worms (Acanthocephala and Macracanthorhynchus), Annelids (Hirudinaria and Haemadipsa).
International regulations for control of different helminthic diseases.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Important helminth parasites of domestic animals and birds	1

	General description	
2	Classification and characteristics of helminth parasites a. Platyhelminthes, b. Nemathelminthes, c. Acanthocephala d. Annelida	1
3	Trematode parasites: a. Liver flukes- Fasciola, Dicrocoelium and Opisthorchis b. Intestinal fluke- Fasciolopsis	2 1
4	Blood flukes (Schistosoma nasalis, S. bovis, S. spandale, S. indica, S. incognitum) and cercarial dermatitis due to schistosoma and Ornithobilharzia.	2
5	Amphistomes/immature amphistomiasis (Paramphistomum, Cotylophoron, Gigantocotyle, Gastrothylax, Gastrodiscus, Gastrodiscoides, Pseudodiscus).	2
6	Lung fluke- Paragonimus Oviduct fluke- Prothogonimus	1
7.	Nematode parasites Ascaris, Parascaris, Toxocara, Toxascaris, Ascaridia, Oxyuris and Heterakis	3
8	Bursate worms (Strongyloides, Strongyles, Chabartia, Syngamus, Oesophagostomum	3
9	Kidney worms- Stephanurus and Dioctophyma	1
10	Hook worms- Ancylostoma, Agriostomum, Bunostomum, Trichostrongylus, Ostertagia, Cooperia, Capillaria, and Nematodirus.	3
11	Stomach worms- Haemonchus, Ollulanus and Mecistocirus	3
12	Tissue round worms- Trichinella, Habronema, Thelazia, Spirocerca and Gongylonema	3
13	Filarial worms- Dirofilaria, Setaria, Onchocerca	2
14	Lung worms- Dictyocaulus, Protostrongylus	1
15	Guinea worm- Dracunculus	1
	Total	**30**

Practical

S.No.	Topic	No.of Lectures
1	Methods of collection, fixation, preservation, mounting of trematode, nematode, and acanthocephala parasites.	2
2	Identification of important trematodes, nematodes, acanthocephala and annelids parasites.	2
3	Study of morphological characters of adults and their larval	1

	stages and damages caused by them.	
4	Examination of Faecal smples for eggs of cestode, trematode, nematodes and acanthocephalan.	2
5	Demonstration of parasitic culture, sporulation and detection of larvae of parasites with Bearmann's apparatus	2
6	Demonstration of the lifecycle and development of the types, species of Trematode, Nematode, Acanthocephala and leeches parasites.	2
7	Visit the slaughter house or abattoir for collection of parasites.	1
8	Collection of important snail, their identification and preservation.	1
9	Measure the size of parasite and its organs and eggs with the help of micrometer	2
	Total	**15**

References

Levine, N. D. 1983. Text Book of Veterinary Parasitology. CBS Publishers and Distributors (1st Indian Edition).

Soulsby, E. J. L. 1986. Helminths, Arthropods and Protozoa of Domesticated Animals. The English Language Book Society and Bailliere Tindall and Cassell Ltd. (7th Edition).

Urguhart, G. M. 1996. Veterinary Parasitology Blackwell Science Ltd. (2nd Edition).

Course Code: VPT 202
Course Title: Veterinary Neuropharmacology
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Upon the completion of the course, student will be able to understand the drugs acting on the CNS, autonomic nervous system, and peripheral nervous system.

Syllabus

Drugs acting on autonomic nervous system: Neurohumoral transmission, adrenoceptors agonists and antagonists, adrenergic- neuron blockers, cholinoceptors agonists and antagonists, ganglionic stimulants and blockers.

Autacoids: Histamine and antihistamine agents, 5-Hydroxytryptamine and its antagonists, prostaglandins, angiotensin and bradykinin.

Drugs acting on central nervous system (CNS): Pharmacology of neurotransmitters, History of general anaesthetics and theories of anaesthesia. Inhalent, intravenous and dissociative anaesthetics; hypnotics and sedatives; tranquilizers, psychotropic drugs, anticonvulsants, opioid analgesic, nonsteroidal anti-inflammatory drugs, analeptics and other CNS stimulants, central muscle relaxants. Drugs acting on somatic nervous system: Local anaesthetics and peripheral muscle relaxants. New drugs and drug formulations.

Course Breakdown

Theory

S. No	Topic	No.of Lectures
1	Drugs acting on autonomic nervous system:	
	Neurohumoral transmission,	1
	adrenoceptors agonists and antagonists,	2
	adrenergic- neuron blockers,	1
	cholinoceptors agonists and antagonists,	2
	ganglionic stimulants and blockers.	1
2	Autacoids:	
	Histamine and antihistamine agents,	2
	5-Hydroxytryptamine and its antagonists,	1
	prostaglandins, angiotensin and bradykinin.	2
3	Drugs acting on central nervous system (CNS):	

	Pharmacology of neurotransmitters	1
	History of general anaesthetics	1
	theories of anaesthesia.	1
	Inhalent, intravenous and dissociative anaesthetics;	4
	hypnotics and sedatives;	1
	tranquilizers, psychotropic drugs,	1
	anticonvulsants,	1
	opioid analgesic,	1
	nonsteroidal anti-inflammatory drugs, analeptics and other	2
	CNS stimulants, central muscle relaxants.	2
	Drugs acting on somatic nervous system: Local anaesthetics and peripheral muscle relaxants.	2
	New drugs and drug formulations.	
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Demonstration of the effect of CNS depressants, analgesics,	3
2	CNS stimulants,	1
3	Muscle relaxants	1
4	Anticonvulsants,	1
5	Local anaesthetics in laboratory animals	2
6	Demonstration of the action of adrenergic and cholinergic agonists and antagonists on isolated and intact preparations of the animals	5
7	Alternate use of animals as model for demonstration	2
	Total	**15**

References

Brander, G.C., Pugh, D.N., Bywater, R.J. and Jenkins, W.L.1991. Veterinary Applied Pharmacology and Therapeutics. Bailliere Tindal, London.

Gooodman Gilman A., Rali, T.W., Nies, A. S and Taylor P. 1992. The Pharmacological Basis of Therapeutics, Mcgraw-Hill, Singapoore.

Richard H. Adams.2001. Veterinary Pharmacology and Therapeutics. 8th Edition. IOWA State University Press, USA.

Course Code: VMI 202
Course Title: Microbiology II (Veterinary Immunology and Serology)
Credit Hours: 3(2+1) Full marks 75 Theory: 50 Practical: 25

Objectives

This course will enable students to describe different classes of antigen and antibodies, immune response system, hypersensitivity, autoimmunity and immunoprophylaxix.

Syllabus

History and modern concepts of Immunology and Serology. Organs and cells associated with immunity. Definition and types of immunity and resistance. General features and mechanism of immune response. Antigen: Definition, composition, properties, types and functions. Processing of antigen and their relationship with Major Histo-compatibility Complex (MHC) molecules. Response of B and T cell to antigen. Antigen binding sites and their genetics. Antibody: Definition, properties, types and function. Theory of antibody (Ab) production. Antigen-antibody reaction and their consequences. Chemical Mediators of the Immune system. Complement system and their role in immunity. Induction of immune response and immune effector mechanisms. Hypersensitivity and immune tolerance: Different types of hypersensitivity, factors responsible for immune tolerance. Principles of different serological tests: Agglutination test, precipitation test, hemagglutination activity, Hemagglutination–inhibition, Passive hemagglutination tests, Complement fixation test, Fluorescent antibody technique (FAT), Radioimmunoassay, Immunohistochemistry, Enzyme linked immunosorbent assay (ELISA), Immunodiffusion test, Serum neutralization test (SNT), Focus inhibition test (FIT), counter immuno-electrophoresis and Protection test (PT).

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	History of Immunology	1
2.	Type of Immunity: Specific and nonspecific immunity	1
3.	Factors contributing immunity and factors that influences immunity	1
4.	Phase cytosis	1
5.	What Happens when an organism comes in contact with the body	1
6.	Antigenicity, Immunogenicity and Antibody	1
7.	Epitopes, Haptens, Polyclonal and monoclonal antibodies	1
8.	Adjuvants, mechanism of action and its types	1
9.	Immunodeficiency, Immunotolerance, immune competent, Immune	1

	compromised an immune suppressant	
10.	General immunoglobulin structure	1
11.	Structure and function of specific immunoglobulin	1
12.	The lymphoid system, cells involved in the immune response	1
13.	Events in the induction of immune response	1
14.	Mechanism of antibody production	1
15.	Theories of antibody production	1
16.	Complement system and its Classification	1
17.	Alternative pathways of complement system	1
18.	Agglutination reaction; precipitation; immunodiffusion	1
19.	Haemagglutination and Hemagglutination inhibition test	1
20	Complement fixation test	1
21	ELISA	1
22	Major histocompatability complex	1
23	Blood groups, typing and transfusion	1
24	Hypersensitivity, factors affecting and steps involved in Hypersensitivity	1
25	Type I, Type II, Type III	1
26	Type IV, Type V, Type VI	1
27	Immunization	1
28	Type of vaccines	1
29	Autoimmunity/autoimmune disease	1
30	Recent development in immunology	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Methods of injections in animals	1
2.	Methods of staining blood from laboratory animals	1
3.	Preparation of bacterins for immunization	1
4.	Preparation of immune serum for agglutination and precipitation test	1
5.	Preparation of one percent Chicken RBC and 8HA unit of antigen	1
6.	Passive (indirect) haemagglutinations test	1
7.	Hemagglutination inhibition test	1
8.	Preparation of Phosphate Buffer Saline (PBS) and anticoagulant solution	1
9.	Precipitation by gel diffusion test	1
10.	Complement fixation test	1

11.	ELISA	1
12.	Demonstration of Anaphylactic shock in a guinea pig	1
13.	Demonstration of tuberculin reaction	1
14.	Human blood group typing	1
15.	Study of commercial available different type of vaccines	1
	Total	**15**

References

Buxton, A. and Frazer, G. 1977. Animal Microbiology, Vol. 1. Blackwell Scientific Publication.

Dale, J.W. 1998. Molecular Genetics of Bacteria. 3rd Edition. John Wiley and Sons, Inc. 605, Third Avenue, New York.

Freeman, BA. 1979.Burrows TextBook of Microbiology. 1st Edition. W.B. Saunders Company; Philadephia. London, Toronto.

Roit. I.M. 1980. Essential Immunology. Blackwell Scientific Publication.

Smith, G.R.Ed. 1984. Topley and Wilson's Principles of Bacteriology, Virology and Immunity, Vol, 1.2 and 3. Arnold Heinemann.

Course Code : VPP 202
Course Title : Systemic Pathology
Credit Hours : 3(2+1) Full Marks: 75 Theory:50 Practicals:25

Objectives

Upon completion of this course, student will be able to use principles learned in general pathology to understand the unique ways each system reacts to injury and will be able to understand the pathological processes occurring in different systems of the body and correlate them with specific disease with emphasis on diseases of importance in Nepal. Students will be able to continue learning and using the language of medicine, in particular the appropriate terminology in pathology.

Syllabus

Pathology of Cardiovascular system, Hemopoietic and immune system, Respiratory system, Digestive System, Urinary system, Genital system, Nervous system, Musculoskeletal system, Sense organs, and Integumentery system with appendages

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Cardiovascular system- Developmental defects	1
2	Disease of pericardium, myocardium and endocardium	1
3	Disease of artries and vein	1
4	Disease of lymph node and lymphatic	1
5	Conditions affecting blood	1
6	Coditions affecting spleen and bone marrow	1
7	Anemia	1
8	Primary immunodeficiency disease	1
9	Secondary immunodeficiency disease	1
10	Autoimmunity	1
11	Respiratory system- Developmental malformation	1
12	Disease of nasal cavities, larynx and bronchi	1
13	Disease of lung and pleura	1
14	Disease of mouth and pharynx and esophagus	1
15	disease of stomach and forestomach	1
16	Disease of intestine and peritonium	1
17	Disease of liver and pancrease	1
18	Disease of kidney	1

19	Disease of bladder, ureter, and urethra	1
20	Disease of male genital system and accessory sex glands	1
21	Disease of female genital system	1
22	Disease of mammary gland	1
23	Terminology and disesae of spinal cord	1
24	Disease of brain and meninges	1
25	Disease of muscle	1
26	Disease of bones and ligaments	1
27	Disesae of eyes	1
28	Disease of ears	1
29	Disease of skin	1
30	Disease of hoof, nails and horns	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Post-mortem examination of large animals	1
2	Post-mortem examination of small animals	1
3	Post-mortem examination of wild animals and birds	1
4	Post-mortem techniques of veterolegal cases and report writing	1
5	Collection and dispatch techniques of morbid materials to forensic laboratory	1
6	Study of histopathological slides of cardiovascular, Hemopoietic and immune system	1
7	Study of histopathological slides of digestive and respiratory system	1
8	Study of histopathological slides of urinary and genital system	1
9	Study of histopathological slides of musculoskeletal and nervous system and skin	1
10	Urinanalysis – sample collection, storage, gross appearance, specific gravity determination and dipstick examination and interpretation	1
11	Urinalysis- urine sediment technique, examination and interpretation	1
12	Hematology – collection of blood from different animals and preservation	1
13	Hematology- determination of TLC, DLC, TEC, Hb, PCV, ESR, TP and fibrinogen	1
14	Skin scraping technique and interpretation	1
15	Collection of CSF and interpretatioon	1
	Total	**15**

References

Jaap Van Dijk, Erik Gruys, Johan Mouwen,2006. Color Atlas of Veterinary Pathology 2006. ISBN-13: 978-0-7020-2758-1 Saunders

Jones, Hunt, and King. Williams & Wilkins. 1997. Veterinary Pathology., 6th Ed.

Jubb, Kennedy. 2007. Palmer Pathology of Domestic Animals. Academic Press, 5th Ed., 2007.

Mc Gavin, Zachary.2011. Pathologic Basis of Veterinary Disease., Elsevier, 5th Ed.

Meuten DJ . 2003.Tumors in Domestic Animals.. Iowa State Press, 4th Ed., 2003.

Thomsons' Special Veterinary Pathology .2005. Carlton, McGavin and Zachary. Mosby Publications

Course Code : ANU 204
Course Title : Evaluation of Feed Stuffs
Credit Hours : 2 (1+1) Full Marks : 50 Theory : 25 Practical : 25

Objectives

Upon the successful completion of the course, students will be able to recogrize good quality of feedotuffes, characterize feedstuffs chemically and biologically.

Syllabus

Introduction, scope, importance, history and value of feedstuffs analysis and quality control. Methods, advantages and disadvantages of chemical analysis ,chemical composition and nutritive value,antinutiritional factors,physical and chemical characterization of feeding stuffs, feed additives supplements and adultirants. Specitication feed ingredients and mixed feeds. Factors affecting the storability. In vitro and vivo characterization of feedstuffs.

Course Breakdown

Theory

S .No.	Topic	No of Lectures
1.	Introduction, Importance, scope, and value of feedstuffs of analysis	1
2.	History of feedstuffs analysis	1
3	Methods, advantages and advantages of feedstuff analysis	1
4.	Characteristics of feedstuffs	1
5.	Chemical composition of feeding stuffs	1
6.	Difference between chemical composition and nutritional value of Feedstuffs	1
7.	Ant nutritional factors present in feedingstuffs	1
8.	Physical, (visual, colour, odour and textture) and chemical evaluation of feeding stuffs	1
9.	Characterization of feed additives, supplements and adveterants	1
10.	Quality control of mixed feeds	1
11.	Specification of feed ingredients and mixed feed	1
12.	Factors affecting the storability feed ingredients and mixed feed	1
13.	Methods of digestibility determination	2
14.	Differences, methoods, advantages and disadvantages between in virto and in vivo characterization of feedstuff	1
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1.	Identification of feeds ingredients and mixed feeds	1
2.	Identification and classification of feed additives and supplements	1
3.	Physical, visual, odom, colom, texture and structure characterization and feed Ingredients	2
4.	Proximate analysis of feed ingredients and mixed feed	3
5.	Determination of ADF , NDF and lignin (Vastest method of CF Determination)	3
6.	Determination of Ca and P in feedstaffs.	2
7.	Determination of coefficant of digestibility of feed ingredients and mixed feeds	3
	Total	**15**

References

AOAC, IOLO.Association of Analysis Chemists, Washington Dc, USA

Reddy, D.V 2001.Applied Nutrition: LIvestock, POultry.Human, Pet, Rabbit and Laboratory Animal

NUtrition, Oxford and IBH Piblishing, New Delhi.

Course Code : ANU 205
Course Title : Applied Animals Nutration II (non- ruminant)
Credit Hours : 2(1+1) Full Marks : 50 Theory : 25 Practical : 25

Objectives

Upon the completion of the course students will be able to determine nutrient requirements and feed non- ruminant farm animals and Avian species.

Syllabus

Introduction scope important,nutrat requirements and for feeds poultry (broilers layer,ducks,turkeys,quails,ostrich,). Nutrient requirements and feeding of swine,rabbit and squires feed processing.compounding of diets for poultry,swine,rabbits and Equine,preparation and mixing of different types of diets for non-ruminants(poultry,swine,horse, and rabbits),feed additives used in non-ruminant formulation.

Course Breakdown

Theory

S. No.	Topic	No. of Lectures
1.	Introduction Scope and important of non-ruminants nutrition	1
2.	Poultry nutration, different species of poultry bird	1
3.	Nutrient requirements and feeding of broilers chicken	2
4.	Nutrient requirements and feeding of layers chicken	3
5.	Nutrient requirements feeding of ducks and quails	1
6.	Nutrient requirements feeding of turkey and ostrich	1
7.	Feeding of milk replaces to early wearer and orphan piglets	1
8.	Nutrient requirements and feeding of lactating sow.	
9.	Feeding and breeding stocks(boars, sow, gilt)	1
10.	Feeding of Enquire	2
11.	Feeding of rabbits	1
12.	Feed additives used in non-ruminant feeding.	1
	Total	**15**

Practical

S.No.	Topic	No. of Practicals
1.	Identification and classification of feed ingredient and	

	mixed feeds for non-ruminants .	1
2.	Feed formulation for broiler chicken	2
3.	Feed formulation for layer chickens	2
4.	Preparation of milk replaces for piglets	1
5.	Formulation for swine	2
6.	Concentrate feed preparation and mixing	2
7.	Evaluation of feedstuffs for non-ruminant	3
8.	Formulation Rabbits	1
9.	Types of feeds for rabbits and horses	1
	Total	**15**

References

MC Donald,P.R..A Edwards and I.F.D. Green halgh 1987.Animed Nutrition.ELBS /Longman Publication [4 th Edition]

Nutrient requirements for poultry 2010, National Research courcil, Washington D.C.

Nutrient requirement for swine.2011.National Research council. Washington D.C.

Course Code : ANB 202
Course Title : Animal Breeding and Biotechnology
Credit Hours : 2(2+0) Full Marks: 50 Theory: 50 Practical: 0

Objectives

Upon completion of this course, students will be able to understand basic principle and fundamentals of molecular genetics to understand basic principles and fundamentals of biotechnology for genetic improvement of livestock to understand application of biotechnology in animal breeding.

Syllabus

Basic molecular biology, isolation, handling radio- labeling of DNA and RNA. Nucleic Acid hybridization, gel electrophoresis and DNA sequencing, restriction and DNA modifying enzyme. The biology of genetic engineering. Cloning selection, screening and analysis of recombinant genetic engineering in action: Analysis of gene structure and function, making proteins, transgenic animals. Molecular breeding approaches for genetic improvement of domestic animals. Recent advances in AI, ET, NT.Manippulation of genetic constitution, gene transformation, transgenic animal production and its role in genetic improvement. Genetic principle of diseases resistance and gene therapy. Animal biotechnology in Nepal and genetic progress achieved through biotechnological approaches in anima.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Introducation of basic molecular biology	1
2.	Isolation of DNA and RNA, radiolabelling of nucleic acids	2
3.	Nucleic acid hybridization, Gel electrophoresis,	2
4.	DNA sequencing	1
5.	Restriction enzymes, DNA modifying enzymes and DNA ligase	2
6.	Host cell types, plasmid, bacteriophage and other vectors,	2
7.	Cloning strategies: cloning from mRNA, genomic DNA	2
8.	Expression of cloned genes	1
9.	The polymerase chain reaction	1
10.	Selection screening and analysis of recombinants	1
11.	Analysis of gene structure and function, making proteins	1
12.	Transformation of genes	1

13.	Molecular breeding approaches in domestic animals	2
14.	Recent advances in AI, ET, NT.	2
15.	Transgenic animal production and its role in genetic improvement	2
16.	Genetic principle of disease resistance and gene therapy	2
17.	Animal biotechnology in Nepal	3
18.	Genetic progress achieved through biotechnological approaches	2
	Total	**30**

References

Stent and Calendar 1986.Molecular Genetics
Nicholl 1994.An introduction to genetic engeneering
Sunstand and Simmons, 2000.principle of Genetics.

Course Code: AQU 201
Course Title: Principles of Aquaculture
Credit Hours: 2 (1+1) **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives

Upon the completion of the course, the students will be able to explain the characteristics of cultivable and cultivated fish species, principles and practices of culture systems, various management required, and disease control.

Syllabus

Definition and biological characteristics; water quality management; pond management; fish farming systems; fish breeding, nursing and rearing; common fish diseases and parasites.

Course Breakdown

Theory

S.No	Topic	No.of Lectures
1.	**Introduction:** Definition of fish, fishery and aquaculture, General characteristics of fish, desirable characters of fish for culture, Importance of fish.	1 2
2.	**Biology of cultivated fish species:** Morphological characters, feeding habits, growth rate and reproductive behavior of Common carp, Chinese carps, Indigenous major carps, Tilapia, Trout, Catfishes, Sahar, Silver barb and Freshwater prawn.	2
3.	**Water quality management:** Physical parameters – Temperature and Turbidity; Chemical parameters - DO and pH; Biological parameters - Plankton	3 2
4.	**Pond management:** Site selection for pond construction, Liming, fertilization, Feed and Feeding, Aquatic weeds and Predators control	3
5.	**Fish farming systems (FFS):** Introduction; Classification of FFS on the basis of intensity, enclosure, fish species and integration	2
6.	**Fish breeding:** Basic principles of fish breeding; Breeding of common carp, Chinese carps and Indigenous major carps, Fish seed rearing and transportation	
7.	**Common fish diseases and parasites:** Introduction, causal organisms, symptoms and control measures of Saprolegniasis, Tail rot/fin rot, White spot disease, Dactylogyrosis, Argulosis; and Asphyxiation	
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1	Visit of a fish farm	1
2	Morphology of cultivated fishes of Nepal	1
3	Anatomy of fish (internal organs - alimentary canal, gills, gonads)	1
4	Pond types and measurements of a typical pond	1
5	Pond liming and fertilization	1
6	Water quality measurements (temperature, transparency, DO and pH)	1
7	Feed formulation and Feeding	1
8	Study of different fish farming system	1
9	Common carp breeding	3
10	Study of fishing gears and pond netting	1
11	Examination of skin and gills	1
12	Identification of common drugs and chemicals used in fish health management	1
13	Lab wrap up	1
	Total	**15**

References

Augusty, K.T. 1979. Fish Farming in Nepal. Archana Printers & Publishers, Kottayam 29, India.

ICAR. 2006. Handbook of Fisheries and Aquaculture. Indian Council of Agricultural Research (ICAR), New Delhi.

Jha, D.K. 1991. Laboratory Manual of Fish Disease. Tribhuvan University, IAAS, Rampur

Jhingran, V.G. and R.S.V. Pullin. 1985. A Hatchery Manual for the common, Chinease and Indian Major Carps. Asian Development Bank, ICLARM, Manila, Philippines.

NACA. 1989. Integrated Fish Farming in China Technical Manual 7. A World Food Day Publication of the Network of Aquaculture Centre in Asia and the Pacific, Bangkok Thailand.

Shrestha, M.K. and N.P. Pandit. 2012. A Text Book of Principles of Aquaculture (Second Edition). Aquaculture Department, Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.

Shrestha T.K. and D.K. Jha. 1993. Introduction to Fish Culture. Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.

Woynarovich, E. and L. Horvath. 1984. The Artificial Propagation of Warm Water Finfishes, A Manual for Extension.

Course Code: VPT 303
Course Title: Veterinary Chemotherapy
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

The main objective of this course is to enable students to understand about antibiotics, antibacterials, antifungal, anthelmintics, antiprotozoans, antineoplastic, ectoparacidals hormones and indigenous drugs.

Syllabus

Antibacterial agents: Classification, general principles in antibacterial chemotherapy, antibacterial resistance. Sulphonamides and their combination with diaminopyrimidines, sulfones, nitrofurans, nalidixic acid and fluoroquinolones.

Antibiotics: Penicillins and cephalopsorins, aminoglycosides, tetracyclines, chloramphenicol, macrolides, polypeptides. Miscellaneous agents: methenamine, bacitracin. Rifampin. novobiocin, viginamycin, lincosamides and vancomycin.

Antifungal agents: Topical and systemic agents including anti-fungal antibiotics.
Anthelmintics: Drugs used against cestodes, trematodes, nematodes, drug resistance, broadspectrum anthelmintics.

Antiprotozoal agents: Drugs used in trypanosomosis, theileriosis, babesiosis, coccidiosis, amoebiosis, giardiosis and trichomonosis.

Ectoparasiticides, Antiviral and anticancer agents. Antiseptics and disinfectants. Growth promoters. Common indigenous drugs of plant origin with proven pharmacological and therapeutic efficacies in various animal ailments.

New drugs and drug formulations. Therapeutic drug monitoring.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1	Antibacterial agents: general principles in antibacterial chemotherapy,	1

	antibacterial resistance.	1
	Sulphonamides and their combination with diaminopyrimidines, sulfones, nitrofurans,	2
	nalidixic acid and fluoroquinolones	2
	Penicillins and cephalopsorins,	3
	aminoglycosides,	2
	tetracyclines,	2
	chloramphenicol,	1
	macrolides, polypeptides.	1
2	Miscellaneous agents: methenamine, bacitracin. Rifampin. novobiocin, virginamycin, lincosamides and vancomycin.	2
3	Antifungal agents: Topical and systemic agents including anti-fungal antibiotics.	2
4	Anthelmintics: Drugs used against cestodes, trematodes, nematodes, drug resistance, broadspectrum anthelmintics.	3
5	Antiprotozoal agents: Drugs used in trypanosomosis, theileriosis, babesiosis, coccidiosis, amoebiosis, giardiosis and trichomonosis.	2
6	Ectoparasiticides,	1
7	Antiviral and anticancer agents.	1
8	Antiseptics and disinfectants	1
9	Growth promoters. Common indigenous drugs of plant origin with proven pharmacological and therapeutic efficacies in various animal ailments.	1
10	New drugs and drug formulations; Therapeutic drug monitoring	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Bacterial sensitivity test for different chemotherapeutic agents by disc diffusion method	2
2.	Preparation and formulation of indigenous drugs, their pharmacological properties and usages	2

3.	Study of source, physical characteristic, composition of commonly used drugs and their clinical use	4
4.	Monitoring of drug-plasma concentration and dose-response curve	4
5	Preparation of Pot. Permanganate solution, lugol`s iodine, gentian, violet solution, Preparation of boric acid ointment, zinc oxide ointment, ointment of salicylic acid with benzoic acid	3
	Total	**15**

References

Prescott, J.F., Baggot, J.D. and Walker, R.D., 2005. Antimicrobial Therapy in Veterinary Medicine. Blackwell Scientific Publications, IOWA, USA.

Rang, H.P., Dale, M.M., J.M. and Moore, P.K., 2003. Pharmacology, 5th Edition, Churchill Livingstone, Edinburgh, UK.

Tripathi, K.D., 2003. Essentials of Medical Pharmacology, Essentials of Medical Pharmacology, Jaypee brothers Medical Publishers (P) Ltd., New Delhi.

Course Code: VPY 304
Course Title: Physiology IV (Growth, Environment and Climatology)
Credit Hours: 2 (1+1) **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives

Upon the completion of this course student will be able to understand physiology of growth and physical relation to environment and climatology.

Syllabus

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

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Animal ecology	2
2.	Physiology, regulation of growth, factors affecting efficiency of growth	3
3.	Clinical effects on growth and production	2
4	Physical reaction to environmental changes, physiology of behavior	2
5	Climatology- various parameters and their importance	2
6	Reaction of animal to different environmental variation, viz. temperature and fever; central control of heat regulation	2
7	Temperature regulation in birds	2
	Total	**15**

Practical

S. No.	Topic	No.of Practicals
1.	Measures and measurements of growth in various species	2
2.	Climatic changes related to environmental physiology	3
3.	Climatology- instruments and equipments used in climatology, meteriological assessments	3
	Total	**15**

References

Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.

Ganong, W.F. 1991. Review of Medical Physiology,15th Ed., Prentice- Hall International Inc.

Course Code: VPH 301
Course Title: Environmental Hygiene
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

The main objective of this course is to teach the students about the sources of contamination of water, air pollution, sanitation and prevention of air and water borne diseases in animals and man.

Syllabus

Sources of water supply and their qualities, Physical, chemical, microbiological and biological evaluation of water, Sources of contamination of water and their prevention, Purification and sanitization of water, Sources of air pollution within animal houses and its effect on animal health and production Ventilation and ventilation systems within animal houses and specialized laboratories, Bacteriology of water and air, Disposal of sewage and farm refuses, Health implications of farm wastes, Sanitation and disinfection of animal houses, Methods of prevention and control of air and water borne diseases of man and animals, Atmospheric pollution and methods of control, Farm waste recycling

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Sources of water supply and their qualities,	1
2	Physical, chemical, microbiological and biological evaluation of water,	1
3	Sources of contamination of water and their prevention,	1
4	Purification and sanitization of water,	1
5	Sources of air pollution within animal houses and its effect on animal health and production	1
6	Sources of air pollution within animal houses and its effect on animal health and production	1
7	Bacteriology of water and air,	2
8	Disposal of sewage and farm refuses, Health implications of farm wastes,	2
9	Health implications of farm wastes,	1
10	Methods of prevention and control of air and water borne diseases of man and animals,	2

11	Atmospheric pollution and methods of control	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Sampling of water for sanitary examination,	1
2	Physical examination of water, estimation of colour, turbidity, total hardness, solids, alkalinity and acidity of water	3
3	Chemical and Microbiological evaluation of water quality,	3
4	Disinfection of animal houses	1
5	Determination of the efficacy of disinfectants,	2
6	Demonstration of water purification system	1
7	Carcasses disposal methods	1
8	Demonstration of various ventiliation systems in animal houses.	1
9	Visit to local polluted sites and documentation of local environmental problems.	1
10	Visit of nearest waste disposal and purification plant.	1
	Total	**15**

References

Park K. Text Book of Preventive and Social Medicine

Ray,M. Environmental Pollution: Impact of technology on Quality of life

Philp R.B. Environmental Hazards and Human Health

Sherikar, A.T., Bachhil, V.N. and D.C. Thapliyal (Ed.). 2004. TextBook of Elements of Veterinary Public Health. ICAR, New Delhi. [ISBN : 81-7164-024-9].

Course Code: ANU 306
Course Title: Applied Human Nutrition
Credit Hours: 2 (2+0) Full Marks: 50 Theory: 50 Practical: 0

Objectives

Upon the completion of the course students will be able to recognize nutrient deficiency of human nutrient requirements and health of humans. Also they will be able to know the Functions of Nutrients.

Syllabus

Nutrition and human health: Human health needs major Nepalese health problems; Nutritional guides for health promotion, Nutrition guidelines for prevention or health diseases and Cancer, Relation of food and nutrition to health. Food classification, bioactive physiochemical in food saw their mechanism of action to promote human health carboliydrate. Classification, dictory filer and its role, Types of fiber, Physiologic effect of dictor ,fiber, dietary fifer recommendation, Special functions of carboliydrate in sody tissue, lipid essential falty acids and its role, types of fat functions of fat in human nutrition and health. Cholesteras and its role in human nutrition,
Proteins : essential and non- essential amino acides, functions of protein, protein requirement , factors affecting protein requirements , protein turnover, functions or dictory protein, measures of protein requirements , vitamins, functions or fat and water solasce vitamins, Dieticiary symptons, requirements and food sources of vitamins.Minerals: Minerals in human nutrition, major minerals its functions, deliciency symptions and food sources. trace elements its functions, deliciency symptons and food sources water, electrolyte and minerals balance, energy metabolism and physical work performance. Nutritional deficiency disorder: Protin energy malnutrition causes of malnutrition.Method to solve malnutrition problem,food facilities: naturally occurred toxicants' in foods chemicals contamination in foods.Foods fortification: principles and applications .Nutrition improvement program in Nepal. Food processing 13lkgs of foods processing on nutrition status.Diet, nutrition and digestive disease (coronary, heart disease, diabetics, mellitus; cancer, gastro-intestinal problem, renal disorders, urolithiasis, food factors and cataract).

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Nutrition and human health, human health needs, major Nepalese health problem.	1
2.	Nutritional guides for health,promotion:cancer and heart disease,foods and its classification	2
3.	Relation of food and nutrition to health	

	(a)Nutrition and aging, nutrition and mental function,weight control,nutrition cancer, heart disease and diebeties mellitus	2
4.	Bioactive phytochemicals in foods and their mechanism of action to promot health	1
5.	Carbohydrates: a. classification b. Dietary fiber and in rote. physilogic effects of dietry fiber.Dietary fiber Recommendation Special function of carbohydrates in body tissues.	3
6.	Lipids: Classification,function, requirements and food source cholesterol and its role to Promote human health. Cholesterol and health concern	3
7.	Proteins: Essential or non- essential amino acids, functions of proteins, proteins requirement Factors affecting protein requirement, protein turnover, functions of dietary protein. Measure of protein requirements, deficiency symptoms of proteins	3
8.	Minerals: Major and Minor minerals functions of minerals in human body deficiency symptons as minerals, miniral requirement, food sources	
9.	Water, electrolyte and mineral balance	2
10.	Energy metabolism and physical work performance, factors influencing base metabolism Energy requirements for various physiolosical functions.	2
11.	Nutritional deficiency disorders: Protein energy malnutrition, cases of malnutrition, Methods fo solve malnutrition, governments strategy to solve malnutrition	2
12.	Food toxicities: Naturally occurring toxicants' in food, chemical contaminarals I foods.	1
13.	Food processing: Elhect of food processing on nutritional status	1
14.	Dict, nutritional and degenerative disease (a) Coronary heart disease (b) Diabetes mellitus (c) Cancer (d) Bastro- intestinal problems (e) Rent disorders (f) Urolithiasis (g) Food factors and Cataract.	3
	Total	**26**

References

Nutrition and Diet therapy , sue Rodwell Williams , Times mirror / Mobby College Publishing , St. Lous, Toronto , Boston , Losaltos - 1989.Text book of Human Nutrition,

Editors: Mahatab and Bamji
N. Pralhad Rao.
Vinodini Reddy

Oxford and IBH Publishing Co. Pvt. LTD.
New Delhi, Calculta, 1986.

Course Code: VMI 303
Course Title: Microbiology III (Systematic Veterinary Bacteriology and Mycology)
Credit Hours: 3(2+1) Full marks: 75 Theory: 50 Practical: 25

Objectives

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

Syllabus

Study of important pathogenic bacteria and fungi in relation to their morphology, isolation, identification, growth, colonial, biochemical, antigenic properties, pathogenicity, resistacne and diagnosis of bacterial and fungal diseases caused by the following genera:

Bacteria: Sphaerophorus, Staphylococcus, Streptococcus, Bacillus, Corynebacterium, Erysipelothrix, Listeria, Clostridium, Filamentous bacteria : Actinomyces, Mycobacterium, Enterobacteriaceae (E.coli, Salmonella, Yersinia, Klebsiella, Shigella and Proteus), Pasturellacea : Pasteurella and Mannheimia, Actinobacillus, Haemophilus, Bordetella, Brucella, Pseudomonas and Burkholderia, Aeromonas, Francisella, Moraxella, and Taylorella, Listeria, Actinomyces, Nocardia, Arcanobacterium and Corynebactehum, Nocardia, Dermatophillus, Spirochaetes : Borrelia, Brachyspira, Compylobacter, Arcobacter, Helicobacter, Leptospira, Vibrio, Spirillium, Gram negative anaerobes, Rickettsia, Chlamydia, Coxiella, Ehrlichia and Chlamydophll. Mollicutes: Mycoplasma, Achoplasmas

Fungi: Dermatophytes, Rhinosporidium, Sporotrichum, Candida, Mycetomal fungi, Histoplasma Cryptococcus, Candida, Aspergillus, Zygomycetes, Penicillium and Dimorphic fungi, Fungi causing Mastitis, Abortion and Mycotoxicosis.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
	Study of the important pathogenic bacteria in relation to their morphology, staining, isolation, growth, colonial biochemical and antigenic properties, pathogenicity, resistance, diseases caused and their diagnosis of the following:	
1.	Escherichia	1
2.	Salmonella	1
3.	Yersinia, Shigella	1
4.	Proteus, Klebsiella	1
5.	Pasteurella, Mannheimia	1
6.	Actinobacillus	1

7.	Haemophilus	1
8.	Bordetella, Brucella	1
9.	Pseudomonas, Aeromonas	1
10.	Francisella, Moraxella	1
11.	Borrelia, Brachyspira,	1
12.	Campylobacter, Arcobacter	1
13.	Helicobacter, Leptospira, Vibrio, Spirillium	1
14.	Sphaerophorus	1
15.	Streptococcus and Enterococcus	1
16.	Staphylococcus	1
17.	Bacillus, Corynebacterium	1
18.	Erysipelothrix, Listeria	1
19.	Clostridium	1
20	Filamentous bacteria: Actinomyces, Nocard	1
21	Mycobacterium	1
22	Mollicutes : Mycoplasma, Achoplasmas	1
23	Rickettsia, Coxiella	1
24	Ehrlichia, Chlamydia	1
25	Dermatophytes, Rhinosporidium	1
26	Sporotrichum, Aspergillus	1
27	Mycetomal fungi, Histoplasma	1
28	Cryptococcus, Candida	1
29	Zygomycetes, Penicillium	1
30	Fungi causing mastitis, abortion and Mycotoxicosis	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Collection of samples for bacteriological investigations.	1
2.	Methods of sterilization, preparation of culture media and staining techniques.	1
3.	Cultural characteristics of bacteria.	1
4.	Isolation and identification of bacteria by animal inoculation, biochemical tests, serological tests and molecular techniques: PCR, SDS-PAGE, Western blotting.	1
5.	Drug sensitivity of different types of bacteria	1
6.	Laboratory identification of agents of Mastitis, Haemorrhagic septicaemia. Enteric infections. Brucellosis. Black quarter,	1

	Enterotoxemia, Tuberculosis and Johne's disease, Clostridial infections, Wooden tongue and Lumpy jaw, Anthrax, Glanders, Aspergillosis, Tetanus. Dermatophytosis,	
7.	Demonstration of other agents of importance (Phycomycetes, yeasts etc.).	1
8.	Bacteriological examination of water, milk and pathological specimen, Enumeration of microorganisms	1
9.	Diagnosis of fungi by culture, staining, biochemical tests and molecular techniques.	1
10.	Extraction and analysis of genomic and plasmid DNA from selective bacteria.	1
11.	Endospore stain and bacterial motility	1
12.	Isolation and identification of enterobacteriaceae and pseudomonas	1
13.	Obtaining pure cultures from a mixed population	1
14.	Isolation and identification of streptococci and staphylococci	1
15.	Obtaining pure cultures from a mixed population	1
	Total	**15**

References

Carter & Wise. Essentials of Veterinary Microbiology

Dale, J.W. 1998. Molecular Genetics of Bacteria. 3rd Edition. John Wiley and Sons, Inc. 605, Third Avenue, New York.

Dwight C. Hirsh.Veterinary Microbiology

Qiunn & Carter. Clinical Veterinary Microbiology

Topley and Wilson's Principles of Bacteriology, Virology and Immunity, Vol, 1.2 and 3. Smith, G.R.Ed. 1984. Arnold Heinemann.

Course Code: VPA 303
Course Title: Parasitology III (Veterinary Entomology and Acarology)
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical:25

Objectives

After the completion of this course, student will be able to recognize the important arthropods, ticks and diagnose the gross lesions caused by these parasites as well as their role in vector borne diseases.

Syllabus

General description of insect and arachnida affecting domestic animals and birds. Arthropoda as direct/indirect parasites. Broad classification, general morphological features, distinguishing characteristics, arthropods as disease transmitters on livestock and poultry. Life cycle and vector potentiality in relation to disease transmission, pathogenesis and control of following arthropods affecting animals, birds and man.

The biting midges (culicoides), buffalo/black fly, gnats (Simulium), sandflies (Phlebotamus). The mosquitoes (Cule, Anopheles and Aedes). Horse fly (Tabanus), Musca, Stomoxys, Sarcophaga, Warbles (Hypoderma) and bots (Gasterophilus), bugs, lice (Haematopinus, Linognathus, Trichodectus, Damalina, Menopon, Lipeuris, Menacanthus (Poultry lice). Fleas (Pulex, Ctenocephalides, Echidnophaga, Xenopsylla). Arachnids (Ticks and mites of veterinary importance, soft tick (Argasidae), Argus, Ornithodorus and Otobius.

Hard ticks (Boophilus, Hyalomma, Rhipicephalus, Haemophysalis, Ambyomma, Ixodes), mites (Sarcoptes, Psoroptes, Demodex, Chorioptes, Notoedrus). Anti-tick immunoprophylaxis. Damages to hide and skins due to ectoparasitic infestation.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Introduction of arthropods, general description of insects and arachnida Affecting domesticated animals and birds.	1
2	Classification of arthropods, general morphology, mouth parts, wing venation their larval and pupal stage.	1
3	General morphology, bionomics, life cycle, vector potentiality, pathogenesis and control measures of following important arthropods affecting man, animals and birds-	
4	The biting midges- Culicoides Buffalo/Black fly or gnats- Simulium	2

	Sandflies- Phlebotomus, Lutzomyia Mosquitoes- Anopheles, Culex and Aedes	
5	Tabanidae – Tabanus (horse fly) Muscidae- Musca (houseflies), Stomoxys (stable/flies) Calliphoridae-Lucilia and Calliphora Sarcophagidae – Sarcophaga (blowflies) Hypodermatidae- Hypoderma (warble flies)	2
6	Oestridae- Oestrus (Nasal flies) Gasterophidae- Gasterophilus (bots) Hippoboscidae (wingless flies)- Hippobosca, Melophaga (the sheep ked)	2
7	Bugs- Cimex	1
8	Lice- Haematopinus (sucking lice of cattle), Linognathus, Damalina, Goniocotes, Goniodes, Menopon and Cuclotogaster.	2
9	Fleas- Pulex, Ctenocephalides, Xenopsylla, and Echidnophaga.	1
10	Archnida Soft ticks (Argasidae)- Argas, Otobius and Ornithodoros. Hard ticks (Ixodidae)- Boophilus, Hyaloma, Amblyomma, Rhipicephalus, Haemophysalis, Dermacenter and Ixodes.	2
11	Mites- Dermanyssus (red mite of poultry), Ornithonyssus (tropical mite of poultry), Nemidocopties (scaly leg mite of poultry), Psoroptes, Sarcopties and Demodex (parasitic mites of mammals). Damage to hide and skin due to ectoparasite infestation.	2 1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1	Demostration of the type representatives of various groups of insects, ticks and mites through charts, specimen and mounted slides.	3
2	Demonstration of the types representatives of various groups of ticks and mites through charts, specimen and mounted slides.	3
3	Demonstration of different characters of Insecta and Arachnida (ticks and mites)	3
4	Methods of collection, fixation, preservation, mounting and identification of arthropod parasites.	3
5	Demonstration of enteric myiasis and their collection and preservation.	3
	Total	**15**

References

Chang, T. C. 1973. General Parasitology. Academic Press, USA (1st Edition)

Kettle, D. S. 1993. Medical and Veterinary Entomology. CAB International, Wallingford, Oxon OX108DE, UK.

Soulsby, E. J. L. 1986. Helminths, Arthropods and Protozoa of Domesticated Animals. The English Language Book Society and Bailliere Tindall and Cassell Ltd (7th Edition).

Course Code: EXT 302
Course Title: Extension Techniques in Veterinary Practices and Livestock Production
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical:25

Objectives

Upon the completion of this course, the students will be able to understand the basic concept of extension techniques in veterinary and livestock production practices, their principle, method, type, system and media preparation etc. this course will be helpful to develop student's understanding and ability to apply audio-visual aids in extension techniques for the dissemination of innovation to the farming community.

Syllabus

Meaning, concept , definition scope and type of extension teaching, their process, steps and criteria for effective teaching learning. Extension teaching method and their approaches, classification of audio visual aids, concept of information technologies, multimedia projection and computer aids for extension teaching. Present trend, role issues in agricultural communication. Communication in satellite system, role of private, governmental and non-governmental agencies in agricultural extension development.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Meaning, concept, definition of extension teaching learning process	2
2.	Steps in extension teaching process, cone of experience and criteria for effective teaching learning	2
3.	Extension teaching method – individual, group and mass and their approaches and merit and demerits	3
4.	Classification of audio-visual aids and selection criteria of audio-visual aids, emerging concept of information technologies for extension	2
5.	Multimedia projection and computer aided teaching aid for animal husbandry extension	2
6.	Selection of different extension method for dissemination of animal husbandry technologies and media- mix	2
7.	Role of private, governmental and non-governmental agencies in agricultural extension development	2
	Total	**15**

Practical

S. No	Topic	No.of Practicals
1.	Graphics in communication – Line, Bar, Pie and pictorial graphs	2
2.	Preparation of various kind of charts – Flow, tree, suspense, flip etc.	1
3.	Preparation of pamphlet, leaflet and booklet	1
4.	Preparation of poster and pictorial book, radio script, drama	1
5.	Interaction visit and meeting with DLS, ADB/N, and LDO and study their program planning process, plan of work, organizational setup and calendar of operation	3
6.	Interaction visit and meeting with an NGO/CBOs/Co-operatives/Private sectors and its local group and study their program planning process, plan of work and implementation	3
7.	Visit and observation of LSC/LSSC of DLS at the grass root level study their program planning process, plan of work and implementation	2
8.	Preparation of general community level plan of production in livestock (selective and simulated)	1
9.	Visit and interaction meeting with commercial farmer's group formed by DLS for extension program	1
	Total	**15**

References

A. S. Sandhu. 2000. A Text Book of Agricultural Communication Process & Method.

B. B. S. Dongol. 2004. Extension Education. Prativa Singh Dongol printers Gopal tole Kathmandu, Nepal.

B. Kumar and B. S. Hunsra. 2000. Extension Education for Human Resource Development

Herbert F. Lionberger and Paul H. Gwin.1982. Communication Strategies – A Guide for Agricultural Change. University of Missouria, Colombia.

O. P. Dahama and O. P. Bhatnagar. 1998. Education and Communication for Development. Oxford and IBH publishing company Private Limited. New Delhi.

P. Mathialagan. 2007. A text book of Animal Huabandry & Livestock Extension. International Book ook distributing Co. India.

P. Oakley and C. garforth. 1985. A guide to Extension Training. University of Reading UK.

Course Code: VPP 303
Course Title: Special Pathology I
Credit Hours: 3(2+1) **Full Marks: 75** **Theory: 50** **Practicals: 25**

Objectives

Upon completion of this course, student will be able to understand the relationship between clinical manifestations of disease in an animal and the underlying biochemical and morphologic abnormalities and students will be required to describe the pathogenesis of disease processes, name possible etiologic agents, list differential diagnoses, and determine a reasonable prognosis.

Syllabus

Bacterial disease(general introduction, etiology, pathogenesis, clinical signs, macroscopic and microscopic lesions, sequele and diagnosis of Tuberculosis Johne's disease, Actinomycosis and actinobacillosis, Anthrax and black Quarer, Bovine bacillary hemoglobinurea and malignant edema, Braxy and gas gangrene ,nocardiosis, campylobacteriosis, Hemophilus, salmonellosis, Tetanus Enterotoxaemia and Botulism, colibacillosis in swine, CCPP and CBPP, Strangles and Glanders, Brucellosis, Q-fever and ehrlichosis, Mastitis, porcine enzootic pneumonia, chlamydial group of diseases, Hemorrhagic septicaemia, Leptospirosis and swine erysipelas, Listeriosis, Viral disease- general introduction, etiology, pathogenesis, clinical signs, macroscopic and microscopic lesions, and diagnosis of: FMD, Vesicular stomatitis ,and pox bovine viral diarrhea and malignant catarrhal fever, vesicular exanthema, maedi, jaagziekte, scrapie, Rabies, Aujeszkey's disease, bovine and feline spongiform encephalopathies, Canine distemper, canine parvovirus, feline panleukopenia, Infectious canine hepatits, Hog cholera, diseases caused by rota and corona viruses, infectious bovine rhinotracheitis, , caprine encephalitis-arthritis complex, Rinder pest, PPR and Blue tongue, Equine infectious anemia, equine influenza, equine viral arteritis, African Horse sickness, equine encephalomyelitis and equine rhinopneumonitis, Fungal disease -Introduction, and lesions of: Ring worm, favus, , zygomycosis, histoplasmosis, cryptococosis and candidiasis, Aspergillosis, aflatoxicosis and degnal disease, ochratoxicosis, trichothecosis and ergotoxicosis. Intoduction, etiology, pathogenesis, clinical signs and diagnosis of: fascioliasis, amphistomiasis, ascariasis, strongylosis, hemonchosis, spirocercosis, filariasis, hookworm, tapeworm infections, coccidiosis, toxoplasmosis, babesiosis, Theileriosis, Trypnosomiasis –Surra, Anaplasmosis. Pathogical changes in nutritional and metabolic diseases-deficiency/excess of carbohydrates, proteins, fats, minerals and vitamins and in conditions like milk fever, pregnancy toxaemia, post-parturient haemoglobinuria, ketosis, hypomagnesemic tetany, azoturia, piglet anaemia and sway back/enzootic ataxia and Rheumatism like syndrome. Pathogenesis, gross and microscopic pathology of heavy metal toxicities like arsenic, copper, lead, mercury, cadmium, strychnine, nitrate/nitrite, hydrocyanic acid (HCN), fluoride, oxalate toxicities and insecticide/pesticide poisoning

Course Breakdown

Theory

S.No.	Topic	No.of Lecturers
1	Tuberculosis	1
2	Johne's disease	1
3	Actinomycosis and actinobacillosis	1
4	Anthrax and black Quarer	1
5	Bovine bacillary hemoglobinurea and malignant edema, Braxy and gas gangrene	1
6	Nocardiosis, campylobacteriosis, Hemophilus, salmonellosis	1
7	Tetanus	1
8	Enterotoxaemia and Botulism, colibacillosis in swine.	1
9	CCPP and CBPP	1
10	Strangles and Glanders	1
11	Brucellosis, Q-fever and ehrilichosis	1
12	Mastitis, porcine enzootic pneumonia, chlamydial group of diseases	1
13	Hemorrhagic septicaemia	1
14	Leptospirosis and swine erysepalas	1
15	Listeriosis	1
16	FMD, Vesicular stomatitis ,and pox, bovine viral diarrhea and malignant catarrhal fever, vesicular exanthema	1
17	Maedi, jaagziekte, scrapie	1
18	Rabies, Aujeszkey's disease, bovine and feline spongiform encephalopathies	1
19	Canine distemper, canine parvovirus, feline panleukopenia, Infectious canine hepatits	1
20	Hog cholera, diseases caused by rota and corona viruses,	1
21	infectious bovine rhinotracheitis, caprine encephalitis-arthritis complex	1
22	Rinder pest, PPR and Blue tongue	1
23	Equine infectious anemia, equine influenza, equine viral arteritis	1
24	African Horse sickness, equine encephalomyelitis and equine rhinopneumonitis	1
25	Ring worm, favus, zygomycosis, histoplasmosis, cryptococosis and candidiasis.	1
26	Aspergillosis, aflatoxicosis and degnala disease, ochratoxicosis, trichothecosis and ergotoxicosis	1
27	Fascioliasis, amphistomiasis, ascariasis, strongylosis, hemonchosis, spirocercosis, filariasis, hookworm, tapeworm infections, coccidiosis, toxoplasmosis	1

28	babesiosis Theileriosis Trypnosomiasis –Surra, Anaplasmosis	1
29	Pathogical changes in nutritional and metabolic diseases: (deficiency/excess of carbohydrates, proteins, fats, minerals and vitamins and in conditions like milk fever, pregnancy toxaemia, post-parturient haemoglobinuria, ketosis, hypomagnesemic tetany, azoturia, piglet anaemia and sway back/enzootic ataxia and Rheumatism like syndrome)	
30	Pathogenesis, gross and microscopic pathology of heavy metal toxicities like arsenic, copper, lead, mercury, cadmium, strychnine, nitrate/nitrite, hydrocyanic acid (HCN), fluoride, oxalate toxicities, insecticide/pesticide poisoning	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Post mortem examination of animals suspected for infectious disease	1
2	Study on gross lesions from the gross specimens of infectious disease and gross morphological diagnosis	4
3	Histopathological slide interpretation of infectious disease and microscopic morphological diagnosis	7
4	Post mortem examination, gross lesion identification, tissue collection for histopathology, microbiology, immunohistocemistry, and toxicology, test result interpretation and making differential diagnosis of at least one case suspected for infectious disease.	3
	Total	**15**

References

Jaap Van Dijk, Erik Gruys, Johan Mouwen,2006. Color Atlas of Veterinary Pathology 2006). ISBN-13: 978-0-7020-2758-1 Saunders

Jones, Hunt, and King. Williams & Wilkins. 1997. Veterinary Pathology., 6th Ed.,

Jubb, Kennedy. 2007. Palmer Pathology of Domestic Animals. Academic Press, 5th Ed.,

Thomsons' Special Veterinary Pathology .2005. Carlton, McGavin and Zachary. Mosby Publications.

Vegad, J.L. Vegad .TextBook of Special Veterinary Pathology-Infectious Diseases of Livestock and Poultry. IBDC publishers

Zachary & McGavin. 2012. Pathologic Basis of Veterinary Disease, *5*th Ed.

Course Code: LPT 301
Course Title: Abbatoir Practices and Animal Product Technology
Credit Hours: 2(1+1) Full Marks:50 Theory :25 Practical: 25

Objectives

The objective of the course is to enable the students to understand Abattoir Practices that will help produce wholesome and hygienic meat through proper waste water and sludge disposal.

Syllabus

History, definition, and present situation of abattoir and slaughter slab in Nepal. Handling and care of slaughter animal and birds at lairage. Inspection of slaughter animals and birds. Slaughter procedure and methods of stunning, location and layout of abattoir, slaughter house feature, water supply, ventilation and light. Hygiene practices, abattoir environment impact and mitigation. Roles of local Government and entrepreneur for environment protection. Biosecurity, Fabrication and preservation of meat. Facilities required for health safety and by products utilization.

Course Breakdown

Theory

S. No.	Topics	No. of lecture
1	History, definition, and present situation of abattoir and slaughter slab in Nepal.	1
2	Handling and care of slaughter animal and birds at lairage.	1
3	Inspection of slaughter animals and birds (Ante and postmortem)	1
4	Slaughter procedure and methods of stunning,	2
5	Location and layout of abattoir	2
6	Slaughter house features	1
7	Water supply, ventilation and light.	1
8	Hygiene practices,.	1
9	Abattoir environment impact and mitigation.	1
10	Roles of local Government and entrepreneur for environment protection	1
11	Bio-security and slaughter house and meat inspection act 2055	1
12	Fabrication and preservation of meat.	1
13	Facilities required for health safety and by products utilization	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1	Layout of Slaughter house Slaughter slab	2
2	Animals and birds care at the stockyard/cages	1
3	Inspection of animals before slaughter and after slaughter (ante and post mortem inspection)	1
4	Inspection of birds before slaughter and after slaughter (ante and post mortem inspection)	1
5	Slaughter procedure of animals (stunning/sticking/severing)	1
6	Slaughter procedure of birds (stunning/sticking/severing)	1
7	Process of bio-security	1
8	Whole sale cut and retail cutting and fabrication of carcass	2
9	Different cuts of pig, goat/sheep and buffalo	2
10	Identification of different equipments and knives	1
11	Cleaning and disinfection of the abattoir	1
12	visit to small scale/commercial scale slaughter house/slab for large and small animals and birds	1
13	Report writing and submission of the visit	1
	Total	**15**

References

Lawrie, R.A. 1985. Meat Science 4th ed. Oxford Newyork

Price and Scheing ert (latest ed. The science of meat and meat production, Freexran and Company, Sanfranciesco

Wiggin and Welson (latest ed). Color atlas of meat and poultry inspection-VanNostrand Reixhold Company N.Y. Sanfrancisco

Forest et al (latesr ed). Principles of meat science WttFreeman and company, Sanfancisco

Sensory evaluation of food-laboratory manual Tan and Mambesa –IFST-COA,UPLB,Leguna

Warris P.D. Meat science – An introductory Text CABI- Publishing.

The science of meat products. AMIF, WHF Freeman and Company Sanfrancisco and London

Course Code: BCH 303
Course Title: Clinical Biochemistry
Credit Hours: 2 (1+1) Full Marks 50 Theory: 25 Practical: 25

Objectives

The main objective of this course is to teach the students to determine the health and disease condition of animal.

Syllabus

Biochemical conditions of health and disease acid-base balance and interpretation. Biochemistry of renal function and acid base balance, digestive disorders, endocrine functions. Liver, kidney and pancreatic function tests. Role of enzymes for detection of tissue /organ affections. Clinical application of enzymes, identification and the basis of treatment of enzyme deficiency, disorders of metabolism with detailed emphasis on diabetes, obesity, atheroschlerosis, jaundice, diseases related to hormones. Recent laboratory techniques to assay chemical/biochemicals/immunochemicals and their clinical correlations and interpretation of laboratory results. Enzyme linked immunosorbent assay, agglutination, etc. Toxic metals such as arsenic, lead, antimony, mercury, copper, zinc, fluorides. Nitrates/nitrites, cyanides and tannins in body fluids/tissues of animals and evaluation of toxic residues. Appreciation and differentiation of symptoms caused by various types of toxic materials including agrochemicals plants and drugs. Principle and applications of flame photometer.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Biochemical conditions of health and disease- acid-base balance and interpretation	2
2	Biochemistry of renal function and acid base balance, digestive disorders, endocrine functions.	2
3	Liver, kidney and pancreatic function tests.	1
4	Role of enzymes for detection of tissue and organ affections.	1
5	Clinical application of enzymes, identification and the basis of treatment of enzyme deficiency, disorders of metabolism with detailed emphasis on diabetes, obesity, atheroschlerosis, jaundice, disease related to hormones.	3

6	Recent laboratory techniques to assay chemical, biochemicals, immunochemicals and their clinical correlations and interpretation of laboratory results.	2
7	Enzyme linked immunosorbent assay. Dot immunoassay, agglutination test etc.	2
8	Toxic materials such as arsenic, lead, antimony, mercury, copper, zinc, fluorides. Nitrates and nitrites, cyanides and tannins in body fluids and tissues of animals.	1
9	Appreciation and differentiation of symptoms caused by various types of toxic materials including agrochemicals, plants and drugs.	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1	Quantitative estimation of plasma protein.	1
2	Quantitative estimation of cholesterol in serum.	1
3	Quantitative estimation of bilirubin in serum.	1
4	Quantitative estimation of urea in serum.	1
5	Quantitative estimation of glucose in serum.	1
6	Estimation of Li, Na and fluoride in extra cellular fluids	1
7	Enzyme linked immunosorbent assay test	1
8	Dot immunoassay	1
9	Tube agglutination test, slide agglutination tests etc	1
10	Extraction and estimation of toxic materials such as arsenic, lead, antimony, mercury, copper, zinc from samples.	2
11	Detection of Nitrates, nitrites, cyanides and tannins in body fluids and tissues of animals.	2
12	Separation of proteins by electrophoresis.	2
	Total	**15**

References

Devlin, T.M. 1997. TextBook of biochemistry with clinical correlation. Wiley-liss, publication.
Kaneko, J. JerryJ.W.Harvey, M.L.Bruss. 1997. Clinical biochemistry of domestic animals. Fifth Edition. Academic Press.

Course Code: VPH 302
Course Title: Veterinary Epidemiology
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

This course will enable students to describe the pattern and spread of a disease in a community, and explain different methods of prevention, control and eradication of diseases.

Syllabus

Definitions and application of epidemiology, ecological concepts of epidemiology, disease spread, patterns of disease distribution, multifactorial causation of disease, strategies of epidemiology, types of epidemiological studies, prevention, eradication and control of diseases, laws regulating animal diseases, international organizations regulating emerging diseases, OIE and its functions, regulations handling, import and export of biomaterials.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Definitions ,objectives and applications of epidemiology.	2
2.	Ecological concepts of epidemiology	3
3.	Disease process and its spread	2
4.	Pattern of disease distribution in the community; epidemic, endemic, sporadic and pandemic	2
5.	Multifactorial causation of disease: agent, host and envirionment	2
6.	Strategies of Epidemiology	2
7.	Types of epidemiological studies: case control, cohort etc.	2
8.	Investigation of an epidemic	2
9.	Prevention, control and eradication of diseases.	3
10.	Laws regulating animal diseases	2
11.	International organizations regulating emerging and spreading diseases of animals and birds; Office Internationale Des epizootic (OIE), its functions , its categorization of diseases that are transmissible	3
12.	Regulations regulating handling, import, export of biomaterials.	2
13.	Veterinary Economics and risk-assessment.	3
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Visit to the veterinary hospitals/organized farms etc. for the collection of data for epidemiological investigation	1
2.	Collection of epidemiological samples. Measurement of disease: determination of morbidity and mortality rates/ratios	1
3.	The laboratories investigations and data collection related to epidemiological studies and its correlation	2
4	Determination of Associations and risks: relative risk, Odd's ratio, Kappa ratio, attributable risk, SPSS, logistic regression, factor analysis	5
5	Evaluation of diagnostic tests	2
6	Survey of an animal disease on a farm	1
7	GIS (Geographical information system)	3
	Total	**15**

References

Martin, S.W., A. H. Meek, and P. Willeberg.1987. Veterinary Epidemiology; Principles and Methods. Iowa State Press/Ames (1st Edition)

Thapliyal. 1996. Fundamental Animal Hygiene and Epidemiology. International Book Distributing Company.

Thrushfield. M.-Veterinary Epidemiology, Blackwell publishing

Course Code: VPA 321
Course Title: Parasitology IV (Veterinary Protozoology)
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

After the completion of this course, student will be able to evaluate the protozoan disease based on their pathogenesis and symptoms, they also know their mode of transmission and control measures.

Syllabus

Introduction and general description to protozoa and their development. Differentiate from protophyta, bacteria and rickettsia. Classification of protozoan parasites. Life cycle in relation to mode of transmission, pathogenesis, diagnosis and control of protozoan parasite of veterinary importance. 5

Entamoeba, Leishmania, Trypanosoma (surra), Giardia, Hexamita, Histomonas, Trichomonas, Balantidium, Eimeria, Isospora, Plasmodium, Babesia(piroplama), Theileria (theilerosis), Hepatozoon, Toxoplasma, Sarcocystis, Haemoproteus, Leucocytozoon, Besnoitia, Neospora, Cryptosporidiosis and Anaplama. Recent developments in the preparation of protozoan vaccine for field use.

International regulation for control of different protozoan diseases.

Course breakdown

S.N	Topic	Lectures
1	Introduction and general description to protozoa and their development.	2
2	Differentiate from protophyta, bacteria and rickettsia.	1
3	Classification, life cycle, mode of transmission, pathogenesis, symptoms diagnosis treatment and control measures of different parasites of animals, birds and man. These important parasites are-	
	Entamoeba, Typanosomes, Leishmania	3
	Giardia, Hexamita, Histomonas,	2
	Trichomonas, Balantidium, Plasmodium,	3
	Eimeria, Isospora, Cryptosporium,	3
	Babesia, Theileria, Hepatozoon,	3
	Toxoplasm, Sarcocystis, Hemoproteus,	3
	Neospora, Leucocytozoon,	3
	Besnoitia and Anaplasma.	3

4	Recent development in protozoan vaccine for field use.	2
5	International regulation for control of different protozoan diseases.	2
	Total	**30**

Practical

S.N	Topic	No. of Lectures
1	Examination of faecal materials for identification of intestinal protozoa, coccidian and flagellates.	2
2	Demonstration different organs/tissue of hosts affected by protozoan parasite	2
3	Preperation of thick and thin blood smear and their staining, examination of slides for haemoprotozoan parasites.	2
4	Methods of collection, fixation, preservation and mounting of protozoan parasites.	3
5	Identification of representative slides of protozoan parasites.	3
6	Identification of drugs against the protozoan diseases.	3
	Total	**15**

References

Levine, N. D. 1983. Text book of veterinary parasitology. CBS Publishers and Distributors (1st Indian Edition).

Soulsby, E. J. L. 1986. Helminths, arthropods and protozoa of domesticated animals. The English Language Book Society and Bailliere Tindall and Cassell Ltd (7th Edition).

Course Code: VMI 304
Course Title: Microbiology IV (Systematic Veterinary Virology)
Credit Hours: 3(2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

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

Syllabus

Brief history, classification and characteristics of various families of DNA and RNA viruses causing diseases in livestock and poultry, laboratory diagnostic techniques, immunity to viral infections, systemic virology including: DNA viruses: Adenoviridae - Infectious canine hepatitis, egg drop syndrome (EDS), Inclusion body hepatitis-Hydropericardium syndrome (IBH-HPS). Papillomaviridae: Papillomatosis, Poxviridae: Pox viruses of cow, sheep, goat and fowl, Herpesviridae: Aujeszky's disease, malignant catarrhal fever, infectious bovine rhinotracheitis, equine abortion. Marek's disease, infectious laryngyotracheitis. Asfarviridae: African swine fever, Parvoviridae: Canine Parvovirus. Circoviridae: Chicken infectious anaemia. RNA viruses: Reoviridae: African horse sickness and blue tongue, Calf Rotavirus, Birnaviridae: Infectious bursal disease. Picornaviridae: foot and mouth disease (FMD), duck viral hepatitis, Avian Encephalomyelitis Virus. Togaviridae: Swine Fever, Mucosal Diseases, Equine encephalitis, Arteriviridae: equine viral arteritis, Calciviridae: vesicular exanthema Coronaviridae: avian infectious bronchitis, transmissible gastroenteritis, Rhabdoviridae: Rabies, vesicular stomatitis, ephemeral fever. Paramyxoviridae: Rinderpest, PPR, canine distemper and Ranikhet disease Orhomyxoviridae: Swine, equine and Avian influenza. Filoviridae: Ebola Virus, Arenaviridae: Lassa Virus, Bunyavirdae: Phlebovirus. Flavivirldae: Classical swine fever, bovine viral diarrhoea. Retroviridae: Avian leucosis group, Equine Infectious Anaemia Virus. Hepadnaviridae: Hepatitis B Virus. Lentiviruses- Equine infectious anemia virus, Sheep pulmonary adenomatosis, Maedi, Visna. Prions: Scrapie (Sheep), Bovine Spongiform Encephalopathy, Mad Cow Disease, Exotic and emerging animal and poultry viruses.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	General properties of various families of RNA and DNA virus.	1
2.	Classification of virus	1
3.	Adenoviridae: Infectious Canine Hepatitits, Aviadenovirus (Inclusion Body Hepatitis), Egg Drop Syndrome	1

4.	Papovaviridae: Papilloma Virus, Polyoma Virus, Vacuolating Virus	1
5.	Poxviridae: Cowpox Virus, Fowl Pox Virus, Capripoxvirus, Pseudocow Pox	1
6.	Herpesviridae : Malliganant Catarrhal Fever, Pseudorabies Virus, Marek's Disease Virus, Infectious Laryngyotracheitis Virus, Infectious Rhinotracheitis, Equine Abortion	1
7.	Asfarviridae: African Swine Fever Virus	2
8.	Irridoviridae	2
9.	Parvoviridae: Canine and Other Parvovirus	1
10.	Circoviridae: Chicken infectious anaemia	1
11.	Reoviridae: Reovirus, Rotavirus, Blugtongue virus, African Horse Sickness	1
12.	Birnaviridae: Infectious Bursal Disease Virus	1
13.	Picornaviridae: FMD Virus, Duck Hepatitis Virus, Avian Encephalomyelitis Virus	1
14.	Togaviridae: Swine Fever, Mucosal Diseases, Equine Encephalitis	2
15.	Coronaviridae: Infectious Bronchitis, Transmissible Gastroenteritis	1
16.	Rhabdoviridae: Rabies Virus, Vesicular Stomatitis Virus, Bovine Ephemeral Fever Virus	1
17.	Paramyxoviridae: New Castle Disease Virus, Rinderpest Disease Virus, PPR Disease Virus, Bovine Respiratory Syncytial Virus	2
18.	Orthomyxoviridae: Swine, Equine Influenza Virus, Avian Influenza Virus	2
19.	Filoviridae: Ebola Virus, Arenavirdae: Lassa Virus	1
20	Bunyaviridae: Phlebovirus. Flavivirldae: Classical swine fever, bovine viral diarrhoea.	1
21	Retroviridae: Avian leucosis group, Equine Infectious Anaemia Virus.	1
22	Hepadnaviridae: Hepatitis B Virus	1
23	Lentiviruses- Equine infectious anemia virus, Sheep pulmonary adenomatosis, Maedi, Visna.	1
24	Prions: Scrapie (Sheep), Bovine Spongiform Encephalopathy, Mad Cow Disease, Exotic and emerging animal and poultry viruses.	2
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Orientation of Virology laboratory	1
2.	Preservation and transportation of clinical samples for virological investigations	1

3.	Demonstration virus propagation by egg inoculation, animal inoculation	1
4.	Study of cytopathogenesis, viral inclusions, diagnostic procedures, serological techniques	1
5.	Preparation of glassware for tissue culture (washing, sterilization)	1
6.	Preparation of media like Hanks, MEM	1
7.	HA and HI test	1
8.	AGID	1
9.	Recognition of CPE in tissue cultures	1
10.	Demonstration of cell culture	1
11.	Serological tests ELISA for HIV, RPHA for HbsAg, Haemagglutination	2
12.	Diagnostic procedures for Peste des petits ruminants (PPR), FMD, Ranikhet disease (RD), Blue tongue, Infectious bronchitis (IB), Infectious bursal disease (IBD) and other viral agents.	3
	Total	**15**

References

Bets A.O. and York, C.J., 1967. Viral and Rickettsial Infection of Animal. New York Academic Press.

Joklik, W.K., 1988. Principles of Animal Virology. Appletoncentury-Crofts, New York.

Murphy, Gibbs, Horzineck and Studert. Veterinary Virology

Qiunn, Markey & Carter. Veterinary Microbiology & Microbial Diseases

Russel, P.H. and Edingon, N., 1985. Veterinary Viruses. Edington Russel Publisher.

Course Code: VPP 304
Course Title: Special Pathology II (Poultry, Fish and Diagnostic Pathology)
Credit Hours: 3(2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon completion of the course, student will be able to understand the basic disease processes that affect tissues of poultry and fish, will gain appreciation of the relationship between clinical manifestations of disease processes and their underlying biochemical and morphologic abnormalities students will be expected to describe pathological changes, understand the pathogenesis of specific disease processes, make a morphological diagnosis based on the gross and/or histological findings presented, name possible etiologic agents, list differential diagnoses, and determine a reasonable prognosis and will be able to understand technique and use of biopsy, cytology and DNA technology and antibody in disease diagnosis.

Syllabus

Biopsy and Cytology, Fish pathology (Anatomy, physiology, immunology and inflammatory response in fish Viral diseases affecting fish bacterial, diseases affecting fish mycotic and parasitic diseases affecting fish Nutritional and toxic pathology Miscellaneous non-infectious diseases associated with physicochemical abnormalities of water. Neoplasia of teleosts.), DNA technology and antibody in disease diagnosis, Tumerogenic disease of poultry- introduction, etiology, pathogenesis clinical signs, post mortem lesion and microscopic lesion of Mareks disease and Avian leukosis complex. Bacterial disease- introduction, etiology, pathogenesis, clinical signs, PM lesion and diagnosis of: Pullorum disesae, typhoid and paratyphoid, Fowl coryza and fowl cholera, Collibacillosis and clostridial diseases (botulism, necrotic enteritis, gangrenous dermatitis, ulcerative enteritis) Mycoplasma gallisepticum infection (chronic respiratory disease), Mycoplasma synoviae infection, Avian chlamydiosis (psittacosis) tuberculosis and spirochaetosis. Viral disease- introduction, etiology, pathogenesis, clinical signs, PM lesion and diagnosis of New castle disease and Infectious bronchitis, ILT, Avian nephritis, infectious stunting syndrome, and reovirus infections, Avian influenza, and Gumboro disease, inclusion body hepatitis, hydro-pericardium syndrome Avian encephalomyelitis, fowl pox, Chicken infectious anemia, EDS-76. Fungal infection-intrduction, etiology, pathogenesis and lesions of Aspergillosis, thrush, Favus and mycotoxicosis. Pathogenesis, gross and microscopic pathology of Aflatoxicosis, ochratoxicosis and trichothecenes. Nutritional, metabolic and Miscellaneous diseases- Pathogenesis, gross and microscopic pathology of major diseases due to deficiency/excess of carbohydrates, proteins, minerals and vitamins in poultry. Miscellaneous Diseases: Pathology of important vices and miscellaneous conditions.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Biopsy and Cytology -Its scope, Methodology and limitation in the diagnosis of lesions	1
2	Exfloative cytology	1
3	Anatomy, physiology, immunology and inflammatory response in fish	1
4	Viral diseases affecting fish	1
5	Bacterial, diseases affecting fish	1
6	mycotic and parasitic diseases affecting fish	1
7	Nutritional and toxic pathology.	1
8	Miscellaneous non-infectious diseases associated with physicochemical abnormalities of water. Neoplasia of teleosts.	1
9	Cleavage of DNA into fragments, DNA cloning and probes	1
10	Polymerase chain reaction	1
11	Restriction fragment length polymorphism	1
12	Southern, western and eastern blotting	1
13	Immunoperoxidase and Immunohistochemistry technique in disease diagnosis	1
14	Tumerogenic disease- introduction, etiology, pathogenesis clinical signs, post mortem lesion and microscopic lesion of Mareks disease and Avian leukosis complex	1
15	Pullorum disesae, typhoid and paratyphoid	1
16	Fowl coryza and fowl cholera	1
17	Collibacillosis and clostridial diseases (botulism, necrotic enteritis, gangrenous dermatitis, ulcerative enteritis)	1
18	Mycoplasma gallisepticum infection (chronic respiratory disease), Mycoplasma synoviae infection, Avian chlamydiosis (psittacosis).	1
19	tuberculosis and spirochaetosis	1
20	New castle disease and Infectious bronchitis, ILT	1
21	Avian nephritis, infectious stunting syndrome, and reovirus infections.	1
22	Avian influenza, and Gumboro disease	1
23	Inclusion body hepatitis, hydro-pericardium syndrome,	1
24	Avian encephalomyelitis, fowl pox	1
25	Chicken infectious anemia EDS-76,	1
26	Aspergillosis, thrush, Favus and mycotoxicosis	1
27	Pathogenesis, gross and microscopic pathology of Aflatoxicosis, ochratoxicosis and trichothecenes.	1

28	Parasitic infestation- pathogenesis and pathology(flukes, cestodes, nematodes), protozoal diseases (coccidiosis, histomoniasis), ectoparasites, Avian malaria	1
29	Nutritional and metabolic diseases Pathogenesis, gross and microscopic pathology of major diseases due to deficiency/excess of carbohydrates, proteins, minerals and vitamins in poultry	1
30	Miscellaneous Diseases: Pathology of important vices and miscellaneous conditions.	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Normal anatomy and histology of finfish and shellfish	2
2	Ante-mortem and post-mortem examination of fish	1
3	Haematology of fish	1
4	Histopathology of important viral, bacterial, fungal and parasitic diseases.	2
5	Post mortem examination and diagnosis of poultry diseases based uppn clinical signs and gross lesions and Writing of postmortem report.	2
6	Collection, preservation and dispatch of morbid materials in poultry diseases.	1
7	Study of gross specimens and histopathological slides of different diseases of poultry.	3
8	Demonstration of immunoperoxidase technique	1
9	Demonstration of immunohistochemistry technique	1
10	Demonstration of PCR technique	1
	Total	**15**

References

Jaap Van Dijk, Erik Gruys, Johan Mouwen, 2006. Color Atlas of Veterinary Pathology. ISBN-13: 978-0-7020-2758-1 Saunders

Mugera G.M. 2000. Veterinary Pathology in the Tropics- For Students & Practitioners.New Age International (P) Ltd, New Delhi.

Newton, C.R. & A. Graham Introduction to Biotechniques – PCR. II Edition. 1997

Published by BIOS Scientific Publishers ltd. Oxford.

Sirois, Margi ,McBride, Douglas F. C.V. Mosby, Livestock and Poultry.. IBDC publishers

Veterinary Clinical Laboratory Procedures 1996 . USA

Strafuss, A.C and Charles C. Thomas Springfield. Necropsy: Simplified procedures and Basic diagnostic methods for practicing veterinarians. 4. Schalm's Veterinary Hematology, 5th Edn. 2000. Feldman, Zinkl and Jain. Lei Febiger

Course Code: VOG 301
Course Title: Theriogenology I (Animal Reproduction and Gynecology)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives
Upon the completion of this course, student will be able to describe the structure, developmental abnormalities of reproductive organs and the roles of hormones on reproductive system.

Syllabus
Introduction, description of pelvic bones and ligaments in domestic animals. Embryology of the female genital tract - development of ovaries and female genital tract. Physiology of reproductive hormones - pituitary, ovarians, placental and other hormones growth, puberty, estrous cycle, sexual maturity in relation to reproduction, role of hormones on various phases of reproduction in females. Symptoms of estrus and estrous cycle in domestic animals. Factors affecting estrous cycle, palpation of genital organs for changes during estrous cycle, coitus, oogenesis, ovulation. Transportation of sperm and ova, fertilization, zygote formation. Shape and location of pregnant uterus. Position and number of foetus in the uterus. Twining and multiple births in unipara, sex parity, bacterial flora of the pregnant uterus, length of pregnancy. Hormonal control of gestation, duration and rate of reproduction. Abnormalities of fertilization and gestation. Mammary gland and lactation. Period of ovum, embryo, and foetus, organogenesis. Foetal membranes - placenta, umbilical cord. Anomalies of the development. Teratology - inherited and non-inherited anomalies.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction, definition of animal reproduction and gynaecology	1
2.	Clinical evaluation and abnormalities of reproductive tracts in domestic animals	1
3	Comparative description of pelvic bones and ligaments in domestic animals	1
4.	Development of ovaries and female genital tract	1
5.	Physiology of hypothalamic and hypophysial reproductive hormones	1
6.	Ovarian, placental and other sources of hormones	1
7.	Growth, puberty and estrous cycle	1
8.	Role of hormones on various phases of reproduction	1

9	Symptoms of estrous and factors affecting estrous cycle	1
10.	Palpation of different organs of reproductive system for changes during estrous cycle	2
11.	Sexual behavior, coitus and oogenesis	1
12.	Mechanism of Ovulation, transport of ova	1
13.	Fertilization and zygote formation	1
14.	Shape and location of pregnant uterus	1
15.	Position of foetus in uterus	1
16.	Number of foetuses, twining and multiple birth in uniparous	2
17.	Sex parity and bacterial flora of the pregnant uterus	1
18.	Pregnancy and its duration in different species	2
19.	Hormonal control and rate of gestation and reproduction	1
20.	Abnormalities of fertilization and gestation	2
21.	Mammary gland and lactation	2
22.	Period of ovum, embryo and foetus	1
23.	Period of organogenesis	1
24.	Foetal membranes and placentation	2
25.	Anomalies of developments	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	To study the bony pelvis and its associated structures	1
2	To study the different organs of female reproductive system(slaughter house material)	3
3	To study the different organs of female reproductive system with respective measurements and observation	1
4	To study the contents of the pelvis through rectal palpation	3
5	To study the organs of reproductive system by rectal palpation	2
6	To detect estrous in farm animals	1
7	Collection and examination of vaginal mucous by various techniques	2
8	Vaginitis and its treatments	1
9	Metritis in cattle and buffaloes	1
	Total	**30**

References

Arthur, G.H. 1977. Veterinary Reproduction and Obstetrics. The ELBS and Bailliere Tindall (latest Edition).
Hefez, E.S.E. 1997. Reproduction in Farm Animals. Lea and Febiger Philadelphia (latest Edition).
Robert, S.J. 1971. Veterinary Obstetrics and Genital Diseases. CBS Publishers and Distributors, New Delhi (latest Edition).

Course Code: VMC 301
Course Title: Internal Medicine I (Systemic)
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Students are expected to perform a complete and accurate physical examination, including ophthalmologic, otoscopic, dental and rectal examinations, interpret the result, diagnose and treat the diseases of digestive, respiratory,cardiovascular and urogenital system.

Syllabus

History and importance of veterinary medicine, Concept of health and disease in relation to general medicine, Definition , classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of diseases of alimentary tract, respiratory system, cardiovascular system and urogenital system. Diseases of digestive system with special reference to rumen dysfunction and diseases of stomach in non-ruminants. Affections of peritoneum, liver and pancreas. Diseases of respiratory and cardiovascular systems including blood and blood forming organs. Diseases of uro-genital system & lymphatic system.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	History and importance of veterinary medicine, Concept of health and disease in relation to general medicine	1
2	Definition , classification, etiology, pathogenesis, clinical sign Diagnosis, differential diagnosis and treatments of alimentary diseases of teeth, stomatitis, glositis	1
3	Parotitis, pharyngitis, oesophagitis, choke,	1
4	Indigestion in animals ,tympany	1
5	Traumatic reticulitis ,diaphragmatic hernia	1
6	Vagus indigestion,abomasal displacement	2
7	Gastritis in small animals,vomition in swine	1
8	Colic in horses, enteritis	2
9	Cecal obstruction, volvulus	1
10	Intussusceptions and proctitis	1
11	Definition , classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of hepatitis and cirrhosis	1

12	Jaundice, pancreatitis, peritonitis, ascites	2
13	Definition, classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of rhinitis, epistaxix	1
14	Laryngitis,bronchitis	1
15	Pneumonia,pulmonary emphysema, pleurisy broken wind in horses and repiratory failure	2
16	Pneumothorax, hydrothorax,lungs abscess, asthma	1
17	Definition , classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of ,Pericarditis, myocarditis, endocarditis	2
18	Hypertrophy and dilatation of heart congestive heart failure, Haemorrhage, toxaemia,	2
19	Anaemia, Leukaemia, Leukopenia	1
20	Lyphangitis, Lymphadenitis and diseases of lymphatic system	1
21	Nephritis, Nephrosis, renal colic, Albuminurea, haemoglobinurea	2
22	Urinary incontinence, uremia, urethritis, Urolithiosis, cystitis pyelonephritis, and orchitis	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	History taking of animals	1
2	Morbidity and mortality rate determination	1
3	Identification of equipments and utensils used in medicine laboratory	1
4	Identification of different chemicals reagents used in Veterinary medicine laboratory	1
5	Physical and clinical examination of animals	2
6	Collectation ,preservation and storage of faecal samples	1
7	Collection and examination of blood samples	1
8	Collection and examination of urine samples	1
9	Collection and examination of feaces for lab test	1
10	Prescription writing techniques	1
11	Method of administration of drugs by intra uterine route	1

12	Method of administration of drugs by injections	1
13	Method of administration of drugs drenching	1
14	Case record of at least 10 cases	1
	Total	**15**

References

Blood D.C. and G.M.Radostitis.1989. Veterinary Medicine, A TextBook of the diseases of cattle , sheep, pigs, goats, and horses, ELBS publication (7th Edition)

Chakrabarti ,A. 1988.Text Book of Clinical Veterinary Medicine Kalyani Publishers, India (Third revised Edition)

Merck Veterinary Mannual. 2010 . S.E. Aiello (Ed.) .Merck and Co. Inc. White House Station, USA(10th Edition).

Smith, B.P. 1996. Largest Animal Internal Medicine. Mosby Publication (2nd Edition).

Course Code: VCS 301
Course Title: Veterinary Clinical Service I
Credit Hours: 1(0+1) **Full Marks: 25** **Theory: 0** **Practical: 25**

Objectives

Upon the successful completion of this course, student will be able to diagnose and treat the cases of different animals.

Syllabus

Handling of cases brought at veterinary teaching hospital, clinical examination of animals, collection and preparation of samples for laboratory analysis, prescription writing, drug administration and preparation of clinical records.

Course Breakdown

Practical

S.No.	Topic	No. of Practicals
1	Orientation to veterinary clinics including teaching hospital.	1
2	Registration, filling of registration cards and history taking.	1
3	Familiarization and practice of first aid procedures and emergency medicine.	1
4	Clinical practice comprising of clinical examination of the patient with emphasis on history taking, examination techniques e.g. palpation, percussions and auscultation.	1
5	Systematic examination of various systems recording of clinical observation viz temperature, respiration, pulse, cardiac sounds.	2
6	Functional motility of digestive systems, routes and techniques of administration of medicaments.	1
7	Practice of i/m, s/c, i/v, i/p subconjunctival and i/mammary infusion.	1
8	H1andling, examination, diagnosis and treatment of sick animals under field conditions.	1

9	Pregnancy diagnosis techniques by rectal palpation.	1
10	Faecal examination techniques VIZ Direct smear methods, floatation techniques methods and sedimentation techniques methods.	1
11	Techniques of skin scraping methods.	1
12	Examination of cases of anoestrus, silent oestrus and conception failure	1
13	Prescription writing	1
14	Postmortem techniques in poultry	1
	Total	**15**

References

Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS publication (10th Edition).

Hefez, E.S.E. 1997. Reproduction in farm animals. Lea and Febiger Philadelphia (latest Edition).

Venugopalan, A (2002). Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH publishing Co. Pvt. Ltd.

Course Code: VPT 304
Course Title: Veterinary Toxicology
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Upon the completion of the course, student will be able to understand toxicology of metals, non-metals, agro-chemicals, radioactive substances, venoms toxins and plants.

Syllabus

General Toxicology: Definitions, fundamentals and scope of toxicology. Sources and mode of action of poisons. Factors modifying toxicity. General approaches to diagnosis and treatment of poisoning. Toxicity caused by metal and non-metals: Arsenic, lead, mercury, copper, selenium, molybdenum, phosphorus, nitrates and nitrites, common salt and fluoride. Toxicity caused by plants and weeds: Cyanogenetic plants, abrus, lantana, ipomoea, nerium, datura, nux vomica, castor, selenium containing plants oxalate producing plants, plants causing thiamine deficiency. Drug toxicity and toxicity caused by agrochemicals: organophosphates, carbamates, chlorinated hydrocarbons, pyrethroids. herbicides, fungicides, rodenticides and urea.

Residue toxicology: Hazards of residues, concepts of withdrawal time and MRLs, minimizing drug and toxic residues in animal products Venomous bites and stings: Snake bite, scorpion, spider, wasp stings and toad poisoning. Radiation hazards and industrial toxicants. Toxicity caused by food additives and preservatives.

CourseBreakdown

Theory

S.No.	Topic	No.of Lectures
1	Definitions, Terminology, Scope of Toxicology	1
2	Sources of poisoning, mode of action of poisons. Factors modifying toxicity. Classification of toxicants	1
3	Collection, preservation and dispatch of samples for toxicological laboratory.	1
4	General approaches to diagnosis of poisoning and line of treatment.	1
5	Toxicology of metals & non metals: Antimony, Arsenic, calcium, lead, mercury, copper, selenium, phosphorous, cobalt, fluorine, iodine, iron, magnesium, nitrates and nitrites, common salt.	4
6	Toxicology of Agro chemicals: (a) Insecticide:	2

	organophosphates, carbamates, chlorinated hydrocarbons, pyrethroids.	
7	(b) Herbicides: Phenoxy derivatives of fatty acid, Dinitrocompounds	1
8	(c) Fungicides: Organic: Sulphur; Inorganic: phthalimides, Dithiocarbamates, Pentachlorophenol(PCP)	1
9	(d) Rodenticides : Fluoroactates, Reserpine, Alphanapthylthiyourea, Zinc phosphide	1
10	(e) Fumigants: Organic & inorganic fumigants	1
11	Toxicology of Radioactive substances: Source of radiation, biological effects of ionizing radiation, somatic effect of radiation	1
12	Toxicology of commonly used drugs: Anaesthetics (Tranquilizer, Sedatives, Hypnotics), analgesics, anthelmentics, antibiotics, antibacterials, antihistaminics, antiseptics& disinfectants, coccidiostats, digitalis, purgatives, quinuronium derivatives, hormones, vitamins & CNS stimulants	3
13	Toxicology of venomous bites & Stings(snake, toads,Spiders, Bees,Wasps)	2
14	Toxins(Mycotoxins by moulds &larger fungi)	1
15	Toxicity due to plants (Cyanogenetic, jowars, lantana, Dhatura, nuxvomica, castor, selenium containing plants, oxalate containing plants etc.)	4
16	Residue toxicology: Hazards of residues, concepts of withdrawal time and MRLs, minimizing drug and toxic residues in animal products	2
17	Toxicology of Food &Feed additives: Antioxidants, Coloring agent, Flavoring agent, preservatives, growth & performance enhancer	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Demonstration of commonly used drug toxicity in lab animals (Antibacterial, Antibiotics, Anthelmintics, coccidiostats etc.)	2
2	Identification of commercially available antidotes & their use in toxicological cases (Organophosphophate poisoning, cyanide poisoning, etc.)	2

3	Collection of sample, its preservation and dispatch of material for toxicological laboratory.	2
4	Method & procedure of analysis of samples for diagnosis of poisoned cases in lab.	3
5	Identification and collection of toxic plants.	1
6	Analysis of milk, meat, fodder & agricultural by products for residual of drugs & agrochemicals.	3
7	Case recording of clinical cases of poisoning.	2
	Total	**15**

References

Garg, S.K., 2000. Veterinary Toxicology, CBS Publishers & Distributors, New Delhi.
Roy B.K (2001) Veterinary Pharmacology and Toxicology, Kalyani Publishers, New Delhi.
Sandhu, H.S. and Brar, R.S.,2000.TextBook of Veterinary Toxicology,
Kalyani Publishers, Ludhiana.

Course Code: AEC 401

Course Title: Farm Management and Production Economics

Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of this course the students will be acquainted with the principles of farm management and production economics dealing with the analysis of farm resources having alternative under constraint conditions.

Syllabus

Definition, nature, scope and importance of farm management in relation to other sciences. Farm resource management- land, labour, machinery and civil works. Farm management problems in Nepal. Production relationship- factor-product, factor-factor and product-product relationships. Principles of farm management decisions- principle of variable proportion, cost principle, factors substitution, equi-marginal return, opportunity cost, principles of comparative advantages, the principle of time comparison. Farm planning and budgeting. Farm record and account. Farm efficiency measure. Risk and uncertainty management. Linear programming: concept and approach.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Concept, nature, subject matter and scope of farm management	2
2.	Importance of farm management and problems related to management of firms in Nepal	1
3.	Management of farm resources- land, labour, machinery and equipments and civil works	4
4.	Production relationships – Factor-product relationships	2
5.	Factor-factor relationship and least cost combination	2
6.	Product-product relationship and comparative advantage	2
7.	Principles of farm management decisions- variable proportion, factor substitution, cost principle, equi-marginal return, opportunity cost principle, time comparison and comparative advantage principle	5

8.	Farm planning-characteristics and techniques	2
9.	Farm budgeting- enterprise and partial budgeting	1
10.	Farm inventory, depreciation and valuation technique of farm assets	2
11.	Farm records keeping- balance sheet, income statement and cash flow statement	3
12.	Farm efficiency measures	
13.	Risk and uncertainty- concept, types, safeguards and measures	2
14.	Linear programming- concept and approach	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Determination of optimum input use and maximization of profit using only one input	1
2.	Least cost combination of inputs	1
3.	Revenue maximization through optimum enterprise combination	1
4.	Farm record keeping	1
5.	Preparation of farm inventory	1
6.	Development of new farm plan	1
7.	Preparation of Balance Sheet of a farm	1
8.	Preparation of Income Statement of farm	1
9.	Development of Cash Flow budget of a farm	1
10.	Farm physical efficiency measures	1
11.	Farm financial efficiency measures	1
12.	Computation of depreciation of farm assets	1
13.	Valuation techniques of farm assets	1
14.	Exercise on time value of money	1
15.	Exercise on linear programming	1
	Total	**15**

References

Panda, S. C. 2007. Farm Management and Agricultural Marketing. Kalyani Publishers, New Delhi

Manson, J. 1996. Farm Management. Kangaroo Press, Pennsylvania State University.

Kay, R.D. and W.M. Edwards. 1994. Farm Management. McGraw Hill, Inc., New Delhi.

Kahlon, A. S. and K. Singh. 1992. Economics of Farm Management in India. Allied Publishers, New Delhi.

Shankhyan, P. L. 1983. Introduction to Farm Management, Tata, McGraw-Hill, Co. Ltd., New Delhi.

Johl, S. S. and T. R. Kapoor. 1973. Fundamentals of Farm Business Management . Kalyani Publishers, New Delhi.

Course Code: VOG 402
Course Title: Theriogenology II (Gynecology and Obstetrics)
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Upon the successful completion of this course, students will be able to diagnose pregnancy and differentiate it with various pathological conditions, and identify diseases during gestation period.

Syllabus

Pregnancy diagnosis (PO) in cow - external, internal, clinical, hormonal, ultrasonic, radiographic and differential diagnosis of pregnancy. Mare- rectal and vaginal examination. Biological tests. PD in Ewe, Sow, Bitch and Queen. Disease and accidents during gestation period- prolonged gestation, premature birth, early embryonic death, abortion in cattle, horse, sheep, goat, swine, cat and dog. Mummification of foetus, fetal maceration, induced abortion, extra uterine pregnancy, dropsy of fetal membranes and foetus, abdominal hernias. Torsion of uterus, vagina cervical prolapse, paraplegia of pregnancy. Accidents during pregnancy. Parturition - symptom and initiation of parturition. Stages of parturition. Involution of uterus. Artificial interferences of normal parturition. Case and diseases of new born and dam. Eutocia, Dystocia, types, causes, handlings of dystocia - diagnosis and treatments of dystocia.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Pregnancy diagnosis - external, internal and differential diagnosis	2
2.	Chemical, radiological and biological tests in different species	3
3	Disease and accidents - prolonged, prematures and early embryonic death	3
4.	Abortion in cattle, horse, sheep, goat, swine and dog	2
5.	Mummification and maceration of foetus	1
6.	Induced abortion and extra uterine pregnancy	1
7.	Dropsy of foetal membranes and foetus	2
8.	Abdominal hernia	1
9	Torsion of uterus and vagina	1
10.	Cervical prolapse	1
11.	Paraplegia of pregnancy	1

12.	Accidents during pregnancy	1
13.	Parturition - symptoms, stages and involution of uterus	2
14.	Artificial interferences of normal parturition	2
15.	Care and diseases of new born	2
16.	Dystocia - types and causes	2
17.	Diagnosis; handling and treatments of dystocia	3
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Pregnancy diagnosis	2
2.	Observation of normal parturition	1
3	Handling and use of Gynecological Instruments	2
4.	To irrigate the uterus having endometritis with normal saline solution	2
5.	Manipulation of foetal malpresentation	2
6.	Corrections of uterine torsion	1
7.	Retention of foetal membranes	1
8.	Prolapse of vagina and uterus	2
9	Attending several cases of dystocia	2
	Total	**15**

References

Arthur, G.H. 1977. Veterinary Reproduction and Obstetrics. The ELBS and Bailliere Tindall (latest Edition).

Hefez, E.S.E. 1997. Reproduction in Farm Animals. Lea and Febiger Philadelphia (latest Edition).

Robert, S.J. 1971. Veterinary Obstetrics and Genital Diseases. CBS Publishers and Distributors, New Delhi (latest Edition).

Course Code: VSR 401
Course Title: Anaesthesiology
Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon the completion of course student will be familiar with different preanaesthetics, anaesthetics with their antidotes, other emergency drugs and their proper use in veterinary field.

Syllabus

History and terminology of anaesthesia, general considerations in selection of anaesthesia, preanaesthetic medication, local and regional anaesthesia, general anaesthesia, balance anaesthesia and stage of anaesthesia, muscle relaxants, electro-anaesthesia, acupuncture and hypothermia, anaesthetic complications, emergencies and their remedies, anaesthesia of laboratory animals and birds, restraining of zoo and wild animals and euthanasia.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	History and importance of anaesthesia in veterinary surgery	1
2.	Introduction, types of anaesthesia and definition of common terms	1
3.	General considerations in selection of anaesthetic agents	1
4.	Preparation of patients for anaesthesia	1
5.	Preanaesthetic medication in domestic animals Anticholinergics, tranquillizers (reasons and contraindications, effects on body systems) Narcotic and sedatives (reasons and contraindications, effects on body systems)	2
6.	Local and regional anaesthesia Introduction, Indications and clinically useful local analgesic drugs Methods of producing local analgesia (surface, infiltration, instillation, field block and nerve block) Methods of producing regional anaesthesia (epidural, paravertebral, intravenous)	3

7.	General anaesthesia Anaesthetic drugs (parentral and inhalation) Balance anaesthesia and stage of anaesthesia	2
8.	Muscle relaxants, electro-anaesthesia, acupuncture and hypothermia (definition level)	1
9.	Anaesthetic complications, emergencies and their remedies	1
10.	Anaesthesia of laboratory animals and birds	1
11.	Restraining of zoo and wild animals	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Familiarization with anaesthetic apparatus, endotracheal device, laryngoscopes, gadgets for monitoring	1
2.	Laboratory tests of the patients before anaesthesia	1
3.	Methods of local infiltration (Ring block, diamond block, T-block, inverted L- block)	1
4.	Epidural and paravertebral block (Regional blocks)	1
5.	Intravenous regional block	1
6.	Methods of administration of anaesthesia in horse, cattle, sheep and goat	1
7.	Methods of administration of anaesthesia in dogs, cats and pig	1
8.	Endotracheal Intubation in animals	1
9.	Artificial ventilation to the patients	1
10.	Anaesthetic machines and their systems	1
11.	Demonstration and monitoring of general anaesthsia	1
12.	Postanaesthetic intensive care of animals and management of anaesthetic emergencies	1
13.	Induction of anaesthesia in laboratory animals and birds	1
14.	Chemical method of restraints of zoo and wild animals	1
15.	Euthanasia: Indications, various methods and agents used	1
	Total	**15**

References

Blaze and Glowaski 2004. Veterinary Anaesthesia- A Quick Reference, Elseviers Saunders.

Hall, LW,KW Clark, and CM Trim, 2001. Veterinary Anaesthesia. 10th Ed., WB saunders Company, London, Edinburgh.

Lumb, WV and EW Jones, 1996. Veterinary Anaesthesia. Williams & Wilkins -A Waverely Copmany, Baltimore, Philadelphia, London.

Paddleford, RR 1999. Manual of Small Animal Anaesthesia, 2nd Ed., WB Saunders Company, Philadelphia, London.

Seymour, C and R Gleed, 1999. Manual of Small Animal Anaesthesia and Analgesia, 1st Edn, British Small Animal Veterianry Association, Kingsley House, Church Lane, UK.

Course Code: VSR 402
Course Title: General Surgery
Credit hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Upon the Completion of course student will be able the basic principles of tissue handlings, basic surgical instruments, suture materials and suturing patterns, haemorrhage and haemostasis and aseptic techniques of surgery, nutritional support for veterinary surgical patients, fluid & electrolyte infusion and blood transfusions.

Syllabus

Introduction, branches, history and development of veterinary surgery, reasons of surgery, principles of tissue handling and general surgical principles, proficiency in veterinary surgery, sterilizations of surgical materials and instruments, suture and ligature, nutritional support to surgical patients, infection control, wound and wound healing, haemorrhage, haemostasis and shock, surgical management of necrosis, gangrene, burn, scalds, frost bite, sinus and fistula, bandages and physical therapy, principles of fluid and blood transfusions, affections and surgical managements of blood vessels, lymphatics, bursa, muscles and nerves.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction, branches, history and development of veterinary surgery	1
2.	Reasons of surgery, principles of tissue handling and general surgical principles	1
3.	Proficiency in veterinary surgery (pre-operative preparations, operative technique and post-operative considerations)	2
4.	Sterilizations of surgical materials and instruments	2
5.	Suture and Ligature- Knot tying, suture characteristics, specific suture materials, ligation technique Surgical needle, principles of choosing a surgical needle and types of needle Principles of suture selection, common suturing techniques and suture removal	3

6.	Nutritional support to surgical patients Introduction, consequences of malnutrition, metabolic changes associated with starvation, Dietary requirement, enteric feeding, parental nutrition	2
7.	Infection control Factors in wound infection, surgical asepsis, antimicrobial prophylaxis Treatment of wound infections, nosocomial infections	2
8.	Wound and Wound Healing Introduction, classification, symptoms, diagnosis and treatment Pathways of wound healing, stages and phases of wound healing Factors affecting wound healing, complications of wound and their management	3
9.	Haemorrhage, haemostasis and shock	2
10.	Differential diagnosis and surgical treatment of inflammation, abscess, tumors, cyst, haematoma and hernia	3
11.	Differential diagnosis and surgical treatment of necrosis, gangrene, burn, scalds, frost bite, sinus and fistula	2
12.	Bandages and physical therapy Applications, layers and bandaging techniques Applications, regimens and adjunct to physical therapy	2
13.	Principles of fluid and blood transfusions Indications, major body compartments and body water distribution, various electrolytes solutions, replacement solutions and colloid Assessment of dehydration, hypovolaemic shock, assessment of fluid requirements and Intraoperative fluid therapy and blood transfusion	3
14.	Affections and managements of- Blood vessels, lymphatics and bursa Muscles and nerves	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	An introduction to the layout of operation theater and theater management	1
2.	Acquaintances of common equipments and surgical instruments	1

3.	Care of surgical instruments	
4.	Restraints of various species of animal	1
5.	Clinical examination of animals	1
6.	Nutritional support to surgical patients	1
7.	Administration and dispensing of medications	1
8.	Peri-operative fluid therapy to surgical patients	1
9.	Preparation and sterilization of surgical packs and equipment for theatre	1
10.	Preparation of the patient for theatre	1
11.	Preparation of the surgical team	1
12.	Familiarization with various suture materials and suture and their handling	1
13.	Different types of incision and pattern of suturing	1
14.	Postoperative care of the surgical patients	1
15.	Dressings and bandages	1
	Total	**15**

References

Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.

Oehme, FW and JE Prier, 1976. Text Book of Large Animal Surgery, 3rd Edn, Williams & Wilkins A Waverely Copmany, Baltimore, Philadelphia, London.

Slatter, HS 1993. Textbook of Small Animal Surgery. Vol-I & II, 2nd Edn, WB Saunders Company, Philadelphia, London.

Tyagi, RPS and J Singh, 2002. Ruminant Surgery, CBS Publishers and Distributors, Delhi, India.

Venugopalan, A 2002. Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH Publishing Co. Pvt. Ltd.

Code: VMC 402
Course Title: Internal Medicine II (Metabolic and Deficiency)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Students are expected to learn the skills on interpretation of results of diagnostic tests, identifying new problems and subsequently diagnose the animals affected by metabolic disease, deficiency diseases and diseases of muscle, skin, eye and ears.

Syllabus

Definition, classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of milk fever, downer's cow syndrome, hypomagnesaemia in cattle and buffalo, azoturia in equines, hypothyroidism and diabetes in dogs. Diagnosis and management of diseases caused by deficiency of iron, copper, cobalt zinc, manganese, selenium, calcium, phosphorus, magnesium, vitamin A, D, E, B. complex, K and C in domestic animals and poultry, Nutritional haemoglobinuria. Diseases of neonates. Diseases of skin and musculo-skeletal system, sense organs of domestic animals.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1	Definition , classification, etiology, pathogenesis, clinical sign diagnosis, differential diagnosis and treatments of milk fever, downer's cow syndrome	2
2	Hypomagnesemic tetany, Ketosis	2
3	Diabetes mellitus and diabetes insipidus	1
4	Nutritional haemoglobinuria,goiter, rheumatism	1
5	Rickets, Osteomalacia, Hypothyroidism	2
6	Pregnanacy toxaemia in cows	1
7	Azoturia, Eclampsia, Obesity	2
8	Vitamin defeficiency- Vitamin A,D,E,K	3
9	Vitamin deficiency – Vitamin B and C	2
10	Mineral deficiency diseases	2
11	Myopathy,myositis, osteodystrophy,osteomyelitis, arthritis	3

12	Urticaria, alopecia, psoriasis, erythema, ,	2
13	Dermatomycoses, pododerm, photosensitization, parakeratosis, hyperkeratosis	2
14	Conjunctivitis, Keratitis, otitis	1
15	Common poisoning cases	2
16	Ethnoveterinary medicine	1
17	Diseases of new borne animals	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Clinical examination of sick animals suffering from metabolic diseases	2
2	Examination of urine and milk for ketone bodies	2
3	Skin scrapping for lab test	1
4	Examination of blood for lab test	3
5	Collection of body fluids for metabolic profile test	2
6	Case records	5
	Total	**15**

References

Blood D.C. and G.M.Radostitis.1989. Veterinary Medicine ,A TextBook of the diseases of cattle , sheep, pigs, goats, and horses, ELBS Publication (7th Edition)

Chakrabarti ,A. 1988.Text Book of Clinical Veterinary Medicine Kalyani Publishers, India (Third revised Edition)

Merck Veterinary Mannual. 1991 . S.E. Aiello (Edition) .Merck and Co. Inc. White House Station, USA(8th Edition).

Smith, B.P. 1996. Largest Animal Internal Medicine. Mosby Publication (2nd Edition).

Robison NE. 1997. Current Therapy in Equine Medicine. WB Saunders.

Course Code: VMC 403
Course Title: Preventive Medicine I (Bacterial, Fungal and Rickettsial Diseases)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon completion of this course student will be able to describe the status of bacterial, fungal and rickettsial diseases prevalent in livestock and poultry and able to diagnose and treat the common infectious diseases.

Syllabus

Principles of epidemiology, general epidemiology of infectious diseases, Modes of disease transmission. Definition, incidence, etiology, epidemiology, pathogenesis, transmission, clinical signs, diagnosis, treatment, prevention and control of Pasteurellosis, Black quarter, Tetanus, Anthrax, Tuberculosis, Paratuberculosis, Actinomycosis, Actinobacillosis, Brucellosis, Listeriosis, Leptospirosis, Mastitis, Contagious bovine pleuropneumonia (CBPP), Campylobacteriasis (Vibriosis) Chlamydiosis, Botulism, Contagious Caprine Pleuropneumonia (CCPP),Foot rot, Strangles, Glanders, Swine Erysepalas, Salmonellosis, Mycoplasmosis, Fowl Typhoid, Fowl cholera, Colibacillosis, Aspergillosis, Mycotoxicosis, Sporotrichosis, Ringworm, Degnala disease, Q fever, Anaplsmosis.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction and principles of epidemiology	1
2	General epidemiology of infectious diseases and modes of disease transmission	1
3	Pasteurellosis and Black quarter	2
4	Tetanus	1
5	Anthrax and Tuberculosis	2
6	Paratuberculosis	1
7	Actinobacillosis and Actinomycosis	1
8	Brucellosis	1
9	Leptospirosis and Listeriosis	2
10	Mastitis	1
11	Contagious bovine pleuropneumonia (CBPP)	1
12	Campylobacteriosis and Chlamydiosis	1
13	Botulism	1

14	Foot rot and Enterotoxaemia	2
15	Contagious Caprine Pleuropneumonia (CCPP)	1
16	Strangles and Glanders	1
17	Swine erysepalas	1
18	Salmonellosis and Fowl typhoid	1
19	Mycoplasmosis and Colibacillosis	2
20	Fowl cholera and Aspergillosis	1
21	Mycotoxicosis and Sporotrichosis	2
22	Ringworm and Degnella disease	2
23	Q fever and Anaplasmosis	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Collection, preservation and dispatch of materials for bacteriology and mycology	1
2	Preparations of glasswares and medias for bacteria and fungus	1
3	Identification of bacteria by Gram's staining	2
4	Drug sensitivity tests	1
5	Common biochemical tests	2
6	Diagnosis of mastitis by cultural and indirect tests	2
7	Diagnosis of Tubercullosis and Johne's disease by allergic tests	1
8	Diagnosis of brucellosis by PAT and MRT	1
9	Diagnosis of Salmonellosis by whole blood agglutination tests	1
10	Examination of skin scrapings for fungus	1
11	Maintaining of case records of at least 10 cases	2
	Total	**15**

References

Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).

Chakravarti, A .2011. TextBook of Preventive Veterinary Medicine. Kalyani Publishesrs , India

Merc. Veterinary Manual, 2010. Merc and Co, USA (10th Edition).

Course Code: VCS 402
Course Title: Veterinary Clinical Service II
Credit Hours: 2(0+2) Full Marks: 50 Theory:0 Practical: 50

Objectives

Upon the successful completion of this course, student will be able to diagnose and treat the cases of different animals.

Syllabus

Handling of cases brought at veterinary teaching hospital, clinical examination of animals, collection and preparation of samples for laboratory analysis, prescription writing, drug administration and preparation of clinical records and ambulatory clinics.

Course Breakdown

Practical

S.No.	Topic	No. of Practicals
1	Hospital management involving out patient department (OPD)	1
2	Indoor patient, critical care, intensive care unit, sanitation, up keeping, practice management	1
3	Diagnosis and treatment of common clinical cases like pharyngitis, laryngitis, stomatitis	1
4	Diagnosis and treatment of common clinical cases like indigestion, ruminal impaction, Tympany	1
5	Diagnosis and treatment of common clinical cases like enteritis, traumatic reticulo peritonitis	2
6	Diagnosis and treatment of common clinical cases like traumatic pericarditis	1
7	Treatment of cases of metritis, cervicitis and vaginitis	3
8	Treatment of fresh wound and chronic wound	1
9	Treatment of broken horn injury and horn cancer	1
10	Passing of stomach tube and gastric tube	2
11	Use of antiseptic and disinfectants	1
12	Treatment of magotted wound	1
13	Castration of goat, bulls and pig	1
14	Treatment and prevention of omphalitis and colibacillosis in poultry	1
15	Treatment and prevention of Infectious Bursal Diseases and Newcastle Diseases	1

16	Treatment of Ascarid worms and tapeworms in poultry	1
17	Treatment control and prevention of ticks, lice and flea infestation in cattle buffalo and dogs	1
18	Tr19eatment control and prevention of paramphistomiasis and fascioliasis in cattle and buffalo	2
19	Treatment control of calf scour	1
20	Treatment control and prevention of coccidiosis in poultry and bovine	2
21	Treatment, control and diagnosis of clinical and subclinical mastitis in cattle and buffalo	1
22	Diagnosis treatment and control measures in Actinobacillosis and Actinomycosis	1
23	Allergy and its treatment	1
24	Handling storage and security of drugs and instruments	1
	Total	**30**

References

Blood D.C. and O.M. Radostits. 2007. A textbook of the diseases of cattle, sheep, pigs, goats and horses. ELBS publication (10th Edition).

Hefez, E.S.E. 1997. Reproduction in farm animals. Lea and Febiger Philadelphia (latest Edition).

Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.

Venugopalan, A 2002. Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH publishing Co. Pvt. Ltd.

Course Code: AQU 402
Course Title: Fish Diseases
Credit hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives
Upon completion of the course, students will be able to diagnose and treat common fish diseases.

Syllabus
Introduction: principles and importance of fish health management; Common fish diseases: causes, symptoms and treatment; Different methods of disease control: Prophylactic measures and Curative measures; Bio-security and best management practices; Common drugs, chemicals, probiotics and their application.

Course Breakdown

Theory

S. No.	Topic	No. of Lectures
1.	Introduction: Importance of health management, Status of fish disease, OIE listed diseases, Host- pathogen - environment interaction, Modes of disease transmission, Factors affecting fish health: Genetic and physiological profiles, environment, feed and feeding, injuries and pathogens, Signs of sickness of fish	6
2.	Common fish diseases: Causes, symptoms and treatments a. Infectious diseases: Bacterial- Ulcer, Dropsy, Eye disease, Fin rot; Fungal diseases- Saprolegniasis, Branchiomycosis, Epizootic Ulcerative Syndrome (EUS); Protozoan diseases- Ichthyophthiriasis, Trichodinosis, Coastiasis, Whirling disease; Diseases caused by worms- Dactylogyrosis, Gyrodactylosis, Ligulosis; Diseases caused by Crustaceans- Argulosis, Learneasis, Ergasilosis	12
	b. Non-infectious diseases- Asphyxiation, Gas bubble disease, Aflatoxin, Mechanical trauma, Temperature, pH, Nutritional diseases	4
3.	Different methods of disease control: Prophylactic measures: Test and slaughter, Sanitation of aquaculture equipments, Quarantine and restriction of movements; Curative measures: Swabbing, Dip, Bath, Flush, Pond (indefinite) treatment, Systemic, Vaccination	4
4.	Bio-security and best management practices	2
5.	Common drugs, chemicals, probiotics and their application	2
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1.	Study of external organs of fish	1
2.	Study of internal organs of fish (Carp, Catfish and Tilapia)	3
3.	Identification of commonly used equipments in fish health examination	1
4.	Sampling procedure, preservation technique (slide preparation)	3
5.	Examination of skin, fins and gills alimentary canal of fish	2
6.	Study of fungal organisms of fish	1
7.	Identification and use of common drugs and chemicals	1
8.	Calculation of chemicals for the treatment of fish	1
9.	Methods of treatment	2
	Total	**15**

References

Brown, E.E. and J.B.Gratzek.1980. Fish farming Hand Book. AvI publishing company , Inc. Westport Connecticut.

Jha.D.K. 1991. Laboratory manual of fish diseases Nepal. Tribhuvan university .IAAS, Rampur.

Kabata, Z.1985. Parasites and diseases of fish cultured in the tropics. Taylor and Farancis .London.

Lucky,Z.1977. Methods for the diagnosis of fish diseases. Glenn L. Hoffman (Ed.). Amerind Publishing Company Pvt. Ltd. New Delhi India.

Noga,E.J.2008. Fish diseases :Diagonosis and Treatment. St. Louis, Mosby.

Post,G.W.1983. Text book of fish heath. T.F.H. Publication, INC.Ltd.

Roberts,R.J. 1978. Fish pathology. Bailliere Tindall .London.

Schaperclaus, W. 1991. Fish Disease, vol. I and II. Amerind Publishing Co., New Dehli.

Lectures notes and journals articles

Course Code: LPT 402
Course Title: Milk and Milk Product Technology
Credit Hours: 2(1+1) Full marks: 50 Theory: 25 Practical: 25

Objectives

Upon the completion of the course, the students will be able to collect milk sample and perform quality control tests, determine different component of milk (TS, SNF, FAT) process milk and milk products.

Syllabus

Milk: definition of milk and diagrammatical representation of milk constituents Composition of milk. Factors affecting the composition, nutritive values and physical and chemical properties of milk, Processing of milk. Different dairy products, Method of preparation, types, and nutritive value of following dairy product: butter, ice-cream, cheese, powder milk and condense milk, sweets, prepared from chhenna and khoa and their quality control.

Course Breakdown

Theory

S. No.	Topic	No. of Lectures
1.	Definition milk and diagrammatic representation of milk constituents	1
2.	Composition of milk: Fat, Lactose, protein, energy, Vitamin and minerals	2
3.	Nutritive value of milk.	1
4.	Physical and chemical properties of milk	1
5.	Factors affecting the composition of milk	1
6.	Natural flavor and off- flavor of milk	1
7.	Milk processing: receiving weighing, sampling, platform test, Straining, filtration and clarification	1
8.	Cooling system, transportation, emulsification homogenization	1
9.	Pasteurization, sterilization, packaging, distribution and storage of milk and products	1
10.	Products processing: Methods of preparation, type, flow diagram, nutritive values and uses of following dairy products e.g. cream, butter, ghee, khoa. chhana, dahi (yogurt) planner, ice-cream, powder milk, condensed milk and cheese	3
11.	Sweets prepared from chhana and khoa	1
	Total	**15**

Practical

S. No	Topic	No. of Practicals
1.	Study of commonly uses dairy equipments in a lab	1
2.	Study of milk sampling procedures	1
3.	Clot on boiling (COB) and titrable acidity test in milk	1
4.	Estimation of fat by Gerber's method	1
5.	Estimation of specific gravity SNF, and TS in milk.	2
6.	Study of MBR test for assessing microbial quality	1
7.	Preparation of milk products: Chhana ,khoa, paneer, butter and ghee	4
8.	Preparation of ice -cream	1
9.	Preparation of condensed milk	1
10.	Preparation of sweets from chhana and khoa	2
	Total	**15**

References

Clarence, H.E., W.B. combs and H.Macy.1994. Milk and Milk Products, TATA. MC Graw-Hill Publishing Co. Ltd. India

Prashad, J.1997 Animal Husbandry and Dairy science Kalyani publishers, India

Sukumar, De.2000. Outline of Dairy Technology. Oxford Univ. press, New Delhi.

Course Code: VPH 403
Course Title: Milk and Meat Hygiene, Food Safety and Public Health
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of course student will be able to increase milk and meat product quality, risk analysis, sanitary and phytosanitary measures in relation to food of animal and aquatic origin.

Syllabus

Milk hygiene in relation to public health. Microbial flora of milk and milk products. Sources of milk contamination during collection and transport of milk and processing of dairy products. Control of milk and milk product contamination. Hygienic handling/ management of dairy equipment. Quality control of milk and milk products. Legislation and standards for milk and milk products. Milk as a source of disease transmission. Pathological conditions associated with the transport of food animals. Elements of meat inspection. Hygiene in abattoirs. Ante-mortem inspection of meat animals. Humane slaughter of animals. Postmortem inspection of meat animals. Methods of inspection of meat. Rigor mortis and examination of lymph nodes. Speciation of meat. Health implications of emergency and causality slaughter. Hygienic disposal of unsound meat. Inspection of poultry and aquatic foods (fish) for human consumption. Occupational health hazards in meat processing plants. Meat as a source of disease transmission. Food safety, definition, hazard analysis and critical control point (HACCP) system and chemical and microbial toxicities associated with milk, meat and aquatic foods. Risk analysis: assessment and management and food safety measures. Toxic residues (pesticides, antibiotics, metals and hormones) and microbial toxins in food and their health hazards. Types of bio-hazards. Sanitary and phytosanitary measures in relation to foods of animal origin and aquatic foods. International and national food safety standards, Office International des Epizootics (OIE), World Trade Organisation (WTO), Sanitary and Phytosanitary (SPS) and Codex Alimentarius.

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Milk hygiene in relation to public health.	1
2.	Microbial flora of milk and milk products. Sources of milk contamination during collection and transport of milk and processing of dairy products.	2
3.	Control of milk and milk product contamination.	2

	Hygienic handling/ management of dairy equipment.	
4.	Quality control of milk and milk products;Legislation and standards for milk and milk products.	2
5.	Milk as a source of disease transmission.	1
6.	Elements of meat inspection.	1
7.	Pathological conditions associated with the transport of food animals.	1
8.	Hygiene in abattoirs; Ante-mortem inspection of meat animals.	2
9.	Humane slaughter of animals. Postmortem inspection of meat animals.	2
10.	Methods of inspection of meat. Rigor mortis and examination of lymph nodes.	2
11.	Speciation of meat.	1
12.	Health implications of emergency and causality slaughter;Hygienic disposal of unsound meat.	1
13.	Inspection of poultry and aquatic foods (fish) for human consumption.	2
14	Occupational health hazards in meat processing plants. Meat as a source of disease transmission.	2
15	Food safety, definition, hazard analysis and critical control point (HACCP) system and chemical and microbial toxicities associated with milk, meat and aquatic foods.	2
16	Risk analysis: assessment and management and food safety measures.	2
17	Toxic residues (pesticides, antibiotics, metals and hormones) and microbial toxins in food and their health hazards.	2
18	Types of bio-hazards. Sanitary and phytosanitary measures in relation to foods of animal origin and aquatic foods.	1
19	International and national food safety standards {Office International des Epizootics (OIE), World Trade Organisation (WTO), Sanitary and Phytosanitary (SPS) and Codex Alimentarius}.	1
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1.	Sanitary collection of samples for chemical and	1

	bacteriological examination.	
2.	Grading of milk by MBR test	1
3.	Test for pasteurization and plant sanitation.	1
4	Microbiological examination of raw and pasteurized milk, milk products and water. Standard plate, coliform, faecal streptococcal, psychrophillc, mesophilic and thermophilic counts.	3
5	Detection of adulterants and preservatives in milk and milk products.	1
6	Isolation and identification of organisms of public hearth significance from milk.	2
7	Visit to abattoirs, meat processing plants, marketing centers and food service establishments.	1
8	Ante-mortem and post mortem inspection of food animals.	1
9	Methods of slaughter (demonstration at the slaughter houses).	1
10	Demonstration of speciation of meat.	1
11	Physical and bacteriological quality of meat and aquatic foods (fish).	1
12	Demonstration of toxic chemical and microbiological residues in milk and meat	1
	Total	**15**

References

SJ Forsythe and PR Hayes, ***Food Hygiene, Microbiology and HACCP***, 3rd ed. 1998., An Aspen Publishers, Gaithersberg, Maryland.

John de Vries (editor), ***Food Safety and Toxicity***, 1997, CRC press, New York

Leo ML Nollet & Fidel Toldra (editors), ***Safety Analysis of Foods of Animal Origin***, 2011, CRC Press.

Joseph Gracey, David S. Collins and Robert Huey, ***Meat Hygiene***, 10th ed.,1999, WB Saunders Company Ltd., London, UK

James M. Jay, ***Modern Food Microbiology***, 6th ed., 2000,An Aspen Publishers, Gaithersberg, Maryland.

Course Code: LPT 403
Course Title: Meat, Meat Products Technology
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon completion of the course, students will be able to understand about meat, its structure, composition and nutritional value and the products prepared from meat and their preservation and best utilization.

Syllabus

Definition, prospects and problems of meat industry in Nepal. Pre-slaughter care and handling effect on meat quality. Structure and growth of muscles, chemical and biochemical constitution of muscles. Conversion of muscle to meat. Eating quality of meat, methods of preservation and maintenance of quality. Edible and inedible carcass and their utilization and handling. Microbiology, deterioration and contamination of meat. Comminuted and emulsified meat product common of in Nepal. Curing methods and ingredients.

Course Breakdown

Theory

S. No.	Topics	No. of Lectures
1	Definition , Prospects, and problems of meat industry in Nepal	1
2	Pre-slaughter care and handling effect on meat quality	1
3	Structure and growth of muscles	2
4	Chemical and biochemical constitution of muscles.	2
5	Eating quality of meat	1
6	Meat preservation and maintenance of quality	2
7	Edible and inedible carcass and their utilization and handling.	2
8	Conversion of muscle to meat.	1
9	Microbiology, deterioration and contamination of meat.	1
10	Comminuted and emulsified meat product common of in Nepal.	1
11	Curing methods and ingredients	1
	Total	**15**

Practical

S. No	Topic	No. of Practicals
1	Judging and selection of meat animals	1

2	Meat identification/Bones of chicken, pork and lamb	1
3	Approximate yield of whole sale cuts of lamb, pork and beef/Identification of meat carcass	2
4	Pre-slaughter and post slaughter evaluation of birds and animals Ante/post mortem inspection	1
5	Identification of equipments used in the fabrication of meat	1
6	Handling and packaging of meat	1
7	Curing of meat	2
8	Comminuted and emulsified meat product preparation (Ham, Bacon, Sausage, Meat loaf, dry meat)	2
9	Sensory evaluation of meat	2
10	Visit of meat processing plant/slaughter house	1
11	Report writing and submission	1
	Total	**15**

References

Lawrie, R.A. 1985. Meat Science 4th ed. Oxford Newyork

Price and schweigert (latest ed. The science of meat and meat production, Freeman and Company, Sanfrancisco

Wiggin and Welson (latest ed). Color atlas of meat and poultry inspection-VanNostrand Reixhold Company N.Y. Sanfrancisco

Forest et al (latest ed). Principles of meat science WH Freeman and company, Sanfrancisco

Tan and Mambesa Sensory evaluation of food-laboratory manual–IFST, COA, UPLB, Laguna

Warris P.D. Meat science – An introductory text CABI- Publishing.

AMIF-The science of meat products WHF Freeman and Company Sanfrancisco and London

Course Code : VOG 403
Course Title: Theriogenology III (Gynecology and Obstetrics)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the successful completion of this course; students will be able to proceed for manipulative delivery, embryotomy, caesarian section, hysterectomy, correction of prolapsed and retention of foetal membrane.

Syllabus

Fertility, infertility, anoestrous, hypoplasia, adrenal virilism, genital diseases and infertility of cow, mare, saw, doe, bitch. Infectious diseases- trichomoniasis, vibriosis, brucellosis, granular venereal diseases, pustular vulvo vaginitis, miscellaneous (Infection of bovine female genital tract). Hormonal disturbances - resulting in infertility - cysts, cystic ovaries, anoestrous and its causes, repeat breeding and managemental problems. Obstetrical operation for relieving dystocia, mutation, forced extraction, embryotomy/fetotomy, caesarean section/hysterectomy. Injuries and disease of puerperal period, post-partum haemorrhage, laceration, contusion of the birth canal and adjustment structures, rupture of the uterus, perineum, vagina, prolapse vaginal and uterine prolapse. Abdominal or pelvic visceral prolapse, metabolic diseases of post partum period, post-partum infections and diseases, retention of placenta and septic metritis, infection of cervix, vagina and vulva. Post partum paraplegia milk fever, clinical uses of hormones and prostaglandins.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction and definition of the courses	1
2.	Fertility, infertility and sterility	1
3	Anoestrus, hypoplasia, adrenal virilism in different domestic animals	2
4.	Trichomoniasis, vibriosis, brucellosis and their diagnosis and treatment	2
5.	Granular Venereal Disease and Pustular Vulovaginitis	1
6.	Hormonal disturbances resulting in infertility	2
7.	Cyst and Cystic ovarian condition	1
8.	Anoestrous,its causes,diagnosis and treatments.	1
9	Repeat breeding, its causes, diagnosis and treatment	2

10.	Managemental problem- identification and solution	1
11.	Embryotomy/Fetotomy its procedure and removal	2
12.	Mutation, forced extraction and treatment	1
13.	Caeserean section, its procedure and post-operative care	2
14.	Hysterectomy, its procedure and post-operative care	2
15.	Post partum haemorrhage and its control	1
16.	Rupture of uterus, perineum and vagina and their managment	1
17.	Vaginal and uterine prolapsed, its control measures and treatment	2
18.	Metabolic diseases during pregnancy	2
19.	Retention of placenta, its removal and treatments	1
20.	Use of GnRH to improve reproductive efficiency in bovines	1
21.	Use of PGF2α to improve reproductive efficiency	1
	Total	**30**

Practicals

S.No.	Topic	No.of Practicals
1.	Manipulative delivery of foetal malpresention	3
2.	Use of gynaecological appliances	2
3	How to perform foetotomy	2
4.	How to perform Hysterectomy	3
5.	How to perform caesarean section	3
6.	Post operative care	2
	Total	**15**

References

Arthur, G.H. 1977. Veterinary Reproduction and Obstetrics. The ELBS and Bailliere Tindall (latest Edition).

Hefez, E.S.E. 1997. Reproduction in Farm Animals. Lea and Febiger Philadelphia (latest Edition).

Robert, S.J. 1971. Veterinary Obstetrics and Genital Diseases. CBS Publishers and Distributors, New Delhi (latest Edition).

Course Code: VSR 403
Course Title: Radiology and Diagnostic Imaging
Credit Hours: 2 (1+1) **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives

This Course will enable students to take X-rays of the affected parts and their processing and interpretation and to acquire fundamental knowledge about ultrasonography, CT scan, MRI, echocardiography, scintigraphy, gamma camera, xeroradiography and Doppler.

Syllabus

Introduction and historical backgrounds of veterinary radiology, production and properties of X-rays, working principles of x-rays machine and radiographic accessories, processing of radiograph, factors influencing production of radiographs, intensifying screen and its uses, advantages and disadvantages of fluoroscopy, contrast radiography, interpretation X-rays films, biological effect of radiation hazards and safety measures, principles of ultrasonography, CT scan, MRI, echocardiography, scintigraphy, gamma camera, xeroradiography and Doppler and their applications in veterinary practice, physical therapy

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction and historical backgrounds of veterinary radiology	1
2.	Production and properties of X-rays	1
3.	Working principles of x-rays machine and radiographic accessories, Processing of Radiograph	1
4.	Factors influencing production of radiographs (Radiographic factors and photographic factors)	1
5.	Intensifying screen and its uses Advantages and disadvantages of fluoroscopy	1
6.	Contrast radiography: classification, materials used, indications, and contraindications	1
7.	Principles of viewing and interpreting X-rays films , classification of radiographic lesions	1
8.	Biological effect, measurement of the radiation, hazards, and safety measures	1
9.	Principles of ultrasonography and its applications in veterinary practice.	1
10.	Principles of radiation therapy, isotopes, and their uses in diagnosis	1

	and therapy	
11.	Principles of physical therapy, its classification, scope and limitations	2
12.	Mechanism, applications, indications and contraindications of cold and heat therapy, massage, hydrotherapy, infrared and ultraviolet therapy	1
13.	Mechanism, applications, indications and contraindications of short wave, microwave diathermy and ultrasonic therapy	1
14.	Principles and application of CT scan, MRI, echocardiography, scintigraphy, gamma camera, xeroradiography and Doppler	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Familiarizations with and operation of X-rays equipments, X-rays accessories and dark room equipments	1
2.	Positioning and radiography of different parts of body in small and large animals	1
	Processing of X-ray films	1
3.	Handling, viewing and interpreting of an X-ray film, familiarization with film contrast, density and detail, spot film viewing, common defects of X-ray films, interpretation and classification of lesions	2
4.	Radiographic pathology of skull of large and small animals (Clinical cases/transparencies)	1
5.	Radiographic pathology of bones and joints of small and large animals	2
6.	Radiographic pathology of thorax and abdominal cavity	1
7.	Demonstration of contrast techniques in small animals	1
8.	Familiarization with fluoroscopic examination and ultrasonography	1
9.	Techniques and application of diathermy, electrical stimulators, ultrasonographic therapy	2
10.	Use of cold and hot application, massage and planned exercise, infrared and ultraviolet rays etc their precautions	2
	Total	**15**

References

Hoque, M and GR Singh, 2004. Ultrasonography in Animals- Technical Bulletin, ICAR Publication, Izatnagar India.

Lavin, LM 1999. Radiography in Veterinary Technology, 2nd Edn, WB Saunders Company, Philadelphia, London.

Singh, AP and Singh, J 2004. Veterinary Radiology- Basic Principles and Radiographic Positioning, 1st Edn, CBS Publishers and Distributors, Delhi, India.

Singh, GR and M Hoque, 2004. Manual of Veterinary Radiology, ICAR Publication, Izatnagar India.

Course Code: VSR 403
Course Title: Regional and Clinical Surgery I
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

This course will enable students to diagnose and correct major surgical affections regarding orthopaedics, lameness in animals, ophthalmology, ear, nose and throat.

Syllabus

Bone as a tissue, fracture-fracture healing, fracture reduction and fixations, differentiation between fracture and dislocation, affections of the joints, ligaments and tendons, affections of the vertebral columns including contusion fracture of the ribs, injuries to the costal cartilage, Lameness- it's definition and classification, body confirmation in relation to lameness and diagnosis of lameness, affections of the fore and hind limbs and their treatments on different domestic animals, anatomy of the foot, examination of the foot and their treatments, declawing, therapeutic shoes and corrective shoeing, crural paralysis, subluxation of sacro-iliac ligaments, rupture of round ligament, trochantric bursitis, femoral nerve paralysis, upward luxation of patella and stringhalt, examination of eye and diagnosis of eye diseases, principles of ophthalmic surgery, affections of the eye and their surgical management: entropion, ectropion, growth and tumors of the eyelid, occlusion of the nasolacrimal duct, squint, affections of the cornea and conjunctiva and their management, hydropthalmia, glaucoma, panopthalmia, injuries and affections of the anterior and posterior chambers, worm in the eye, affections and surgical management of ear, guttural pouches, lips and chicks, teeth, tongue, salivary gland, palate, nose, horns, neck and withers, esophagus, trachea, larynx and pharynx.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Bone as a tissue: formation of bone, structural and cellular elements of bone, and blood circulation to fractured bone	1
2.	Fracture: definition, etiology, classification, diagnosis Process of fracture healing Factors affecting fracture healing and complications of fracture healing Techniques of fracture reduction and fixations Fracture of the sternum, sternal fistula and pneumocele	4
3.	Differentiation between fracture and dislocation, affections of the	2

	joints, ligaments and tendons	
4.	Affections of the vertebral columns including contusion fracture of the ribs, injuries to the costal cartilage	1
5.	Lameness, it's definition and classification, Body confirmation in relation to lameness (trunk, fore and hind limbs), Diagnosis of lameness	1
6.	Affections of the fore and hind limbs and their treatments on different domestic animals (e.g. cattle, dog, horse, sheep and goat)	2
7.	Anatomy of the foot, examination of the foot and their treatments (contusion and ulceration of the sole, septic and chronic laminitis, avulsion of the hoof and declawing, therapeutic shoes and corrective shoeing)	2
8.	Crural paralysis, subluxation of sacro-iliac ligaments, rupture of round ligament, trochantric bursitis	1
9.	Femoral nerve paralysis, upward luxation of patella and stringhalt	1
10.	Examination of eye and diagnosis of eye diseases, Principles of Ophthalmic surgery	1
11.	Affections of the eye: entropion, ectropion, growth and tumors of the eyelid and conjunctivitis, occlusion of the nasolacrimal duct, squint	1
12.	Eye Ball: Affection of the cornea, hydropthalmia, glaucoma, panopthalmia, injuries and affections of the anterior and posterior chambers, Worm in the eye.	2
13.	Affections of the ear and their treatment: haematoma of the ear, ear cropping, necrosis and ulceration of the conchal cartilage, chronic ottorhoea, tumors of the ear	1
14.	Affections and treatment of the guttural pouches, chondritis, tympanitis, sinutitis, pus in the sinus	1
15.	Affections and treatments of lips and chicks: hare lip, lip fold pyoderma, edema of conical papillae of cheek Teeth: Congenital abnormalities, irregular molars	1
16.	Affections and treatment of tongue: strangulation, sublingual abscess, necrosis and gangrene, self suck	1
17.	Affections and treatment of salivary gland: fistula, mucoceles & ranulas, neoplasm, abscess, sialoliths and sialocele	1
18.	Affections and treatment of palate: cleft, lampasas, palatine tumors Nose: atheroma, nasal polyps, parasites in the nasal chambers, necrosis of the turbinates	1
19.	Affections and treatment of horns: avulsion of the horns, broken	1

	horns, horn cancer, fracture and fistula of the horn, disbudding and amputation	
20.	Affections and treatment of neck: yoke gall, yoke-abscess, yoke-tumors, torticollosis and affection of the withers	1
21.	Affections and treatment of esophagus and trachea: Stenosis, ulcers, dilation and diverticulations, chocking, collapse of the trachea and tracheal tumors	1
22.	Affections of the larynx and pharynx: foreign bodies, abscess, traumatic injuries and fistula	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Familiarization of the various orthopedic instruments	1
2.	Plaster of Paris bandage in animals	1
3.	Intramedullary pinning in the dog	1
4.	Demonstration of the corrective shoeing, examination and paring of the bovine foot	1
5.	Examination of horse for soundness and preparation of certificates for lameness	1
6.	Amputation of limbs	1
7.	Medial patellar desmotomy and operation for string halt	1
8.	Operation of the corneal ulcer, technique of sub-conjunctival injection, blepharoplasty for entropion and ectropion and excision of dermoids	1
9.	Enucleating of the eye/extirpation of the eye and operation for draining the guttural pouches	1
10.	Disbudding and amputation of horns	1
11.	Exploration of the mouth using various mouth gags and tooth rasping	1
12.	Ear cropping, operation for aural haematoma and Zepp’s operation	1
13.	Oesophagotomy	1
14.	Tracheotomy and tracheostomy	1
15.	Amputation of the tail	1
	Total	**15**

References

Alexander, JW 1985. Leonard's Orthopaedic Surgery of the Dog and Cat. 3rd Edn, WB Saunders Company, Philadelphia.

Bojrab, MJ 1990. Current Techniques in Small Animal Surgery. 2nd Edn, Lea & Febiger 600 Washington Square, Philadelphia.
Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.
Slatter, HS 1993. TextBook of Small Animal Surgery. Vol-I & II, 2nd Edn, WB Saunders Company, Philadelphia, London.
Venugopalan, A 2002. Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH publishing Co. Pvt. Ltd.

Course Code: VMC 404
Course Title: Preventive Medicine II (Viral, Protozoal and Parasitic Diseases)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon completion of this course student will be able to describe the status of viral, protozoal and parasitic diseases prevalent in livestock and poultry and able to diagnose and treat the common infectious diseases.

Syllabus

Definition, incidence, etiology, transmission, pathogenesis, clinical signs, diagnosis, treatment, prevention and control of Rabies, Pseudorabies, FMD Infectious bovine Rinderpest rhinotracheitis, Bovine viral diarrhea, Bovine malignant catarrah, Ephemoral fever, Pox disease, Scrapie, Blue tongue, Contagious pustular dermatitis, PPR, African horse sickness, Infectious equine anaemia, Infectious equine rhinopneumonitis, Equine influenza, Virus encephalomyelitis of horse, Hog cholera, Swine influenza, Swine vesicular disease, Canine distemper, Infectious canine hepatitis, Canine Parvo virus infections, Avian influenza, Ranikhet disease, Infectious bursal disease, Infectious bronchitis, Marek's disease, Avian leucosis complex, Fowl pox, Litchi disease, EDS – 76, Avian encephalomyelitis, Trypanosomosis, Theileriosis, Babesiosis, Coccidiosis, Amphistomiosis, Fascioliosis, Schistosomosis, echinococcosis, cysticercosis, trichomonosis,

Course Breakdown

Theory

S.No.	Topic	No of.Lectures
1.	Rabies and Pseudorabies,FMD	2
2	Infectious bovine rhinotracheitis and Bovine viral diarrhea,Rinderpest	2
3	Bovine malignant catarrah and Ephemoral fever,	1
4	Pox disease, Scrapie and Blue tongue,	1
5	Contagious pustular dermatitis and PPR	1
6	African horse sickness and Infectious equine anaemia,	1
7	Infectious equine rhinopneumonitis, Equine influenza and Virus encephalomyelitis of horse,	2
8	Hog cholera,	1
9	Swine influenza and Swine vesicular disease,	1
10	Canine distemper,	1

11	Infectious canine hepatitis and Canine Parvo virus infections,	2
12	Avian influenza,	1
13	Ranikhet disease and Infectious bursal disease,	2
14	Infectious bronchitis and Marek's disease,	2
15	Avian leucosis complex and Fowl pox,	1
16	Litchi disease, EDS – 76 and Avian encephalomyelitis,	1
17	Trypanosomosis and Theileriosis,	2
18	Babesiosis and Coccidiosis,	2
19	Amphistomiosis and Fascioliosis,	1
20	Schistosomiosis and echinococcosis,	1
21	Cysticercosis and Trichomonosis,	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Collection, preservation and dispatch of materials for virology laboratory	2
2	Practice of vaccination in livestock	2
3	Practice of vaccination in poultry	2
4	Review of common viral diseases of livestock in Nepal	2
5	Review of common viral disease of poultry prevalent in Nepal	2
6	Case record of 10 viral diseases	5
	Total	**15**

References

Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).

Chakravarti, A . 2011. TextBook of Preventive Veterinary Medicine. Kalyani Publishesrs , India

Merc. Veterinary Manual, 2010. Merc and Co, USA (10th Edition)

Course Code: VMC 405
Course Title: Ethics and Jurisprudence
Credit Hours: 1 (1+0) Full Marks: 25 Theory: 25 Practical: 0

Objectives

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

Syllabus

Legal duties of veterinarians, animal legislation, welfare and forensic laws. Examination of animals for soundness. Examination of injuries, causes of sudden animal death. Post- mortem examination. Detection of frauds, malicious poisoning, bestiality, mischief, cruelty, poisoning drugs. Animal quarantine and meat inspection act. Insurance. Ethics for veterinarian made under Nepal Veterinary Council Act. OIE codex.

Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Legal duties of veterinarian	1
2	Techniques of soundness examination for animals	1
3	Clinical examination of injuries.	1
4	Causes of sudden animal death and their detection.	1
5	Post-mortem examination for detection of death cause.	1
6	Frauds, malicious poisoning, bestiality	1
7	Examination Mischief and cruelty	1
8	Forensic laws, OIE codex and guidelines, poisoning drugs and their cautious use	2
9	Animal quarantine act and slaughter house and meat inspection Regulation, 2057 (2001)	1
10	Insurance of livestock.	1

11	Nepal veterinary council rules, 2057 (2000)	2
12	And Act Made to Provide Necessary Arrangement Relating to Animal Health and Livestock Services	1
13	Laws relating to Nepali Muluki Ain	1
	Total	**15**

References

Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).

Dabas, S.P.S and O.P. Saxena. 2001. Veterinary Jurisprudence and Post mortem.

International, Book Distributing Co. (2nd Edition).

Nepal Veterinary Council Rules, 2057 (2000)

Course Code: VCS 403
Course Title: Veterinary Clinical Service III
Credit Hours: 2(0+2) **Full Marks: 50** **Theory: 0** **Practical: 50**

Objectives

Upon the successful completion of this course, student will be able to diagnose and treat the cases of different animals.

Syllabus

Handling of cases brought at veterinary teaching hospital, clinical examination of animals, collection and preparation of samples for laboratory analysis, prescription writing, drug administration and preparation of clinical records and ambulatory clinics

Course Breakdown

Practical

S.No.	Topic	No. of Practicals
1	Ambulatory clinical activity (medicine, gynaecology and obstetrics, surgery) infield conditions	3
2	Diagnosis and treatment of common clinical cases like pneumonia	1
3	Diagnosis and treatment of common clinical cases like haemoglobinuria and haematuria	1
4	Diagnosis and treatment of common clinical cases like milk fever and ketosis	1
5	Diagnosis and treatment of common clinical cases like rickets and osteomalacia	1
6	Diagnosis and treatment of common clinical cases like organophosphorus and lead poisoning	1
7	Diagnosis and treatment of common forage poisoning	1
8	Handling of cases of retention of placenta	1
9	Management of Prepartum and postpartum prolapse of vagina	1
10	Examination and preliminary handling of dystocia cases	2
11	Rectal examination of genitalia and vaginal examination practice	2
12	Familiarization with antiseptic dressing techniques	1
13	Treatment and management of inflammation, wounds, abscess, cysts, tumors	1
14	First aid in fractures and dislocation and other affections of joints, fascial paralysis	1

15	Diagnosis and treatment of ephemeral fever and swine fever	1
16	Diagnosis treatment and control measures in Marek's and Avian Leukosis complex (ALC)	1
17	Prevention and control measures of LPAI and HPAI in poultry bird	1
18	Vaccination program in Broiler and layers	2
19	Vaccine and vaccination program in large animals	2
20	Correction of uterine torsion and repeat Breeding syndrome in large animals	2
21	Treatment and control measures of rabies diseases	1
22	Treatment and control measures of PPR and CCPP in caprine	1
23	Treatment and preventive measures in Degnala disease in bovine	1
	Total	**30**

References

Blood D.C. and O.M. Radostits. 2007. A textBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS publication (10th Edition).

Hefez, E.S.E. 1997. Reproduction in farm animals. Lea and Febiger Philadelphia (latest Edition).

Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.

Venugopalan, A 2002. Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH publishing Co. Pvt. Ltd.

Course Code: BCH 404
Course Title: Molecular Biology and Biotechnology
Credit Hours: 3(2+1) Full marks 75 Theory: 50 Practical: 25

Objectives

Upon completion of the course, student will be able to understand the basic fundamentals of molecular biology and DNA technology, and its use in animal biotechnology and disease diagnosis. Nutritional and fermentation biotechnology and bioinformatics will also be introduced and learn to apply molecular biology to veterinary and agricultural problems, biotechnology and biomanufacturing.

Syllabus

Structure and properties of nucleic acids, Recombinant DNA technology, Biotechnological application in animal improvements, Nutritional biotechnology, Animal tissue culture, Molecular diagnosis, Fermentation process, regulatory issues in biotechnology and Bioinfomnatics and modern vaccine. Genetic diseases & Gene therapy.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Overview of DNA and RNA structure and DNA Replicationn and Transcription, RNA processing,Translation and genetic code DNA Damage and Repair	1
2	Regulation and expression of gene	1
3	Chromosomal aberrations and gene mutation	1
4	Gene cloning, vectors and expression vectors.	1
5	Transformation and transfection	1
6	Real time Polymerised chain reaction (PCR),	1
7	Construction of genomic library and cDNA library..	1
8	DNA sequencing.	1
9	Principles of transfer of nucleic acids and proteins (Southern, Northern and Western blotting),	1
10	Nucleic acid hybridization	1
11	DNA probes and DNA fingerprinting	1
12	Restriction fragment length polymorphisms and related DNA-based approaches	

13	DNA microarray technology	
14	Proteomics	
15	Embryo biotechniques, in-vivo and in- vitro embryo production and preservation	1
16	Sexing, micromanipulation and cloning,	1
17	transgenic animal and biopharming	1
18	Mapping of genome and genome sequencing.	1
19	Marker assisted selection..	1
20	Gene banking	1
21	Bioconversion of lignocellulose,	1
22	Genetic manipulation of microbes for improved feed utilization and health	1
23	Animal tissue culture, transformation and cell lines,	1
24	Tumor markers and acute phase proteins and DNA probes.	1
25	Hybridoma and monoclonal antibodies.	1
26	Gene deletion vaccines – bacteria and Subunit recombinant	1
27	Marker vaccines and companion diagnostic tests and recombinant vectored vaccines	1
28	Fermentation process and technologies for milk, meat and leather	1
29	Ethics and regulatory issues in Biotechnology. IPR. and Bioinfomatics	1
30	Genetic diseases & Gene therapy	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Tumor markers and its detection in tissue affected by tumors	1
2	Antibody detection by Competitive ELISA (C-ELISA)	1
3	RNA isolation.	1
4	Demonstration of real time PCR-techniques for disease diagnosis	3
5	Expression analysis of gene by Northern and Western analysis.	1
6	Detection of protein by Immunohistochemistry and Immunoblotting	2
7	Embryo transfer technique	2
8	Use of Multimedia and audio-visual aids for molecular biology aspects.	2
9	Tissue culture technique	2
	Total	**15**

References

Gerald Karp, John Wiley and Sons. Cell and molecular Biology, Concepts and experiments

Jenkins N. 1999. Methods in Biotechnology. Animal Cell Biotechnology – Methods & Protocols. Published by Human Press Inc., New Jersey.
Malacinski and Freifelder Jones and Bartlelt Publishers.Essentials of molecular Biology,
Srivastava S.,P. S. Srivastava & B. N. Tiwary. 1996. Trends in Molecular biology and Biotechnology. 1996. Ed. By. Published by CBS Publications & Distributors, New Delhi.
William H. Elliott & Daphne C. Elliott. 1997. Biochemistry and Molecular Biology. Published by Oxford University press, Oxford.

Course Code: AEC 402
Course Title : Agriculture Marketing and Cooperatives
Credit Hours : 2 (2+0) Full Marks: 50 Theory: 50 Practical: 0

Objectives

Upon the completion of this course, the students will be able to understand the meaning, concept and importance of agricultural marketing and cooperatives. Students will also develop analytical techniques in agricultural marketing research.

Syllabus

Concept and definition – Market and marketing, importance of agricultural product prices and marketing of both inputs and outputs. Meaning and concept of utility, consumers behavior, consumer and market equilibrium, revealed preference, consumer surplus, demand for agricultural products and their derivation. Supply of agricultural products and their derivation. Price, income and cross elasticity of demand and supply, relationship among elasticity and their use. Life cycle and development of products, marketing strategy, market and product promotions. Market structures, price determination and equilibrium in pure competition, monopoly, and oligopoly; Price discrimination. Marketing functions, marketing channels and costs. Marketing margins and price spreads. Spatial and temporal price variation. Marketing research, Marketing efficiency and its measurement, economic models for price analysis. Government intervention and public institutions in marketing, Cooperatives- concept, history, definitions, role, organization, structure, cooperative law and by laws, developing agriculture cooperatives, cooperative marketing, cooperative farming, strength and opportunities.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Agricultural marketing: concepts of market and marketing; nature of agricultural commodities; classification of markets; importance of product prices and agricultural marketing for socioeconomic progress	2
2.	Theory of consumer behavior: concept of utility and measuring approaches; demand function and factors affecting, consumer's behavior, and market equilibrium; consumers' and producer’s surplus	3
3.	Elasticities: various elasticities of demand, supply and their relationship	2

4.	Theory of firm: theory and characteristics of firms; supply function and its derivation; life cycle and development of products; marketing strategy, market and product promotions	3
5.	Market structure and equilibrium: marketable surplus; market structure, price determination and price discrimination.	4
6.	Marketing functions and channels: marketing functions: physical, exchange and facilitating functions; marketing channels, marketing cost; marketing margins and price spreads	3
7.	Price variation: price movement over time: seasonal and cyclic price variation; spatial price variation; spatial distribution of commodities and regional equilibrium models	3
8.	Marketing research: research in agricultural marketing; marketing efficiency and its measurement;	3
9.	Government intervention and public institutions: role of government in product pricing and agricultural marketing; public institutions related to production, marketing and their promotion	2
10.	Cooperatives- concept, definitions, history, role, organization, structure, cooperative law and bylaws, cooperative farming, cooperative marketing.	5
	Total	**30**

References

Rhodes, V. J. 1983. The Agricultural Marketing Systems. John, Wiley, and Sons, Inc. Singapore.

Koutsoyiannis, A. K. 1994. Microeconomics, Printice Hall, India

Barker, J. 1989. Agricultural Marketing. 2nd Ed. Oxford University Press. UK

Acharya, N. L. 1985. Agricultural Marketing in India, Surya Publication

Tomek, W. 1984 Agriculture Product Prices

Course Code: VPH 504
Course Title: Zoonosis and Public Health
Credit Hours: 2 (1+1) **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives

Upon the 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 diseases.

Syllabus

Definiton of zoonoses, classification of zoonoses, role of domesticated pets and wild animals, transmission of zoonotic disease, study of important zoonotic disease of the region, method of prevention, control and eradication of zoonotic disease, socio-economic condition and human health

Course Breakdown

Theory

S. No.	Topic	No.of Lectures
1.	Definitions and objectives of zoonoses	1
2.	Classification of Zoonoses: Direct, Cyclo, Meta, Saprozoonoses	2
3.	Role of domesticated pets, various wild & cold blooded animals in transmission of zoonotic diseases	1
4.	Mode of transmission of zoonotic diseases	1
5.	Study of the important zoonotic diseases of the region, eg., Rabies, Brucellosis , Japanese encephalitis, influenza, anthrax, , tuberculosis, leptospirosis, listeriosis, plague, rickettsiosis, chlamydiosis and dermatophytosis. Food borne zoonoses: salmonellosis, staphylococcosis, clostridial food poisoning, campylobacteriosis, toxoplasmosis and sarcocystosis.etc.	5
6.	Methods of prevention, control and eradication of zoonotic diseases.	2
7.	Socio-economic conditions and Human health	2

8.	Zoonotic pathogens as agents of bio-terrorism	1
	Total	**15**

Practical

S. No.	Topic	No.of Practicals
1	Field survey of zoonotic diseases.	4
2	Isolation and Identification of important pathogens of zoonotic importance from animal and human sources including foods of animal origin and their interpretation.	4
3	Study of the Rural Environment and health status of the rural community.	3
4	Visit to primary health centre/human hospital and study of the common diseases affecting rural/urban population, and probable relationships of these human disease conditions with animal diseases present in the area.	4
	Total	**15**

References

Acha, PN and B. Szyfres. 1989. Zoonoses and Communicable diseases common to man and animals. Pan American Health Organization, USA, 2nd Edition.
Krauss H, Zoonoses: Infectious diseases Transmitted from Animals to Human Being
Martin.E., Jones.E.H., Hubbart,W.T and Hagstard H.V :Zoonoses: Recognition Control and Prevention
Pathak K.M.L: Fundamentals of Parasitic Zoonoses
Thapliyal. 1996. Fundamental Animal Hygiene and Epidemiology. Internation Book Distributing Company.

Course Code: ANB 503
Course Title: Livestock and Poultry Breeding
Credit Hours: 3(2+1) Full Mark: 75 Theory: 50 Practical: 25

Objectives

Upon completion of this course, students will be able to understand basic principles and fundamentals of Livestock breeding and will to understand basic principles and fundamentals of pig and poultry breeding for their genetic improvement.

Syllabus

Concept of heritability and repeatability, Breeding values, dominance and epistemic values .Variance and different gene action .Inbreeding, coefficient of inbreeding and relationship, measure of inbreeding and relationship, resemblance among relatives ,inbreeding methods for development of breed, strain, lines and family. Different mating systems crossing in the light of cattle, buffalo, sheep, goat, pig and poultry. Lab animals their breeding , handling and uses. Selection, selection parameters, principles, method, basis and genetic effect of selection. Effective selection procedure for genetic improvement of cattle ,buffalo, goats ,sheep, pig and poultry. Inheritance of morphological, economic, polymorphic, threshold and sex linked traits in poultry. Breeding plan for meat an egg production in poultry for hilly region of Nepal. Formation and maintenance of control population of poultry. Selection criteria breeding for chicken meat and egg production. The disease resistance mechanism in poultry. Inbred lines are developed and maintained in poultry. Utilize dw (Swarf gene) for broiler production. Intra population selection schemes in poultry. The Egg production characters of laying poultry. Diallel crossing. Random sample test and is important in poultry research. The effect of dwarf gene on economic performance of poultry.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Concept of heritability and repeatability.	1
2.	Breeding values, dominance and epitasis values.	2
3.	Variance and different of gene actions.	2
4.	Inbreeding, coefficient of inbreeding and relationship, measure of Inbreeding and relationship, resemblance among relatives, inbreeding method for development of breed, strain, lines and family.	3
5.	Different mating systems crossing in the light of cattle, buffalo, sheep, goat, pig and poultry.	3

6.	Lab animals their breeding, handling and uses.	2
7.	Selection parameters, principles, method, basic and genetic effect of selection.	1
8.	Effective Selection procedure for genetic improvement of cattle, buffalo, goat, sheep, pig and poultry.	2
9.	Special breeding plan for cattle, buffalo, sheep, goat, pig and poultry.	3
10.	Inheritance of morphological, economic, polymorphic, threshold and Sex linked traits in poultry.	2
11.	Formation and maintenances of control population of poultry.	1
12.	The disease resistance mechanism in poultry.	1
13.	In bred lines are developed, uses and maintained in poultry.	2
14.	Utilize *dw* (dwarf gene) for broiler production.	1
15.	Intra population selection Schemes of poultry.	1
16.	The egg production characters of laying poultry.	1
17.	Diallel crossing	1
18.	Random sample test and is important in poultry research.	1
	Total	**30**

Practical

S.No.	Topic	No. of Practials
1.	Estimation of heritability and repeatability.	1
2.	Estimation of Breeding value, dominance and epistasic value	1
3.	Calculation of Variance and different gene action	1
4.	Inbreeding, coefficient of inbreeding and relationship, measure Of inbreeding and relationship.	2
5.	Different mating system crossing in the light of cattle, buffalo, sheep, goat, pig and poultry	3
6.	Estimation of selection parameters, and genetic effect of selection.	1
7.	Preparation of breeding plan for cattle, buffalo, sheep, goat, pig, and poultry	3
8.	Formation and maintenance of control population of poultry.	1
9.	Diallel crossing.	1
10.	Random sample test and important in poultry research	1
	Total	**15**

References

Lasley, F.J 1988.Genetics of livestock Improvements
Nicholl, D.S.T 1994.An introduction to genetic engineering
Hutt, F.B.1982.Animals Genetics
Warick and legates, 1979.Breeding and Improvement of Farm animals.

Johanssan, I.And Rendel J.1968.Genetics and animals breeding.
Crawford, R.D.2003. Poultry, breeding and genetics.3rd Edition Elsevier.

Course Code: VOG 504
Course Title: Theriogenology IV (Veterinary Andrology and Reproductive Techniques)
Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon the successful completion of this course, students will be able to sterilize the Artificial Insemination (AI) and A.V. equipments, and gain the knowledge on collection, processing, evaluation, preservation of semen as well as conduction AI.

Syllabus

Introduction, development, comparative study of male genitalia and gonads, growth, puberty,sexual maturity, behavior, libido. Factors affecting libido. Forms of male infertility, factors affecting infertility in males, diagnosis and treatment. Abnormalities, malformations, diseaseof male genitalia and coital injuries, their diagnosis and treatments. Training andMaintenance of Bulls – prepare samples, sterilization of equipments - metals, glass, rubberequipments, -assembling of A.V.,Examination of reproductive functions, semen - collectionevaluation, dilution, preservation, and Artificial Inseminations, estrussynchronization,superovulation, conceptus and application of E.T. Techniques and cloning.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Introduction and definition of the course	1
2.	Comparative study during development of gonads and genitalia	1
3	Growth, puberty and sexual maturity	1
4.	Factors affecting libido	1
5.	Training and maintenance of bull	1
6.	Prepucial sampling	1
7.	Sterilization of equipments	1
8.	Parts and assembling of Artificial Vagina set	1
9	Semen collection	1
10.	Evaluation, dilution and preservation of semen	2
11.	Synchronization, superovulation	1
12.	Artificial Insemination Technique	1

13	Embryo transfer technique	2
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Sterilization of A. V. equipment	1
2.	A.V. preparation	1
3	Collection of semen	2
4.	Evaluation	2
5.	Live and dead count	1
6.	Total concentration	1
7.	Extension of semen	1
8.	Preservation of semen	1
9	Artificial Insemination	2
10.	Synchronization	2
11.	Embryo Transfer Technique	1
	Total	**15**

References

Hafez, E.S.E. (Ed.). Reproduction in farm Animal (6^{th} Edition) 1993. LEA and FEBIGER, Philadelphia USA.

Perry, E.J. 1969. The Artificial Insemination of Farm Animals. Oxford and IBH Publishing, New Delhi (latest Edition).

Roberts, S.J. 1971. Veterinary Obstetrics and GEnital Diseases (Theriogenology). CBS Publishers and Distributors, India. (latest Edition)

Salisbury, G.W. and N.L. Van Demark. 1978. Physiology of Reproduction and AI in Cattle (latest Edition).

Course Code: VSR 505
Course Title: Regional and Clinical Surgery-II
Credit Hours: 3 (2+1) **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

To diagnose and correct major surgical affections of thoracic cavity, gastrointestinal system, urogenital system and udder & mammary glands.

Syllabus

Surgical approaches to the thorax, general considerations for thoracic surgery, major affections of thoracic cavity and their management, Hernia- Classification, etiology, diagnosis, and treatment in various species, affections and surgical managements of- Simple and Compound Stomach, Intestine, anal glands, liver, spleen and pancreas, affections and corrections of urogenital system, castration in various species, scrotal ablation, ovariohysterectomy in various species, their indications, techniques and complications, caesarian section in domestic animals, affections of udder and teat and their surgical management.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1.	Thoracic Surgery- surgical approaches to the thorax, General considerations for thoracic surgery Thoracocentesis, pneumothorax, hydrothorax, pyothorax, Chylothorax, Heart worm in dogs, Tumors and abscess of lungs, Diaphragmatic abscess	4
2.	Hernia- classification, etiology, diagnosis, and treatment in various species Umbilical Hernia, perineal hernia, ventral/lateral hernia Inguinal/scrotal hernia, diaphragmatic hernia	3
3.	Affections and surgical managements of simple and compound stomach: Cardiac and pyloric stenosis, torsion of stomach, Gastric ulceration, stomach tumors, foreign bodies in stomach, Ruminal impaction, traumatic reticulitis, Omasal impaction, abomasal displacements,	4

4.	Affections and surgical managements of intestine- Principles of intestinal surgery Colic, intestinal obstruction, intussusceptions Strangulations, volvulus and paralytic ileus Caecal dilatation and caecal torsion Perforation of intestine, perforated wound and fistula of abdomen Supra rectal abscess, rectovaginal fistula, paralysis of the rectum, Prolapse of the rectum, Atresia ani, atresia ani-et-recti-et-coli, haemorrhoids, stenosis of the rectum and anus	7
5.	Affections of the anal glands and their surgical managements	1
6.	Affections and surgical management of liver, spleen and pancreas	2
7.	Affections and corrections of urogenital system: Congenital malformations: Anorchidisim and monorchidisim, cryptoorchidism, ectopic testes, hypospadiasis, persistent penile frenulum Retention of urine, rupture of the bladder and urethra and urolithiasis Urinary fistula, hydrocele, hypertrophy of the prostate gland, phimosis and paraphimosis, haematoma of penis, priapism, penile fracture, preputial prolapse, Episiotomy, prolapse of vagina and uterus, canine vinereal granuloma, Neoplasms and other diseases	4
8.	Castration in various species, scrotal ablation	1
9.	Ovariohysterectomy in various species, their indications, techniques and complications	1
10	Caesarian section in domestic animals, persistent hymen	1
11.	Affections of udder and teat and their surgical management- Imperforate teats, teat fissure, obstruction of the teat canal, teat fistula, papilloma, Contusions, open wounds, gangrenous mastitis, abscess, tumor, ulcers, botryomycosis	2
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Familiarizations with landmark for approach to various visceral organs, thoracocentesis, abdomino-centesis	1
2.	Thoracotomy (demonstration)	1

3.	Laparotomy and visualization of viscera in dog	1
4.	Gastrotomy in small animals	1
5.	Laparotomy and palpation of viscera in large animals, Rumenotomy	1
6.	Surgical correction of abomasal displacement	1
7.	Enterotomy, enterectomy and intestinal anastomosis	1
8.	Anal gland ablation in small animals	1
9.	Cystotomy	1
10.	Urethrotomy	1
11.	Castration, vasectomy, caudectomy	1
12.	Ovario-hysterectomy	1
13.	Caesarian section in domestic animals	1
14.	Episiotomy and Technique of Buhner's suture application	1
15.	Amputation of udder and teat	1
	Total	**15**

References

Bojrab, MJ 1990. Current Techniques in Small Animal Surgery. 2nd Edn, Lea & Febiger 600 Washington Square, Philadelphia.

Harari, J 1996. Small Animal Surgery. The National Veterinary Medical Series, 1st Edn, Williams & Wilkins.

Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.

Slatter, HS 1993. TextBook of Small Animal Surgery. Vol-I & II, 2nd Edn, WB Saunders Company, Philadelphia, London.

Tyagi, RPS and Singh, J(2002. Ruminant Surgery, CBS Publishers and Distributors, Delhi, India.

Course Code: VMC 506
Course Title: Animal Welfare
Credit Hours: 1(1+0) Full Marks: 25 Theory: 25 Practical: 0

Objectives

During and at the end of the course, the student shall be able to define animal welfare within the context of the five freedoms, understand the various spectrum of animal welfare, manifest appreciation of the importance of the five freedoms to animals, explain or discuss and give examples of inputs in providing welfare needs to various animal species, express own practice of applying learned concepts in animal welfare.

Syllabus

Discussion on concepts and importance of animal welfare, spectrum of animal welfare, five freedoms of animal welfare, ethical concerns of welfare, normal behaviors of animals, Identified behavioral indicators of welfare, interaction of humans with animals, animal-human abuse link, role of the veterinarian in animal welfare, responsible pet ownership, welfare issues in population control programmes, humane methods of euthanasia, cultural differences with respect to philosophy and practices on animal ownership and use, animal welfare for wildlife and animal under disasters management, discussion on concepts in animal welfare including practice governing animal control as well as protection and prevention of cruelty to domestic and wild animals.

Course Breakdown

Theory

S.No.	Topic	No.of Lectures
1	Introduction to concepts of animal welfare and ethics	1
2	Welfare assessment methods and the five freedoms	1
3	Human-animal interactions	1
4	Physiological and behavioral indicators of animal welfare	1
5	Immune and production indicators of welfare	1
6	Welfare of animals used in research, testing and education	1
7	Farm animal welfare, animals during transportation and Issues	1
8	Animal welfare in commercial livestock farming practices	1
9	Pet and companion animal welfare	1
10	Companion animals – population control programmes	1
11	Wild animal welfare	1
12	Animal welfare during natural calamities and disaster management	1

13	Euthanasia, cruelty to the animals and bestiality	1
14	Animal welfare legislations and organizations	1
15	Development of veterinary ethics and roles of veterinarian on animal welfare	1
	Total	**15**

References

World Society for Animals 2007. Concepts in Animal Welfare: Animal Welfare Syllabus (CD ROM format). London: University of Bristol and WSPA

Legood, Giles ed. 2000. Veterinary Ethics: An Introduction. New York: Continuum

Fraser A.F. and D.M. Broom 1997. Farm Animal Behaviour and Welfare. Third Edition. Cambridge: CABI Publishing

Gregory, Gregory G. 1998. Animal Welfare and Meat Science. Cambridge: CABI Publishing

Stafford, Kevin 2006. The Welfare of Dogs – Animal Welfare Series Volume 4. Dordrecht: Springer

Course Code: VCS 504
Course Title: Veterinary Clinical Service IV
Credit Hours: 2(0+2) Full Marks: 50 Theory: 0 Practical: 50

Objectives

Upon the successful completion of this course, student will be able to diagnose and treat the cases of different animals.

Syllabus

Handling of cases brought at veterinary teaching hospital, clinical examination of animals, collection and preparation of samples for laboratory analysis, prescription writing, drug administration and preparation of clinical records and ambulatory clinics

Course Breakdown

Practical

S.No.	Topic	No. of Practicals
1	Treatment and prevention of Brucellosis and Trichomoniasis in bovine species	1
2	Treatment and prevention of FMD, BQ, HS and RP	2
3	Treatment and control measures of canine distemper and parvo virus infection in canine	1
4	Treatment and control of hypocalcaemia and Downer's Cow syndrome	1
5	Treatment and control measures of salmonellosis in poultry	1
6	Treatment and control measures of fowl Typhoid	1
7	Treatment and prevention of visceral and Articular gout in poultry	1
8	Treatment and prevention of mycotoxicosis in poultry	1
9	Treatment and control of epistaxis and choking	1
10	Surgical correction of upper fixation medial patellar ligament	2
11	Treatment and prevention of retention of urine	1
12	Bacteriological culture and antibiotic sensitive test	2
13	Examination of blood smear for diagnosis of blood protozoan disease	2
14	Examination of horse for soundness and preparation of certification of soundness	1
15	Familiarization with burn injuries and their treatment techniques	1
16	Clinical management of mastitis	2

17	Familiarization with epistaxis and nasal polyps and their treatment	1
18	Treatment and prevention of corneal opacity	1
19	Treatment and prevention of udder oedema	1
20	Treatment and prevention of stress and Ascites in poultry birds	1
21	Practice of feeding of sick animals	1
22	Vaccination and other disease prevention and control programmes in the field	1
23	Ambulatory clinics (Medicine, gynaecology and surgery) in the field conditions	3
	Total	**30**

References

Blood D.C. and O.M. Radostits. 2007. A textBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS publication (10th Edition).

Hefez, E.S.E. 1997. Reproduction in farm animals. Lea and Febiger Philadelphia (latest Edition).

Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.

Venugopalan, A 2002. Essentials of Veterianry Surgery. 8th Edn, Oxford & IBH publishing Co. Pvt. Ltd.

Course Code: VMC 507
Course Title: Wildlife, Pet and Lab Animal Medicine
Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

Upon completion of the course student will be able to handle, restrain, diagnose and treat the common diseases of wild animals, zoo animals and lab animals.

Syllabus

Basic principles of habitat and housing of various classes of wild and zoo animals. Population dynamics of wild animals, Nutrient requirements of wild animals, Restrain, capture, handling, physical examination and transport of wild and zoo animals. Principles of anaesthesia, anaesthetics, chemicals of restraining, Capture myopathy. Principles of zoo hygiene, public health problems arising from zoos. Prevention, control and treatment of infectious, parasitic, nutritional and metabolic diseases in zoo and wild animals.
National and international organisations and institutions interlinked to wild and zoo animals, Common diseases affecting dogs and cats (bacterial, viral, parasitic, fungal, nutritional etc.) - their clinical manifestations, diagnosis, treatment and control. Vaccination/ deworming schedules. Common diseases affecting pet birds their control and prevention. Common diseases affecting lab animals, their control and prevention.

Course Breakdowan

Theory

S. No.	Topic	No of Lectures
1.	Basic principles of habitat and housing of various classes of wild and zoo animals.	1
2.	Population dynamics of wild animals	1
3.	Nutrient requirements of wild animals	1
4.	Restrain, capture, handling, physical examination and transport of wild and zoo animals.	1
5.	Principles of anaesthesia, anaesthetics, chemicals of restraining, Capture myopathy.	2
6.	Principles of zoo hygiene, public health problems arising from zoos.	1
7.	Prevention, control and treatment of infectious, parasitic, nutritional and metabolic diseases in zoo and wild animals.	2
8.	National and international organisations and institutions interlinked to wild and zoo animals	1

9	Common diseases affecting dogs and cats (bacterial, viral, parasitic, fungal, nutritional etc.) - their clinical manifestations, diagnosis, treatment and control. Vaccination/ deworming schedules.	3
10	Common diseases affecting pet birds ,their control and prevention.	1
11	Common diseases affecting lab animals, their control and prevention.	1
	Total	**15**

Practical

S. No.	Topic	No.of Practicals
1	Visit of nearby wild life sanctuary/zoo/wild animal centres to study the care and management, restraint, examinations, administration of medicines etc. in zoo animals. To study the housing, feeds and feeding schedule of zoo animals.	1
2	Post mortem examination of wild and zoo animals.	1
3	Handling, processing and interpretation of pathological materials from zoo and wild animals.	1
4	Planning for balanced feeding. Diet charts, preparation of balanced diet for new borne, growing and sick animals as oral and intravenous feeds.	2
5	Care of pups, weaning, administration of medicine. Nail and tooth care, clipping of hairs for show purposes.	2
6	Hygiene of kennel/pens, feeding utensils.	1
7	Restraining of dogs for examination and medicine administration.	1
8	Common breeds of cats, handling, restraint, examination, medication and surgical intervention in cats and kittens.	2
9	Identification of common pet birds. Handling of pet birds, their examination and administration of medicines.	2
10	Identification of common lab animals. Handling of lab animals, their examination and administration of medicines.	2
	Total	**15**

References

Craig. E. Greene. 1998. Infectious Diseases of the Dog and Cat.2nd Edn. W.B. Saunders Company, London, U.K

Ettinger, S. J and Feldman E.C .2000. TextBoob of Veterinary Internal Medicine.5th Edn. Vol1. W.B. Saunders, London,U.K
Fowler ME, Miller, RE: Zoo and wild animal medicine.5th Ed. WB Saunders, London, U.K.
Joshi BP. Wild Animal Medicine, Oxford and IBH Publishing Company, New Delhi.

Course Code : EXT 503
Course Title : Social Mobilisation and Community Development
Credit Hours : 3(2+1) Full Marks: 75 Theory: 50 Pracitcal: 25

Objectives

Upon the completion of this course the students will be able to apply the most appropriate process, approaches and techniques in developing rural community development programs by their mobilization in the developmental activities.

Syllabus

Meaning and concepts of development, rural development, community development and the transition in thoughts and application of these aspects developmental process over the period of time to currents stage in their historical perspectives. Rural poverty, causes and consequences, and efforts made in the past and present strategies, introductory concepts of and recent experiences in poverty reduction programs through various models and processes of social mobilization and participatory program planning at the grassroots level, preparing portfolio of opportunities and investment plans; implementation of plans; participatory monitoring and evaluation; an overview of gender concepts overtime, issues, and strategies in developmental activities, gender sensitive development planning.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1	Concept of development, sustainable development, rural and community development, principle of community development, a brief overview of efforts and approaches of rural development in Nepal over the last decades	3
2	Factors and goals of development, cultural and social heritage and dilemma in the rural development of Nepal	2
3	Major problems and issues of rural and community development in Nepal.	2
4	Poverty, human poverty, relative deprivation, poverty in SAARC countries, SAARC declaration on poverty Elimination	3
5	Concept of social mobilization, definition, purposes, strategy of implementing social mobilization	3
6	Process of social mobilization, institutional development, participatory planning, implementation of plans and sustainable	3

	utilization of results	
7	Social mobilization in multi-ethnic communities and conflict situation	1
8	History of social mobilization in Nepal, lesson learned	2
9	Decentralization for development, definition, strategy and current status of decentralization in Nepal.	2
10	Concept of micro-finance and its role in poverty alleviation; practices of micro-finance in Nepal	3
11	Actors of rural development and poverty alleviation programs, linkages and coordination, problems and issues.	2
12	Introduction to gender concepts, gender segregation and stratification, discrimination, equity and social inclusion.	1
13	Gender needs, roles, analysis, gender sensitive planning, gender audit, gender mainstreaming in development in general and poverty in particular with specific focus at the resource poor women.	2
14	Origin and concept of WID, WAD, GAD and GESI	1
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1	Conducting baseline survey into a rural community and analyzing the situation	2
2	Preparing village profile	2
3	Exposure on techniques of organization development through audio visual media, role play and making site visits to observe the real action at the grassroots	2
4	Conducting a participatory social action planning exercise to prepare portfolio of opportunities and community investment plans, aggregation	2
5	Business plan preparation (Livestock and poultry bird related enterprises)	1
6	Observing VDC level planning and process.	2
7	Practical exercise on participatory monitoring and evaluation system	2
8	Practical exercise on exploring equity and inclusion issues and resolving them	1
9	Practical on MIS through observing a real case at the grassroots.	1
	Total	**15**

References

Khan, S. S. and J. S. Sah. 2001. Social Mobilisation Manual Based on Syangja Experience, Social Mobilisation Experimentation and Learning Centre.

UNDP. 2001. Governance and Poverty Reduction: National Human Development Report, Kathmandu

Katar Singh, 1999. Rural Development, second edition, *Sage Publications,* New Delhi. Thousand Oaks. London

Course Code: LPM 505
Course Title: Wild Life Production and Management.
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives

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

Syllabus

Taxonomy of wild animals. Future and present status of wildlife conservation and management in Nepal, wild life low enforcement. Distribution habitats and housing of various class of wild animals. Care of wild animals feeding habits, feeds and feeding system of wild animals. Methods of restraint, capture, handling and physical examination of wild animals .National park, reserves and other protected areas in Nepal. International organizations concerning wild life conservation Common diseases and control strategies against it.

Course Breakdown

Theory

S.No	Topic	No .of Lectures
1.	Introduction, definition and values of wild life.	1
2.	Present and future status of wild life population course - Vation and management in Nepal	1
3.	Wild life low enforcement.	1
4.	Distribution, habitats and housing of various class of wild life	2
5.	Care of various class of wild life.	2
6.	Feeding habits, feeds and feeding system of wild animals.	2
7.	Methods of restraint, capture, handling and physical examination of wild animals.	2
8.	National park, reserver and other protected areas in Nepal	1
9.	International organization concerning wild life conservation.	1
10.	Common diseases of wild animals and their control strategies.	2
	Total	**15**

Practical

S.No.	Topic	No. of Practicals
1.	A visit to Chitwan National park for observation [one day]	1
2.	External body points of different class of wild animals	1
3.	Identification of feeds and fodder for wild life	1
4.	Visit to central zoo for practical demonstration ie Restraining, Capturing, handling of 2002 animals and transportation of wild animal.	3
5.	Study about habitat of wild animals	2
6.	Care and management of zoo animals.	2
7.	Feeding of different species of animals	1
8.	Deticking and deworaing	1
9.	Study about administration of drugs	1
10.	Physical examination of wild animals	1
11.	Checklist of wild animal and birds found in chitwan National park.	1
	Total	**15**

References

Wild life Wealth of Indian (Researches and Management) T.C.M Majupuria, Tec press service, LP Bangkok, Thailand.

Himalayan wild life: Habitat and Conservation -ss Negi Indus publishing co. New Delhi.

Wild life in India: V.B saharia, 1982, Natraj publisher India.

Wild life of Nepal, T.C Majuparia.

Course Code: VCS 505
Course Title: Veterinarian in Society
Credit hours: 1(1+0) Full Marks: 25 Theory: 25 Practical: 0

Objectives
The objective of this course is to familiarize the students with the different roles of veterinarians in society and the importance of veterinary profession in safeguarding animal and public health. The purpose of the course is also to raise awareness of foreign, emerging and exotic animal diseases among veterinary students and veterinarians. The ability of veterinarians in all sections of the profession to suspect, assist and notify proper officials of foreign animal diseases in livestock or companion animals is crucial to safeguarding Nepal's animals and food production sector.

Syllabus
Man Animal and society: Social – ecological interactions in animal rearing. Client oriented approach to physical examination of animals. Concepts in interaction with animal owner / clients. Bio-medical ethics and clinical evaluation. Communication skills. Animal / owner information management. Human – animal bonds. Health maintenance in individual animal and population. Veterinary public health as component of society. Professional development. Societal responsibilities of veterinarians. Societal responsibilities with respect to private and public hospital and practice management. Social conduct and personality profiles in management of clinical practice. Veterinary professional interactions with Health authorities, drug and food regulatory authorities, zoo / animal welfare organizations and civil administration. Role of veterinarian in Natural calamities and disaster management.

Course Breakdown

Theory

S. No.	Topics	No. of Lectures
1.	Man Animal and society; Man animal interaction, Ethano-veterinary medicine; Social – ecological interactions in animal rearing.	1
2.	Client oriented approach to physical examination of animals; client dealing, client service, delivering bad news, Concepts in interaction with animal owner / clients.	1
3.	Bio-medical ethics and clinical evaluation ; Ethical theories, bioethical principles, ethical oaths and codes	1
4.	Animal / owner information management.	1
5.	Human – animal bonds: Benefits of pets to people, responsibility of veterinarians to the society, factors influencing the formation of the human-animal bond.	1

6.	Health maintenance in individual animal and population.	1
7.	Veterinary public health as component of society: Duties of veterinarians to the public, , role of veterinary services in food safety, approaches to food safety, at the farm level, meat inspection	2
8.	Professional development: Veterinarians oath, duties of veterinarians to the profession	1
9	Communication skills; functions of communications; communication styles, functions of interpersonal communications.	1
10	Societal responsibilities of veterinarians.	1
11	Societal responsibilities with respect to private and public hospital and practice management. Social conduct and personality profiles in management of clinical practice: Veterinary institutions, veterinary practice management.	2
12	Veterinary professional interactions with Health authorities, drug and food regulatory authorities, zoo / animal welfare organizations and civil administration.	1
13	Role of veterinarian in Natural calamities and disaster management: Preparedness activities before disaster seasons, response and recovery activities; problems for livestock during natural calamities	1
	Total	15

References

- Maggie Shilcock and Georgina Stutchfield (2008), Veterinary Practice Management - A Practical Guide , Publ; Elsevier limited, pp– 1-11.
- Jerrold Tannenbaum (1995),Veterinary Ethics- Animal Welfare, Client , Publ; Don Ladig, R.R.Donnelley & Sons Company.
- Lagoni , Butler and Hetts (1994), The Human-Animal Bond and Grief, Publ; W.B. Saunders Company, The Curtis Center, Independence Square West, Philadelphia, PA 19106.
- Thomas E. Catanzaro and Philip Seibert, JR. (2000), Veterinary Practice Management Secrets Publ; Hanley & Belfus, INC. Medical Publishers, Philadelphia, PA 19107.
- Tjalma RA. The role of veterinary epidemiology in relation to public health. *Br Vet J* 115:265–270, 1959.
- Calvin W. Schwabe. *Veterinary Medicine and Human Health*, 3rd ed. Baltimore: Williams & Wilkins, 1984.
- Ahl A.S. & Buntain B. (1997): Risk and the food safety chain: animal health, public health and the environment. *Rev. Sci. Tech. Off. Int. Epiz.* 16(1), 322-330.

MINIMUM STANDARDS OF VETERINARY EDUCATION - MINIMUM STANDARD REQUIREMENTS

FOR A VETERINARY COLLEGE FOR 50 ADMISSIONS ANNUALLY

I. Departments
II. Accommodation in the Veterinary College and its associated teaching hospital/farms:
III. Staff, teaching, technical

IV. Equipment in the College departments and the hospitals

I. DEPARTMENTS: Each Veterinary College shall have the following Departments, Teaching Veterinary Clinical Complex and Instructional Livestock Farm Complex under the administrative control of the Dean/Principal.
(1) Veterinary Anatomy
(2) Veterinary Physiology and Biochemistry
(3) Veterinary Pharmacology and Toxicology
(4) Veterinary Parasitology
(5) Veterinary Microbiology
(6) Veterinary Pathology
(7) Veterinary Public Health and Epidemiology
(8) Animal Nutrition
(9) Animal Genetics and Breeding
(10) Livestock Production Management
(11) Livestock Products Technology
(12) Veterinary Gynaecology and Obstetrics
(13) Veterinary Surgery and Radiology
(14) Veterinary Medicine
(15) Veterinary and Animal Husbandry Extension Education
(16) Teaching Veterinary Clinical Complex

(17) Instructional Livestock Farm Complex

Minimum requirement of physical facilities:
ACCOMMODATION:
Common facilities
1. Every Veterinary College shall have its own building and land for running various departments with an attached Teaching Veterinary Clinical Complex (TVCC), Instructional Livestock Farm Complex (ILFC), College Library, Central Instrumentation Facility (CIF), a disease investigation unit and post mortem facility at an accessible distance.
2. The TVCC shall also have well equipped outdoor and indoor patient sections and client accommodation facilities. The complex shall have medical, surgical, Gynecological, diagnostic and ambulatory clinical sections. The ILFC shall have Livestock Units and infrastructure for maintenance of livestock, animals of different species, storage facilities for feed and fodder and fodder production area.

3. In addition to the accommodation mentioned above the College building complex shall provide the following:

(i) Dean/Principal's office room with attached toilet room and retiring room 300sq.ft.

(ii) Visitor's room. 300 sq.ft.

(iii) Committee room. 600 sq.ft.

(iv) Office room accommodating office staff of General, Academic (Admission & Examination), Accounts and Establishment Sections. 1000sq.ft.

(v) Central store room.

(vi) Personal Staff room with attached toilet facilities 300 sq.ft

(vii) Toilet facilities for visitors and office staff

(viii) Record room

(ix) Typing, Duplicating and Photocopying facilities

(x) Canteen.

(xi) Library with reading room and arrangement for staff and students with adequate seating accommodation. The Library at the College level should be provided with adequate books/journals/periodicals; reprographic and duplication facilities; internet connectivity and manpower (at least one Assistant Librarian with supporting staff) in case the College is located away from the university/centralized library.

(xii) A Conference hall with facility for visual demonstrations and projections.

(xiii) Seminar Room of 40-60 capacity.

(xiv) Five lecture halls each with a seating capacity for 60 to 100 students with the facilities of audio-visual aids

(xv) Examination Hall(s)

(xvi) Toilets (Gents & Ladies)

(xvii) Drinking water facility

(xviii) College auditorium

(xix) Play grounds with games and sports facilities including indoor games facilities.

(xx) Hostels for boys and girls (including Interns) with common room, mess etc.

(xxi) Animal houses for small, large, laboratory animals and poultry as per need.

(xxii) Instructional livestock and poultry farms.

(xxiii) Central Computer lab.

(xxiv) Central College Diagnostic lab.

(xxv) Microphotography and processing unit

(xxvi) Transport faculties including bus, minibus, staff car, ambulatory van & mobile diagnostic unit.

(xxvii) Artificial Insemination Centre

(xxviii) Health Unit for student & staff

(xxix) Cold room facility

NOTE:- These are minimum general requirements for Veterinary Institution imparting education leading to B.V.Sc. & A.H. degree. However, Institution/colleges having additional departments; special infra structural and academic facilities would be encouraged to enlist them as desirable facilities keeping in view the demands and advances in the discipline/ sub-discipline concerned.

General accommodation facilities to be provided in each departments/units

(i) Chamber of HOD 200 sq.ft.

(ii) Office for the each teaching staff 100 sq.ft. (iii) Office of the department 200 sq.ft.

(iv) Store 150 sq.ft.

(1) VETERINARY ANATOMY

(i) Osteology and Arthrotogy lab. 900 sq.ft.

Attached store for bone sets (There should be separate provision for macerating and cleaning bones).

(ii) Dissection hall 1200 sq.ft.

(There should be provision for Cold room, Embalming Room, Cadaver room, Tanks, washing tubs for cadaver. Fly proofing and cooling facility should be ensured (when temp, is beyond 20° C)

(iii) (a) Histology and Embryology lab. 900 sq.ft.

(b) Tissue preparation room 200 sq.ft.

(iv) Museum 200 sq.ft.

(2) VETERINARY PHYSIOLOGY & BIOCHEMISTRY

(i) Facilities at TVCC shall be utilized

(ii) Physiology lab 900 sq.ft

(iii) Biochemistry lab 900 sq.ft

(iv) Biotechnology lab 900 sq.ft

(v) Analytic equipment and maintenance laboratory 600 sq.ft

(3) VETERINARY PHARMACOLOGY AND TOXICOLOGY

(i) Experimental Pharmacology Lab 900 sq.ft.

(ii) Pharmacology and Toxicology Lab 900 sq.ft.

(4) VETERINARY PARASITOLOGY

(i) Helminthology Lab cumMuseum 900 sq.ft

(ii) Entomology & Protozoology lab 900 sq.ft

(5) VETERINARY MICROBIOLOGY

(i) Bacteriology and Mycology lab. 900 sq.ft (ii) Virology lab. (with tissue culture lab., egg inoculation 200 sq.ft. booth, air conditioned)

(iii) Veterinary Immunology lab. 600 sq.ft.

(iv) Sterilisation room 200 sq. ft.

(v) Cleaning and washing room 100 sq. ft

(vi) Media and preparation room 100 sq. ft.

(6) VETERINARY PATHOLOGY

(i) Histopathology lab 900 sq.ft.

(ii) Clinical Pathology lab 900 sq.ft

(iii) Tissue processing facility 600 sq.ft

(iv) Museum 1200 sq.ft

(v) Post -mortem room for large animals and poultry 1200 sq.ft With carcass and other waste disposal facilities

with floor area at an accessible distance.

(7) VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY

(i) Zoonoses- cum- Epidemiology lab 600 sq.ft

(ii) Milk Hygiene Lab 600 sq.ft

(iii) Meat Hygiene Lab 600 sq.ft

(8) ANIMAL NUTRITION

(i) Feed processing and mixing plant (desirable)

(ii) Feed/fodder analysts and Energy Metabolism laboratory 1200 sq.ft

(iii) Metabolic stall / Boxes (desirable)

Note: Feed Mixing. Hay and silage preparation etc. for the farm will be undertaken through this Department

(9) ANIMAL GENETICS AND BREEDING

1) U.G. Lab with Computer and statistical analysis facilities 1200 sq.ft

2) U.G. Laboratory 900 sq.ft

(10) LIVESTOCK PRODUCTION MANAGEMENT

(i) Handling room (amphitheatre type) 1200 sq. ft.
(ii) Museum for breed charts, animal house and
housing material models-cum-U.G. Lab. 1200 sq. ft.

(11) LIVESTOCK PRODUCTS TECHNOLOGY

(i) *Slaughtering-Unit with carcass utilization and waste management unit.
(a) Mini slaughter house for 5 to 10 animals of sheep/goat and pig (if relevant) sections with ante-mortem room, pre-slaughter wash, fly proofing, slanted platform, blood collections, skin treatment, offal collection and disposal etc. (preferably with a waste/dung gas unit).
(b) Poultry slaughter unit for 50 to 100 birds.
(ii) Meat processing and examination lab 1200 sq.ft.
(iii) Dairy technology lab 1200 sq. ft
(iv) Cold storage, product store; (sale section**) 300 sq. ft. * Would serve Veterinary Public Health Dept. also. ** Desirable

(12) VETERINARY GYNAECOLOGY AND OBSTETRICS

(i) Semen/Androtogy tab 900 sq. ft
(ii) Museum- cum-Phantom hall and palpation room
(iii) Artificial Insemination Centre with semen storage and trevis facility.

(13) VETERINARY SURGERY AND RADIOLOGY

(i) Practice hall for training in anaesthesia and operation
theatre routines, X Ray and Imaging Facilities. 900 sq.ft (ii) Small animal operation theatre (practical) with preparation
room. 600 sq.ft
(iii) Large animal operation theatre cum preparation room 1200 sq.ft
(iv) Sterilisation, instrument and surdry room. 400 sq ft

(14) VETERINARY MEDICINE

(i) Clinical Medicine Lab 600 sq.ft
(ii) Preventive Medicine/ Disease Investigation Lab 600 sq.ft
(iii) Mobile Diagnostic lab (Part of TVCC) 200 sq.ft
(iv) Museum cum projection room 600 sq.ft

(15) VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

(Being a department engaged in public relation, livestock Centre at the entrance/in front of the college)

(i) Audio-visual technology laboratory 600 sq.ft
(ii) Photography-cum-graphic unit, projection unit etc. 600 sq.ft
(iii) Group discussion chambers/mini seminar room 600 sq.ft
(iv) Museum-cum-live-stock advisory unit 600 sq.ft

(16) TEACHING VETERINARY CLINICAL COMPLEX (TVCC)

(v) NOTE: This is the unit from where the following departments will be operating their training and services. The departments of Veterinary Medicine, Veterinary Surgery and Radiology, Veterinary Gynaecology and Obstetrics, the departments of Veterinary Pathology, Veterinary Microbiology, Veterinary Parasitology and Veterinary Physiology and Biochemistry will also help in providing their services to the TVCC for the respective courses/services.

(vi) (i) Reception

(vii) a. Waiting hall for large animals.
(viii) b. Waiting hall for small animals.
(ix) c. Registration counter/record room
(x) d. Dispensary, drug store etc.
(xi) (ii) Animal examination section - fitted with chutes
(xii) a. Large animals
(xiii) I. Medical unit
(xiv) II. Surgical unit
(xv) III. Gynaecology unit
(xvi) b. Small animal (same as above with animal examination table)
(xvii) (iii) Operation theatre:
(xviii) (a) Equine surgery
(xix) (b) Bovine surgery (standard surgery) with surgical chute (Uthrecht pattern preferable)
(xx) Bovine surgery (standing surgery) with surgical chute (Uthrecht pattern preferable)
(xxi) (iv) Infectious and contagious disease wards.
(xxii) (a) Rabies ward
(xxiii) (b) Equine isolation ward
(xxiv) (c) Bovine isolation ward
(xxv) (d) Skin ward.
(xxvi) (v) Recovery room for large animals, slings, hoist head protectors, hobbles, twitch, blinkers etc
(xxvii) (vi) Intensive- care unit for small animal.
(xxviii) (vii) Veterinary Diagnostic laboratory with the facilities for activities of 4 departments viz. Veterinary Pathology, Veterinary Microbiology, Veterinary Parasitology, and Veterinary Physiology and Biochemistry
(xxix) (viii) Indoor ward along with client/farmers room (separate for large and small animal owners). (ix) Ambulatory unit (complete with diagnostic and therapeutic equipments).
(xxx) (x) Animal transport facility (desirable)

(xi) Night duty section with facilities for, technicians, residents and students rooms and vehicle to transport doctors during emergencies
(xii) Residential accommodation for staff of clinical departments and specialized services
xiii) Dark room film room interpretation room
(xiv) Physiotherapy room
(xv) Loading and unloading platform

(17) INSTRUCTIONAL LIVESTOCK FARM COMPLEX (ILFC)

Note : This Unit of Veterinary College shall provide the services of teaching in rearing of livestock species including poultry with the facilities of housing, feeding, breeding and management of large and small ruminant units, piggery, poultry and animals of regional interest record keeping ; storage facilities for feed and fodder; production facilities for fodder crops; suitable housing for managerial and technical staff.

All the concerned staff on duty in this Unit shall be responsible for management including emergencies of me animals in the Livestock Farm. They shall arrange and supervise the routine managemental practices from time to time and shall maintain records for the same. They shall also be responsible for production activity in each of the units and these animals shall be utilized as instructional farms for student teaching.

ILFC shall have the following farm units/land for fodder production:

A. Animal Production Management
(i) Handling Room (Amphitheatre type) 1200 sq. ft.

ii) Cattle and buffalo farm of 50 animals with followers
iii) Sheep and Goat farm having 50-100 animals each
iv) Piggery farm with 50-100 stock (where relevant)
v) Horse (if there is no remount Veterinary Core Unit at least two horses be made available for teaching/training. Camel/Yak (optional).
vi) Rabbitary (optional)
vii) Fodder production and grassland management facility.
B. Avian Production Management
i) Poultry farm (as per need)
ii) Models of various systems, Pens, Cages, Runs, Equipment etc.
iii) Sample stock of various breeds of poultry and other avians,
iv) Hatchery and chick pens.
v) Brooders.
C. Fish Production Management
i) Fish ponds

(i) ii) Hatchery

(ii) D. Fodder Production Management

(iii) i) 25-50 acres of land sufficient to meet the requirement for fodder for the ILFC

(iv) ii) The housing should be as per Animal welfare requirements. All animals reared exclusively for the conduct of practical be stationed and managed in a separate section.

(v) iii) Farm data room taking care of pedigree charts, stud books and other farm biodata, farm account on income and other farm expenditure, balance sheets etc. shall be available as teaching material, preferably in computer terminals/floppy.

(vi) **III. STAFF:**

(vii) 1. General Remarks:

(viii) a) Emphasis of veterinary education being on practical, instruction and demonstration must be carried out in small groups of 5-10 students: the number of teachers must be adequate for such instructions to be carried out effectively.

(ix) b) The teaching staff of the departments in a veterinary college shall be whole- time teachers.

(x) c) The number of teachers shown below is the minimum/critical number in each Department for imparting undergraduate teaching leading to B.V.Sc & A.H.degree. The departments having extension & other services attached, shall have additional faculty members.

(xi) d) To ensure exposure of under-graduate students to experienced teachers, it is essential to provide adequate number of senior posts (Professor, Associate Professor/Reader) in every department. No department shall function without at least one Professor.

(xii) e) In view of acute shortage of faculty members in different veterinary colleges as well as the situation anticipated to prevail for some more time, it is suggested/recommended that in order to overcome the situation, meritorious persons possessing BV.Sc &A.H. degree may be recruited as Teaching Associate/Assistant/Demonstrator as stop-gap arrangement However, such arrangements should be restricted to a maximum of one person in each department for a maximum period of five years within which the faculty positions prescribed in these Regulations should be filled up.

(xiii) **2. Positions**

(xiv) (A) **Dean's Office*****

(xv) (i) The Dean

(xvi) (ii) Administrative Assistant/A.A.O. (iii) P.A./P.S

(xvii) (rv) Academic section staff (admission, examination, Record)

(xviii) (v) Account section staff
(xix) (vi) Purchase & Store section staff
(xx) (vii) Typing, duplicating/photocopier staff
(xxi) *** The institutions may provide the requisite office staff as per norms of the state/territory, needed for efficient working. The positions like driver, gardener, mechanic, instrumentation technicians etc. must be included as per need and as per norms for the purpose.

(B) **Departments**

Minimum secretarial/supportive/account staff should be made available to each Department/Unit in a Veterinary College as per workload and tor smooth independent functioning. Keeping in mind of shortage of teaching staff and subject matter specialist, although the prescribe faculties listed should be fulfilled in future but minimum three teaching faculties (Professor 1, Associate Professor 1 Assistant Professor 1) in each department is mandatory. In each department at least one permanat faculties should be minimum but within three year all minimum three faculties should be parmanat.

(1) VETERINARY ANATOMY

i. Professor 1
ii. Associate Professor 1 Hi. Assistant Professor 2
iv. Curator cum museum/specimen technicians 1
v. Laboratory technicians 1
vi. Laboratory assistant/Attendants 1
vii. Animal attendant-cum-macerator/embalmer 1
viii. Sweeper-cum-Attendant 1

(2) VETERINARY PHYSIOLOGY & BIOCHEMISTRY

i. Professor 1
ii. Associate Professor (1- Physiology, 1-Biochemsitry) 2
iii. Assistant Professor (1-Physiology, 1-Biochemistry) 2
iv. Laboratory technicians 1
v. Laboratory Assistant/Attendants 1
vi. Animal attendant 1
VII. Sweeper-cum-attendant 1

Staff for clinical and service jobs has to be added as per work load and nature of work.

(3) VETERINARY PHARMACOLOGY AND TOXICOLOGY

i) Professor 1
ii) Associate Professor 1 iii) Assistant Professor 2
rv) Laboratory technicians 2
v) Laboratory assistant/Attendants 1
vi) Animal attendant 1
vii) Sweeper-cum-attendant 1

Staff for toxicological work/service has to be added as per work load and nature of work.

(4) VETERINARY PARASITOLOGY

i. Professor 1
ii. Associate Professor 1

iii. Assistant Professor 2

iv. Laboratory technicians 1
v. Laboratory assistant/Attendants 1
vi. Animal attendant 1
vii. Sweeper-cum-attendant 1
viii.Staff for conical jobs has to be added as per work load and nature of work.

(5) VETERINARY MICROBIOLOGY

i. Professor 1
ii. Associate Professor 1
iii. Assistant Professor 2 JV. Laboratory technicians 1
v. Laboratory assistant/Attendants 1
vi. Animal attendant 1
vii. Sweeper-cum-attendant 1

6) VETERINARY PATHOLOGY

i) Professor 1
ii) Associate Professor 2
iii) Assistant Professor 3
iv) Laboratory technicians/Specimen Curator 1
v) Laboratory assistant/Attendants 1
vi) Post Mortem/Animal attendant 1
vii) Sweeper-cum-attendant 1 viii) Staff for clinical and Post Mortem jobs has to be added as work load and nature of work.

(7) VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY

i. Professor 1
ii. Associate Professor 1
iii. Assistant Professor 2
iv. Laboratory technicians 1
v. Laboratory assistant/Attendants 1
vi. Animal attendant 1
vii. Sweeper-cum-attendant 1

(8) ANIMAL NUTRITION

i. Professor 1
ii. Associate Professor 1
iii. Assistant Professor 2
iv. Laboratory technicians 1
v. Laboratory assistant/Attendants 1
vi. Animal attendant 1
vii. Sweeper-cum-attendant 1
viii Machine operators/feed plant technicians (as per need)

ix Staff for Consultancy/feed analysis jobs has to be added as per work load and nature of work

(9) ANIMAL GENETICS AND BREEDING

i. Professor 1
ii. Associate Professor 1
iii. Assistant Professor 2 iv. Computer Programmer 1
v. Laboratory technicians 1
vi. Laboratory assistant/Attendants 1
vii. Data and Console Operator 1

viii. Sweeper-cum-attendant 1 Staff needed for data analysis or similar service has to be added as per need

(10) LIVESTOCK PRODUCTION MANAGEMENT

i. Professor 1
ii. Associate Professor 2
iii. Manager Farm Operations 1
iv. Rest of the posts of LPM Department have been shown against Instructional Livestock Farm Complex.
v. Farm Assistant

(11) LIVESTOCK PRODUCTS TECHNOLOGY

i. Professor 1
ii. Associate Professor 1
iii. Assistant Professor 2
iv. Laboratory technicians 1
v. Laboratory assistant/Attendants 1
vi. Butchers/skilled assistants for processing/waste management etc. as per work load.
vii. Sweeper-cum-attendant 1

Staff for commercial production, quality control, meat testing, Consultancy etc. has to be added as per work load and nature of work.

(12) VETERINARY GYNAECOLOGY AND OBSTETRICS

i. Professor 1
ii. Associate Professor 2
iii. Assistant Professor 3
iv. Laboratory technicians/Compounders /Stock-men 1
v. Laboratory assistant/Attendants 1
vi. Animal Attendant 1
vii. Sweeper-cum-attendant 1

Staff for Clinical and Service Jobs as to be added as per Work load and nature or work

(One post of Assistant Professor has been shown against TVCC)

(13) VETERINARY SURGERY AND RADIOLOGY

i. Professor 1
ii. Associate Professor 2
iii. Assistant Professor 3
iv. Operation Theatre Masters/Technicians 1
v. Operation Theatre assistant 1
vi. Imaging Technicians 1
vii. Animal Attendant 1
viii. Sweeper-cum-attendant 1

Staff for clinical and service jobs has to be added as per work load and nature of work.

(One post of Assistant Professor has been accommodated/shown against TVCC)

14.VETERINARY MEDICINE

i. Professor
ii. Associate Professor
iiii Assistant Professor 3

iv Lab. Technicians/ Compounders 1
v. Laboratory assistant/Attendants 1 .
vi. Animal Attendant 1
vii Sweeper-cum-attendant 1
Staff for clinical and service jobs has to be added as per work load and nature of work. (Two posts of Assistant Professor has been accommodated/shown against TVCC)

(15) VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

i) Professor 1
ii) Associate Professor 1
iii) Assistant Professor 2
iv) Audio-visual Technician 1
v) Artist-cum-Photographer 1
vi) Driver-cum-Operator 1
vii) Art room attendants 1
viii) Sweeper-cum-Attendant 1

(16) TEACHING VETERINARY CLINICAL COMPLEX (TVCC)

i. Head of Department-Clinics (Professor or associate professor rank with specialization in any of the clinical or paraclinical subjects) 1
ii) Hospital Superintendent (Associate Professor rank with specialization in any of the clinical subjects) 1
iii. Assistant Professors for Medicine(2*), Surgery (1), Gynecology (1), Clinical Pathology/Biochemistry/ Parasitology/Microbiology (1) 5

All the faculty of the TVCC shall also participate in the teaching programmes of their respective ©departments * One for Ambulatory Clinical Service

Record Keeper cum Data Operator 1
Registration Assistant 1
In-charge medical store 1
Compounder/Pharmacist 1
Laboratory Technician 1
Laboratory Assistant/Attendant 1
Sweeper-cum-attendant (as per work load)

(17) INSTRUCTIONAL LIVESTOCK FARM COMPLEX (ILFC)

i. Head of Department. Instructional Livestock Farm Complex (Professor rank with specialization in any of the production subjects) 1
ii. Farm Manager (Associate Professor rank with specialization in any of the production subjects) 1
iii. Assistant Professors for Breeding (1). Nutrition (1), LPM (2*), Agronomy (1)
* One for Poultry Production Management 5

All the faculty of the Instructional Livestock Farm Complex shall also participate in the teaching of their respective departments

iv) Manager Farm Operations 1
v) Farm Assistant 1
vi) Animal Attendants 2
vii) Farm labourers/casual labourers (as per work load and as per economic viability-except in units exclusively reserved for experimentation)
viii) Sweeper-cum-Attendant (as per unit size and work requirements).

ix) Machine Operator/Tractor Driver Mechanics etc. (as per need.)

Staff for Consultancy, planning, analysis etc. has to be added as per work load and nature of work.

The posts at Sl. No. (iv) to (ix) above have been shown as transferred from the Department of Livestock Production Management.

IV. EQUIPMENT

1. Common Facilities

A. Five lecture halls fitted with audio-visual projection system
B. Conference Hall with multimedia projection system
C. Distillation/Deionizer plants
D. Photography Unit with all facilities
E. Central Instrumentation Facility (CIF)

2. Department

(1) DEPARTMENT OF VETERINARY ANATOMY

I. Work-tops tables fitted with 5 amp. plug points for 20 pairs of students. 1
II. Lab-stools

III. Black board (sliding)

IV. Almirah for bone-sets 6
V. Almirah for microscopes 2
VI. Steel Racks for bones store 20
VII. Whatnots 10
VIII. Glass almirah 4
IX. Show-cases (Glass paneled) 15
X. Marble-top/Stainless Steel Top Tables (with drainage) 10
XI. Tissue disposal Buckets 10
XII. Steel racks for wet specimens 40
XIII. Whatnots do 40
XIV. Large tubs with over flows for washing specimens/limbs 10
XV. Steel frames with hooks etc. 4
XVI. Articulated skeleton one for Ox, Horse, Sheep, Goat,
Buffalo, Pig, Dog, Cat Camel Fowl, Rabbit Duck As per need
XVII. Embalmed specimen for surface anatomy one each
XVIII. Embalmed hollow organs One set each
XIX. Embalmed specimen with viscera in situ'
XX. Slide cabinets-50000 slides 2
XXI. Binocular microscopes 10
XXII. Dissection microscopes 10
XXIII. Automatic slide projector 1
XXIV. Microslide projector 1
XXV. Projection screen 1
XXVI. Overhead projector 1
XXVII. Specimen slides of histology & embryology 5 sets each
XXVIII. Specimen of some rajor Zoo Animals (skeleton etc.)

XXIX. Post-mortem sets 2
XXX. Scissors-straight 6
XXXI. Scissors curved 6
XXXII. Hand-saw 2
XXXIII. Rib cutter 4
XXXIV. Rib-shear 4
XXXV. Forceps Large 6
XXXVI. Forceps Small 6
XXXVII. Artery Forceps 6
XXXVIII. Tennaculum 6
XXXIX. B.P. Handle 6
XL. Vacuum Pump for embalming 1
XLI. Bucket fitted with taps etc. for embalming 2
XLII Meat Saw 2
XLIII. Plastic drums with cover 20
XLIV. Plastic Buckets with cover 30
XLV. Enameled Iron buckets 20
XLVI. Enameled trays 10
XLVII. Enameled Basins 20
XLVIII. Enameled Mugs 5
XLIX. Autoclave 1

L. pH meter 1

LI. Oven for paraffin embedding 2
LII Slide warmers 2
LIII. Rotary Microtome 2
LIV. Tissue floatation bath 4
LV. Hot Air Oven 2
LVI. Refrigerator (double door) 1
LVII, Automatic Tissue Processor 1
LVIII, Automatic Knife Sharpener 1
LIX. Microtome Knives 6
LX. Hone With Surfaces 4
LXI. Stropping Leather 1
LXII. Slide Box 100 slides 20
LXIII. Slide Cabinet 5000Slides 4
LXIV. Analytical Balance 2
LXV. Monopan Balance 1
LXVI. Ice-Box 2
LXVII. Staining Jars 20
LXVIII. Coupling Jars 20
LXIX. SS Staining Trays 20
LXX Animal Cages As per need
LXXI. Glass wares As per need
LXXII Electric Pointers

(2) DEPARTMENT OF VETERINARY PHYSIOLOGY & BIOCHEMISTRY

1). Work table / lab table with sink, water source, chemical racks etc. for analytical experiments, for 20 pair students
2). Work tables / lab tables with electric points and other controls for animal experiments, for 20 pair students
3). Compound microscopes (with eye pieces and objectives etc. complete) 20
4). Haemocytometer sets 30
5) Haemoglobinometer sets 30
6) MicRohematocrit 2
7) Microhematocrit tubes As per need
8) Centrifuge 1000 RPM 2
9) Wintrobes sets 20
10) Calorimeter 2
11) Flowmeter 2
12) Haemagglutination plate 10
13) Kymograph with accessories 10
14) Spirometer 2
15) Stimulators 5
16) Tissue chamber 20
17) Isolated organ bath 2
18) Dissecting sets 10

19) Manometers (mercury) 5

20) Sphigmo manometers (dial type) 2
21) Catheters (silastic) 10
22) Catheters (portable) 1
23) Flame photometers 1
24) Spectra photometer 1
25) Common Balance 5
26) Mono pan digital balance 1
27) Glass ware As per need
28) Refrigerator 1
29) Microkjeldahl set 1
30) Digestion set 1
31) Refractometer 1
32) Student's Microscope 10
33) Column chromatography set 1
34) T.L.C. 1
35) Hot air oven 1
36) Photoelectric Colorimeter 1
37) *Electophoresis apparatus 1
38) Micro Haematocrit centrifuge 1
39) *Blood Analyser (Automatic) 1
40) *pH meter 1
*Prefer latest time saving models (automatic etc.) with uninterrupted power supply (UPS). Burettes, Pipettes of different volume, volumetric flasks, measuring cylinders, test tubes, slides, etc. Biotechnology equipment like PCR is required as there is a course in Biotechnology.

(These equipment have been included under this Department from the Department of Veterinary Biochemistry)

(3) DEPARTMENT OF VETERINARY PHARMACOLOGY AND TOXICOLOGY

1. Demonstration table with electrical points,
drainage, steriotaxic control etc. 1
2. Kymograph with complete accessories,
electric recording drumetc 5
3. Respiration pump, endotracheal tube, mouth gag, spirometer etc. 1
4. Isolated tissue bath with accessories 15
5. Observation cages for rats and mice 25
6. Tuberculin syringe 15
7. Common balance 5
8. Monopan electronic balance 1
9.Aerator 10
10. Binocular microscopes 2
11. Spctrophotometer 1
12. Centrifuge (1000RPM) 1
13. Dispensing scales with metric and apothecaries WL 25

14. Marble slab 25

15. Spatula (iron, plastic and ebonite) 25
16. Mortar and pestle (porcelain and glass) 25
17. Measuring glasses, cylinders of various sizes 25
18. pH meter (digital) 1
19. Manometers, catheters etc. 2
20. ECG apparatus (portable) 1
21. Electronic stimulator 1
22. Surgical instruments for a pack 2

(4) DEPARTMENT OF VETERINARY PARASITOLOGY

1.Autoclave 1
2.Hotairoven 1
3. Incubator 1
4. Refrigerator 1
5. Microscope with high power (HP) Oil immersion 12
6. Microscope Phase contrast 1
7.Centrifuge 2
8. Micrometers (stage and eyepiece) 2
9. Warning Blender 1
10. Steriliser Unit 1
11. Distillation set 1
12. Eyepiece double demonstration 2
13. Eyepiece comparison 2
14. Hair Hygrometer 1
15. Vernier calipers 3
16. Slide cabinet 2-3
17. Slide Boxes 10-20

18. Desiccators 3
19. Water bath 2
20. Overhead Projector 1
21. Slide Projector 1
22. Total counter 2
23. Table Counter 2
24. Dissection Set 5
25. Dissection Microscope 4

(5) DEPARTMENT OF VETERINARY MICROBIOLOGY

1. Worktable / lab table with power points & water source tec. For 20 pair of students
2. Lab stools (revolving) 40
3. Autoclave horizontal 1
4.Autoclave 1
5.Hot-airOven 2
6. Instrument sterilizers 2
7. Seitz filter assembly including Seitz filter, vacuum pressure pump etc 1
8. Other filters (bake field, Chamber land and membrane filters)

9. Students Microscopes 20

10. Ultra-violet microscope with U.V. assembly 1
11. Dark-field microscope with light source 1
12. Phase-contrast microscope built-in light 1
13. Stage and ocular micrometer (for measurement of bacteria) 8
14. Hanging drop preparation slides with cover-slips 30
15. Petri-dishes 3" and 4" As per need
16. Platinum loops As per need
17. Bunsen burners 60
18. Mc'intosh and field's anaerobic jar 2
19. Hydrogen gas cylinder 1
20. C02 gas cylinders 1
21. Incubator 2
22. C02 Incubator 1
23. Biological Oxygen Demand (B.O.D.) Incubator 1
24. Water bath 2
25. Deep-freeze 20° C 1
26. Deep-freeze 70° C 1
27. Petroff-Hauser counter 10
28. Micro-kjeldhal 2
29. Photo Colorimeter 2
30. Ultra-violet Lamp 2
31. Laminar flow cabinet 2
32. Tripple - distillatory 2
33. Metal disttillatory 2
34. Colony Counter 2
35. Perspex plates for HA. tests 6
36. ELISA test reader 2
37. Boards/inoculation boxes (for restraining mice, gunea pig. etc.) As per need

38. Cages syringes etc. As per need
39. Surgical instrument As per need
40. McFariands Nephlometer (for vaccine prep.) 4
41. Gel chromatography aptus 4
42. Immuno electrophoresis apparatus 2
43. Centrifuge bucket type 2
44. High-speed centrifuge (16,000 to 20,000 rpm) 1
45. Refrigerated centrifuge 1
46. Ultra centrifuge (60,000 RPM) 1
47. Replica Plates 1
48. Freeze Dryer 1
49. Inoculation cabin (room)
50. Cubicles for virological work
51. Dental drill (for egg inoculation)
52. Post-mortem tables (trolleys) for small animals
53. Automatic pipette washer 2
54. Air-conditioners As per need

55. Glass-ware, cottons wool, syringe, media, sugars, etc. As per need

(6) DEPARTMENT OF VETERINARY PATHOLOGY

1). Lb. table/work table complete with racks, sinks, taps etc. for 20 pair of students
2). Laboratory stools (revolving) 40
3). Students microscopes (complete with eye pieces and objectives) 30
4). Binocular microscopes 5
5). Dark field illumination with projecting units 1
6). Phase contrast microscopes 1
7). Immuno-fluorescent 1
8). Black board cum display boards etc. 2
9). Automatic slide projector 1
10). Overhead Projector 1
11). Display boards, chart boards etc. (as per need)
12). Specimen slides of various histopathological lesions.
13). Set of transparencies of various H.P. & gross lesions
14). Rotary microtomes, AO 30 Spencer type with thin sectioning facility
15). Paraffin floatation bath (temp, control 55-65° C 2
16). Paraffin bath oven 2
17). Refrigerator 1
18). Automatic tissue processor 1
19). Slide cabinet 1000 capacity 4
20). Slide boxes -100 capacity 100
21). Staining jars, coupling jars etc. As per need
22). Tissue cutting boards 5
23). Racks for specimen jars, bottles etc. 10
24). Scalpels (assorted) 10
25). Containers, specimen jars, wide-mouthed bottle As per need
26). Cryostat (microtome) 1
27). Hot Air Oven (Temp. 2 50° C) 2

28) L'moulds & bocks (for embedding) 20
29). Auto staining unit 1
30). Microtome knife sharpener - To and fro with side-shifting arrangement 1
31). Autopsy table for birds (S.S top with drain) 1
32). Autopsy table for small animals 1
33). Specimen cutting table 1
34). Autopsy knives 30
35). Post-Mortem sets (with chisels, saw rib cutter, shears, bone cutter, saw, sharpener, etc.)-5
36). Bone-cutting saw electric 1
37). Heavy-duty rotary saw for large animal P.M. 1
38). Protective wear (gloves, rubber apron, goggles, gum-boots, marks & cap 10
39). Carcass trolley/carcass van (fully covered) 1
40). Hoist with over head railings 1
41). Captive bolt pistols for euthanasia 1
42). Platform balance (large and small) l each
43). Skinning equipments 2
44). Monopan digital balance 2
45). Washing and disinfecting facility, aerosols etc.

46). Specimen washing sinks (with hot & cold water) 5

47). Knife sharpener (mechanical or power) 2
48). Plastic tubs & buckets with lid for specimen collection and transport 20
49). Specimen bottles, jars etc.
50). Large E.I Trays & dissection boards for bird P.M.
51). Incinerator unit Double combustion, smokeless oil burned / electric (pollution free)
52). Cold room unit
53). Freezer unit for small animals and specimens
54). Rabies P.M. unit
55). Sterilisation unit
56). High-pressure hydrant
57). Centrifuge 3000 RPM
58) Spectrophotometer 1
59). Wintrobe pipettes 1
60). Haemocytometer 10
61) Haemoglobinometer 20

(7) DEPARTMENT OF VETERINARY PUBLIC HEALTH & EPIDEMIOLOGY

1) A running table (worktable) with cup-boards, racks, wash basins, water source & shelves for 20 pairs of students
2) Stools (revolving) 40
3) Black board-ciim-display-board 1
4) Steel almirahs 4
5) Almirahs/cupboards 2
6) Monocular students' microscopes 25
7) Fluorescent microscope 1
8) Binocular microscope 5
9) Serologic water baths 4

10) pH-meter (digital) 2
11) Spectrophotometer 1
12) High-speed Centrifuge 1
13) Cooling high-speed Centrifuge 1
14) Gerbers' Centrifuge 1
15) Colony counter 2
16) Burners 25
17) Test-tube racks 30
18) Balance chainomatck 1
19) Electronic moropan balance 2
20) Micrometer 1
21) Staining racks, coupling jars, staining trays etc. 30 sets
22) Autoclave 1
23) Hot-air Oven 2
24) B.O.D. Incubators 2
25) Incubators 3
26) Cages for Lab. Animals 10

27) Micro-diluters 25

28) Microplates 60
29) Micro-pipettes (and tips as required) 12
30) Slide-projector 1
31) Slide cabinet 1
32) Slide Boxes 30
33) Deep-freeze 1
34) Laminar-flow Vertical 1

Data Processing and Programming unit for retrospective and prospective epidemiology.

Facilities for preparation of charts/maps etc for preparation of important animal diseases at the State/Regional and National levels.

Mobile van (s) for field visit - collection of data, material for control of diseases including reagents / antigens / vaccines to be carried in the Refrigerator in the van.

The filed activity has to be carried out in close collaboration with the 'Teaching Veterinary Clinical Complex, allied departments of the college and veterinary officers of the Animal Husbandry Department.

(8) DEPARTMENT OF ANIMAL NUTRITION

1. Slide Projector 1
2. Distillation set 2
3. Chemical balance 5
4.Hotairoven 2
5. Single pan balance 1
6. Electronic monopan balance 2
7.Mufflefurnace 1
8.Desicator 5
9. Suction Pump 1
10. Digestion set 2
11. Kjeldahl apparatus 2
12. Micro Kjeldahl set 1

13. Soxhlet apparatus set 1
14. Water bath 1
15. Water still 1
16. Flame photometer 1
17. Spectrophotometer 1
18. Warburgh apparatus 1
19. Haldens Gas Analyser 1
20. Spiro meter 1
21. Gas collection bags 6

22. Chromatography unit 1

(9) DEPARTMENT OF ANIMAL GENETICS AND BREEDING

1. Work table for 30 units
2. Stools 60
3. .Black board 1
4.Projectionscreen 1
5. Slide projector 1
6. Personal computer As per need*
7. Microscopes 20
8. SlideBoxes Asperneed
9. Transparencies Boxes As per need
10. Specimen racks, almirahs

Storage boxes for charts, diagrams etc. As per need
*Can be a common facility.

(10) DEPARTMENT OF LIVESTOCK PRODUCTION MANAGEMENT

1. Over head projector 1 2 Slide projector 1
3.Sprayer 1
4. Shearing and clipping equipment 1 set
5. Debeaking equipment 1
6. Tattooing set tags etc. 1
7. A.I. equipment (different species) 1 set each
8. Egg Candler 1
9. Incubator (Hatchery) 1
10. Battery Brooder 1
11.Trapnest 5 12. Egg Grading Machine 1
13. Making Machine Set 1
14. Chick sexing machine 1
15. Automatic scalder 1
16. Vernier Callipers 5
17. Screw Gauge 5
18. Maximum-Minimum Thermometer 2
19. Psychro-meter 1
20 Hair Hygrometer 1
21. Milking cans 2
22. Making piles 2
23. Milk measures 1
24. Creamseperater 1

25. Butter chums 1
26. Branding set 1
27. Castrator (for different species) 1
28. Electric clipper 1

29. Garter's centrifuge 1

Housing models, dairy models, photographs of different breeds, models of silo pits, chart, photographs showing different points of body of various species / breeds, models of drainage, models of water troughs for different species, samples of feeds and fodders. Registers / Account procedures.

(11) DEPARTMENT OF LIVESTOCK PRODUCT TECHNOLOGY

1.Refrigerator 1
2. Deepfreeze 1
3. Electronic monopan balance 1
4. Balance for weighing birds 1
5. Large animal balance (weigh bridge type) 1
6. Bone cutting machine 1
7.Incubator 1
8.Hotairoven 1
9. Spring balance 1
10. Stunning machine (for different species) 1
11. Automatic scaler 1
12. Feather plucking machine 1
13. Student's microscope 10
14. L.T.C. set 1
15. Meat mincing machine 1
16. Sausage maker 1
17. Smoking unit 1
18. Salting instruments 1
19. Meat slicer 1
20. Butchering sets (Knives etc) 2
21. Packing unit 1
22. Lactometer 5
23. Butyro refrectometer 1
24. Butter moisture balance 1
25. Gerber's centrifuge 1
26. Gerber'stubes 20
27. Vacuum pump 1
28. Melting point apparatus 1
29. Warning blunder 1
30. Homogenizer 1
31. pH meter 1
32. Microscope binocular 1
33. Flame photometer 1
34. Spectrophotometer 1
35. Freeze drying unit 1
36. Rotary Milk evaporator 1
37. Defreeze drying unit 1

38. Cream separator 1
39. Butter Workers 1
40. Butter churners 1

41. Butter print 1

42. Steel utensils for ghee, curd, khoa 2 each
43. Richmend's scale 1
44. Hand sealing machine for bottle, cans, plastic, bags 1
Charts and Models of different meat cuts, slaughter house

(12) DEPARTMENT OF VETERINARY GYNAECOLOGY AND OBSTETRICS

1. Work table / lab table (with sinks water source light points etc.) for 20 pairs of students
2. Lab stools (revolving) 40
3. Compound microscopes (complete with objectives
eye pieces and other accessories) (one projection /
Close circuit television attachment be procured) 25
4. Binocular microscopes 5
6. Haemocytometers 25 sets
7. Travis (examination) 1
8. Travis (service) 1
8. Phantomboxes 5 9. Palpation tables 5
10. Embroyotomy sets 5
11. Kelver training cow for IU therapy. A.I etc 1
12. Electroejaculator 1
13. Artificial Vaginas (assort) 2 each
14. Oscilloscope for measuring sperm motility 1
15. Autoclave 2
16. Mono pan balance 1
17. Instrument cabinets 5
18. Obstetrical sets 2
19. Whelping sets 2
20. Surgical instruments 4
21. Holmes needles 5
22. Vaginal clamps (large & small) 10
23. Vaginal speculum (cow, goat, dog, cat) 3 each
24. Automatic pipette washer 1
25. Incubator 1
26. Semen shippers 4
27. Thermos flasks 2
28. Insemination catheters As per need
29. Storage tubes (cylinders) 4
30. Stands for storage cylinders 2
31 Swab holders 10
32. Instrument sterilizers 4
33 Record syringes 5
34. Injection cannula 5
35. Rinsing cans1-2 lit 1
36. Nose Tongs 2

37. Protective clothes 5 sets

38. Latex lining for assorted A.V. 5 each

39. Latex funnel 4 each
40. Insulating bags 4
41. Metal funnel 2
42. Measures 2
43. Drop pipettes with nibber nipples 20
44. Filter papers As per need
45. Water suction pump 2
46. Autoclave 1 each
47. Glass-ware As per need

(13) DEPARTMENT OF VETERINARY SURGERY AND RADIOLOGY

1. Operation table for small animals stainless steel top
(Hydraulic or pinion type) 8
2. Small animal preparation tables stainless steel top 2
3. Foot operated waste bins 8
4. Dressing drums (small) 8
5. Dressing drums (large) 4
6. Instrument/syringe sterilizers 3
7. Enameled iron trays 12"x15"x/15"x18" 8
8. Enameled iron trays 8'x10' 8
9. Scissors 8"/10" dipping 2
10. Scissors dressing 4
11. Forceps cheatle 8
12. Lamps (shadow4ess) 4
13. Screens (ward) 4
14. Intravenous drip stands 8
15. Foot operated dressing drum stands 4
16. Foot/Elbow soap dispenser 4
17. Gray'smouth gag 10
18. Endotracheal tubes (cuffed and non-cuffed) 4 each
19. Boyles' Anaesthesia apparatus (major)
with ether, halothance, circle absorber and
methoxyfluorance evaporator 1
20. Ambu's respirator 2
21. Electrocardiogram battery operated/portable 1
22. Catheters, manometers etc. As per need
23. Cotton tapes for control of animals
24. Sand bags for positioning
25. Surgical pack for small animals 4
26. Surgical pack for large animals 4
27. Gloves and other rubber wares 10
28. Trevis for calves, adults, horse etc. 10
29. Large animal trolley-cum-operation tables As per need
30. Operation tables for calves with drain 6
31. Rope. E.I. buckets, irrigatorsetc. As per need

32. Autoclave horizontal with S.S.jacket 16" dia./rectangular

with descalor (BlS-marked) 1

33. Autoclave 2
34. Instrument cabinets 6
35. Orthopaedic instruments
36. Opthalmic instruments/scopes etc.
37. Dental instruments for Large and small animals
38. Teat and udder instruments
39. Endoscope
40. Refrigerator 1
41. Weighing instruments/scale 1
42. Biopsy instruments 2
43. Electro surgery (diathermy) units 1
44. Cautery sets 2
45. Electric stimulators/glavenine, faredic etc. 1 each
46. Short-wave/micro-wave diathermy unit with disc, pad and
coilelectrodes 1
47. Ultra-sonic stimulators/ therapy units 1
48. X-ray unit 500 Ma, 150 Kvp over- head model 1
49. X-ray unit trolley model with 'C'arms fluoroscope, image-intensifier,
spot-films, video-recording and image freezing facility 1
50. Ultra-sonic diagnostic unit with video recorder 1
51. Ultraviolet lamp 1
52. Infra-red lamps 2
53. X-ray accessories, cassettes, film-carrier, dividers, grids,
intensifying screens (rare-earth preferred.)
54. Protection gadgets (film-badges, lead gloves, lead aprons, goggles, lead screens)
55. Dark-room accessories (processing tank, dryer, hangers, safety lamps, film storage box, film-exchange windows, speaking grill, dark-room exhaust etc.
56. Animal transport trolley for large animals 1
57. Stretcher for small animals 2
58. Glass-ware, syringes, drugs, medicine, etc. As per need
59. X-ray film viewers 6
60. Sport film viewer 1
61. X-ray film museum, with film record-racks
62. Different equipment for restraining of animals including capture gun 1 set
63. Shoes and shoeing equipment 1 set

(14) DEPARTMENT OF VETERINARY MEDICINE

1. Black boards-cum-display boards 4
2. Lab stools 40
3. Microscopes 20 sets
4. Microscopes-binocular 5sets
5.Centrifuges 4
6. Common balances 5 7. Electronic monopan balance 1
8. Distillation units 4
9. Digital pH meters

10. Spectrophotometers(digital preferred) 2

11. Microhaematocrits 2
12. Incubators 4
13. Hot-air Ovens 4
14. Water baths 2
15. Dark field microscope 1
16. Autoclave 1
17. Autoclave(vertical) 2
18. B.O.D Incubator 1 19. Microscope with attachment for microphotographs 1
20. Stethoscopes with multiple ear-pieces 3 sets
21. Glass-ware As per need

(15) DEPARTMENT OF VETERINARY AND ANIMAL HUSBANDRY EXTENSION EDUCATION

1. Conference / discussion table (preferably) round tables of 4-6 ca 12
2.Chairs 60
3. Drawing boards, T-scales, drawing sets etc. 20 sets
4. Work table to accommodate 40 students 1 set
5. Black boards, display boards, chart stands etc 2 sets
6. Projection screens (fixed & portable) 2
7. Epidiascope 1
8. Overhead projector 1
9. Slide projectors (automatic & manual) 2
10. Amplifiers (2 models) 2
11. Stage mikes A.S.M. 7 11
12. Horns 4
13. Unit 4
14. Hooters 2
15. Generators (a) 2.5 Kv (b) 0.5 Kv 1 each
16. Television (coloured) 1
17. Video Cassette Recorder 1
18. Video Cassette Player with recording facility 1
19. Video camera (complete set) 1
20. Camera 35 mm (with assorted lenses, filters etc.) 1
21. Enlarger 1
22. Dark room set (safe light, process unit, film store, film dryer, cutter etc.)
23. Display boards (assorted models, with accessories
24. Panel boards
25. Tents, campers ropes, pegs, threads etc
26. Wood cutting machine 1 set
27. Stencils, felt pens, drawing sets 20 sets
28. Film cutter, scissors, tin cutters etc.

29. Work tools 2 sets

(16) TEACHING VETERINARY CLINICAL COMPLEX

The TVCC should have the following common facilities to be used by other departments for the purpose of offering heir respective courses:

1. Phonandoscopes 6
2. Pleximeters and percussion-hummers 10 sets
3 Electronic stethoscope 1
4. Ophthalmoscopes 3 sets
5. Electrocardiograms (portable model) 1
6. Blood-pressure monitors 3 sets
7. Otoscopes 3 sets
8. Laryngoscopes 3 sets
9. Oesophagoscopes 3 sets
10 Tracheo-scopes 3 sets
11. Fibroptic endoscopy desirable) 1
12 Blood-Analyser 1
13. Haemocytometers 30
14. Haemoglonbinometers 30
15. Glass-ware As per need
16. Small animal examination table (Hydraulic or pinion type) 4
17. Instrument Trolleys 6
18. Travis with noise protection 3
19. Travis (service) 1
20. Travis (examination) 1

(17) INSTRUCTIONAL LIVESTOCK FARM COMPLEX

1.Sprayer 1
2. Shearing and clipping equipment 1 set
3. Debeaking equipment 1
4. Tattooing set tags etc 1
5: AI equipment (different species) 1 set each
6. Egg Candler 1
7. Incubator (Hatchery) 1
8. Battery Brooder 1
9. Trap nest 5
10. Egg Grading Machine 1
11. Milking Machine Set 1
12. Chick sexing machine 1
13. Automatic scalder 1
14. Vernier Callipers 5
15. Screw Gauge 5
16. Maximum-Minimum Thermometer 2
17. Psychro-meter 1
18. Hair Hygrometer 1

19. Milking cans 2

20. Milking piles 2
21. Milk measures 1
22. Cream separator 1
23. Butter chums 1
24. Branding set 1
25. Castrator (for different species) 1

26. Electric clipper 1
27. Tractor, Farm Equipment and Implement, Machinery as per requirement