Course Curriculum and Syllabus

For the Degree of

BACHELOR OF VETERINARY SCIENCE

AND

ANIMAL HUSBANDRY

(B. V. Sc. & A. H.)

Purbanchal University

Faculty of Science and Technology

Biratnagar, Nepal

2021

1. Title of course

The official title of the program **is Bachelor of Veterinary Science and Animal Husbandry (B.V.Sc. and A.H.)**

2. Objectives

General Objective:

The objective ofthis program is to produce academically competent and practical oriented professional veterinarians and animal scientists.

Course Objectives

a. To produce internationally competent manpower in Veterinary Science and Animal Husbandry workforce for the development of profession and for fulfilling the need of the country
b. To provide sound academic knowledge and skills to the students, that assists in the strengthening of the profession.
c. To produce quality professionals in order to provide quality animal health services to the farmers/ clients and the community
d. To develop leadership quality in the students for better implementation of animal health policy in tne country and abroad.
e. To produce competent veterinary practioners /surgeons in order to diagnose and treat the animal patients.
f. To be able to manage the veterinary hospitals and clinics properly and effectively
g. To provide Veterinary Science and Animal Husbandry information and education
h. To develop as a team member of animal health care workers in the vet hospital and community setting.

3. Major Area of Instruction: The curriculum emphasizes following major areas of instruction

Veterinary Anatomy, Veterinary Physiology, Veterinary Biochemistry, Livestock Production and Management, Animal Nutrition, Folder Production and Pasture Managements, Sociology, Extension, Animal Housing, Research Methodology and Biostatics, Veterinary Parasitology, Veterinary Pathology, Veterinary Microbiology, Lab Animal Managements, Genetics and Animal Breeding, Veterinary Pharmacology, Biotechnology, Dairy Technology, Meat Science and Technology, Veterinary Public Health and Epidemiology, Endocrinology, Veterinary Toxicology, Animal Disease Diagnosis, Veterinary Surgery, Veterinary Medicine, Veterinary Clinical Services, Farm Management, Veterinary Toxicology, Tracking Program, Study Circle, Entrepreneurial Training and Professional Internship

4. System of Education

a. System of education will be semester in the university.
b. **Academic year**: The academic year is divided into two semesters.
c. **Semester:** A semester will cover a period of 18 weeks in which 15 weeks (ninetyworkingdays) for effective teaching learning and 3 weeks for final examination. The academic calendar is prepared in the beginning of academic session by the faculty dean and circulated to all institutions / departments for effective functioning of academic program.
d. **Credit Unit**: Credits are in semester hours. Each unit of credit carries at least 15 semester hours for instruction. Each credit hour represents one hour of theory class or two to three hours lab or field work per week. The grading will be made on the basis of total marks obtained by the student in theory and practical examination.
e. **Course Code:** Each course is designated with course code consisting of **Three Capital Letters** accompanied by **Three Numerical Digits and again three Capital Letters**. Initial three capital letters represent the short text of the program BVSc & AH and first digit indicates year (1 to 5) in which the course is offered, second digit indicates the semester part (1 or 2) in which the course is being offered and the third digit denotes the serial number of courses offered at the specific semester and last three capital letters represents short text of the subject matter.

5. Duration of Degrees AND MEDIUM OF INSTRUCTION

a. Duration of B.V.Sc. and A.H. degree program is 5 years (10 Semesters). However a student is allowed to complete the program within a period of eight (8) years or 16 semesters. The student failing to complete the BVSc and AH program within 8 years or 16 semesters will be dropped from the program.
b. **Medium of Instruction:** Medium of instruction and examination is English

6. ELIGIBILITY FOR ADMISSION

The candidate's age is minimum 17 years at the time of admission.

Educational qualification:
The candididate must have scored minimum C+ or GPA 2.00 in SLC or SEE. He/ she must have passed I.Sc. (Basic Science) or 10+2 (Science) or I.Sc. Ag. or equivalent with compulsory English, Physics, Chemistry and Biology securing a minimum of 50% marks in aggregate or GPA 2.4 from recognized universities or boards.
He/she must have passed university entrance examination with minimum 50 % marks. Selection for admission for BVSc and AH degree is based on merit through an entrance examination.

Candidates from other Countries: An applicant must meet the requirements stated above and must have a proof of financial support to undertake the studies.

Eligibilitry criteria may be changed as per the criteria set by related professional council.

7. Grading System

Alphabetical Grade: A student will be graded at 1.75-4 scale: 1.75 for the lowest and 4 for the highest grade. Grade ''A+', "A",'B+'', "B", 'C', 'D',' F' and 'I' will be awarded after the final examination of individual subject of the student. Grade 'A+' carries 4 point, A carries 3.75 'B+' caries 3.50, 'C' carries 2.5, 'D' carries 1.75, 'F' carries '0' and I is incomplete grade which carries no value. The grade and grade point allocation system is given below.

Grade and Grade Value Allocation

Equivalent Marks %	Letter Grades	Grade Value
90 and above	A+	4.00
80 and below 90	A	3.75
70 and below 80	B+	3.50
60 abd below 70	B	3.00
50 and below 60	C	2.50
40 and below 50	D	1.75
Below 40	F	00
Incomplete/Absent	I	--

Grade 'I' for incomplete of the courses/internship which is replaced by other grade upon the successful completion of the course or internship.

CGPA Definition	Equivalent Division
3.75 to 4.00	First with Excellence
3.50 to below 3.75	First with Distinction
3.00 to below 3.50	First Division
2.50 to below 3.00	Second Division
2.00 to below 2.50	Pass Division
Below 2.00	Fail

8. MAKE UP FOR MINIMUM POINT:

The Cumulative Grade Point Average (CGPA) of a student must remain 2.00 or above throughout the duration of studies. A student who has not obtained the minimum CGPA by the completion of all semester examinations shall be allowed to make up the minimum CGPA by taking the betterment examination of the lowest grade i.e. 'D'. The student will be allowed to sit for betterment examination after completion of all semester exams, upon the approval by appropriate authority.

9. EVALUATION CRITERIA AND EXAMINATION SYSTEMS

1. Internal Assessment and External Examination

In order to evaluate the performance of the students **Internal Assessment and External Examination** shall be conducted. Internal assessment will be conducted after completing about 60% courses of each semester. Final examination will be conducted by University's Examination Management Office after completing all the theory and practical courses. Students should fulfill the following minimum criteria to be eligible to appear in the external examination at the end of the semester-

a. Must pass the internal assessment
b. Must have 70 % attendance record
c. Have taken classes of at least 90 working days

a. Internal Assessment:

A total of **40 % of full marks in theory and practical** in each subject is evaluated internally by an instructor/ subject teacher/professor. A student must secure at least 40 % marks in the internal assessment to qualify for final examination. A student, who fails in the internal assessment or miss a schedule test for valid reasons, may be given one chance for makeup test.

Evaluation criteria

S.No.	Particular	Percentage (%)	Remarks
1	Internal assessment exam(TH) / skill test(Pr)	50	
2	Attendance	25	
3	Class test & discipline	25	

b. **External Examination**:

Final examination of 60% of full marks of theory and **practical** will be evaluated externally. A student must secure at least 40 % marks separately in theory and practical examinations to pass the final examination of each subject. A student who fails in final theory or practical examination will be allowed to appear again for back paper examination in each semester after about a month of announcement of semester result.

Marks Allocation for External Examination (Example for Cr hr 2+1)

Theory		Practical	
FM	PM	FM	PM
30	12	15	6

External evaluation criteria for practical (25)

S.n	Particular	Percentage (%)	Full Marks
1	Lab Performance/spoting/written	40	10
2	Record File	15	3.75
3	Attendance	15	3.75
4	VIVA	30	7.5
Total			**25**

Final examination will be conducted by Examination Management Office of Purbanchal University at the end of the semester. The procedure for examination will be as per the examination rules of the University.

Professional Internship: See detail in internship guideline.

2. **Attendance:** A student must attend at least 70 % (80% for internship) of total classes both in theory and practical of the semester to be eligible for final examination.

Evaluation criteria for 2078 batch

B.V.Sc. and A.H. (New curriculum)

First Year: First Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 111 -VAN	Gross Anatomy I (Osteology, Arthrology and Biomechanics)	1	2	1	2	15	60	5	2	-	-	20	8	50	20	75
2	BVS 112-VAN	Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)	2	2	2	2	30	60	10	4	-	-	40	16	50	20	100
3	BVS 113-BCH	Veterinary Biochemistry	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
4	BVS 114-LPM	Ruminant Production and Management	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
5	BVS 115-ANU	Principles of Animal Nutrition.	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
6	BVS 116-VPY	Physiology I (Locomotor, Cardiovascular, Blood and respiratory)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
Total Credit Hours & Full Marks			10+8		150+240												450

First Year: Second Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 121-VAN	Veterinary Histology and Embryology	2	2	2	2	30	60	10	4	-	-	40	16	50	20	100
2	BVS 122-ANU	Principles and Practices of Fodder Production and Pasture Management	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
3	BVS 123-BCH	Physiological Biochemistry	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
4	BVS 124-LPM	Non Ruminant Production (Pig and Poultry)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
5	BVS 125-EXT	Sociology and Principles of Vet and AH Extension	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
6	BVS 126-LPM	Animal Housing and Sanitation	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
7	BVS 127-AST	Biostatistics and Computer Application	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
Total Credit Hours & Full Marks			12+8		180+240												500

Second Year: Third Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 211-VAN	Splanchnology and Applied Anatomy	2	2	2	2	30	60	10	4	-	-	40	16	50	20	100
2	BVS 212-VPA	Parasitology I (General vet Parasitology and Cestode Parasites)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
3	BVS 213-VPY	Physiology II (Digestive, Excretory and Nervous System)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
4	BVS 214-VPP	General Pathology	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
5	BVS 15-ANU	Applied Nutrition I (Ruminant)	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
6	BVS 216-VMI	Microbiology I (General Veterinary Microbiology)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
7	BVS 217-LPM	Bee, Pet and Lab Animal Management	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
8	BVS 218-ANB	Principles of Genetics and Animal Breeding	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
9	BVS 219-VPT	General and Systemic Pharmacology	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
Total Credit Hours & Full Marks			16+10		240+300												650

Second Year: Fourth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 221-VPY	Physiology III (Reproduction, Lactation and Endocrinoloy	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
2	BVS 222-VPA	Parasitology II (Helminthology and Leeches)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
3	BVS 223-VPT	Veterinary Neuropharmacology	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
4	BVS 224-VMI	Microbiology II (Veterinary Immunology and Serology)	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
5	BVS 225-VPP	Systemic Pathology	2	1	2	1	30	30	10	4	-	-	40	16	25	10	75
6	BVS 226-ANU	Evaluation of Feed Stuff	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
7	BVS 227-ANU	Applied Nutrition II (Non ruminant)	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
8	BVS 228-ANB	Animal Breeding and Biotechnology	2	0	2	0	30	0	10	4	-	-	40	16	-	-	50
9	BVS 229-AQU	Principles of Aquaculture	1	1	1	1	15	30	5	2	-	-	20	8	25	10	50
Total Credit Hours & Full Marks			15+8		225+240												575

Third Year: Fifth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 311-NPT	Veterinary Chemotherapy	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
2	BVS 312-VPY	Physiology IV (Growth Environment andClimatology)	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
3	BVS 313-VPH	Environmental Hygiene	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
4	BVS 314-ANU	Applied Human Nutrition	2	0	2	0	30	0	10	4	_	_	40	16	_	_	50
5	BVS 315-VMI	Microbiology III (Systematic Veterinary Bacteriology and Mycology)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
6	BVS 316-VAP	Parasitology III (Veterinary Entomology and acarology)	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
7	BVS 317-EXT	Extension Technique in Vet Practice and Livestock Production	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
8	BVS 318-VPP	Special Pathology I	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
9	BVS 319-LPT	Abattoir Practices and APT	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
10	BVS 310-LPT	Milk and Milk Product Technology	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
Total Credit Hours & Full Marks			14+9		210+270												575

Third Year: Six Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 321-BCH	Clinical Biochemistry	1	1	3	3	15	30	5	2	_	_	20	8	25	10	50
2	BVS 322-VPH	Veterinary Epidemiology	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
3	BVS 323-VPA	Parasitology IV (Veterinary Protozoology)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
4	BVS 324-VMI	Microbiology IV (Systematic Veterinary Virology)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
5	BVS 325-VPP	Special Pathology II (Poultry, Fish and Diagnostic Pathology)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
6	BVS 326-VOG	Theriogenology I (Animal Reproduction and Endocrinology))	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
7	BVS 327-VMC	Internal Medicine I (Systemic)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
8	BVS 328-VCS	Veterinary Clinical Service I	0	1	0	1	0	30	_	_	_	_	_	_	25	10	25
9	BVS 329-VPT	Veterinary Toxicology	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
Total Credit Hours & Full Marks			15+9		225+270												600

Four Year: Seventh Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 411-AEC	Farm Management and Production Economics	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
2	BVS 412-VOG	Theriogenology II (Gynaecolgy and Obstretic)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
3	BVS 413-VSR	Anaesthesiology	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
4	BVS 414-VSR	General Surgery	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
5	BVS 415-VMC	Internal Medicine II (Metabolic and Deficiency)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
6	BVS 416-VMC	Preventive Medicine I (Bacterial, Fungal and Rickettsial)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
7	BVS 417-VCS	Veterinary Clinical Service II	0	2	0	2		60	_	_	_	_	_	_	50	20	50
8	BVS 418-AQU	Fish Diseases	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
9	BVS 419-VPH	Milk and Meat Hygiene and Public Health	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
Total Credit Hours & Full Marks			15+10		225+300												625

Fourth Year: Eight Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 421-LPT	Meat, Meat Products Technology	1	1	2	1	15	30	5	2	_	_	20	8	25	10	50
2	BVS 422-VOG	Theriogenology III (Animal Infertility)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
3	BVS 423-VSR	Radiology and Diagnostic Imaging	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
4	BVS 424-VSR	Regional and Clinical Surgery I	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
5	BVS 425-VMC	Preventive Medicine II (Viral, Protozoal and Parasitic Diseases)	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
6	BVS 426-VMC	Ethics and Jurispredence	1	0	1	0	15	0	5	2	_	_	20	8	_	_	25
7	BVS 427-VCS	Veterinary Clinical Service III	0	2	0	2	0	60	_	_	_	_	_	_	50	20	50
8	BVS 428-BCH	Molecular Biology and Biotechnology	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
9	BVS 429-AEC	Agriculture Marketing and Cooperatives	2	0	2	0	30	0	10	4	_	_	40	16	_	_	50
Total Credit Hours & Full Marks			13+8		195+240												525

Fifth Year: Nineth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 511-BPH	Zoonosis and Public Health	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
2	BVS 512-ANB	Livestock and Poultry Breeding	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
3	BVS 513-VOG	Theriogenology IV (Vet Andrology and Reproductive Techniques)	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
4	BVS 514-VSR	Regional and Clinical Surgery II	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
5	BVS 515-VMC	Animal Welfare	1	0	1	0	15	0	5	2	_	_	20	8	_	_	25
6	BVS 516-VCS	Veterinary Clinical Service IV	0	2	0	2		60	_	_	_	_	_	_	50	20	50
7	BVS 517-VMC	Wildlife, Pet and Lab Animal Medicine	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
8	BVS 518-EXT	Social Mobilization and Community Development	2	1	2	1	30	30	10	4	_	_	40	16	25	10	75
9	BVS 519-LPM	Wildlife Production and Management	1	1	1	1	15	30	5	2	_	_	20	8	25	10	50
10	BVS 510-VCS	Veterinarian in Society	1	0	1	0	15	0	5	2	_	_	20	8	_	_	25
Total Credit Hours & Full Marks			12+9		180+270												525

Fifth Year: Tenth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BLT 520	Internship	-	6	-	6	-	6hr/day	-	-	-	-	-	-	150	75	150
Total Credit Hours & Full Marks			6		540												150

Summary of Curriculum in credits and hours

Semester	I	II	III	IV	V	VI	VII	VIII	IX	X	Total
Credits	18	20	26	23	23	24	25	21	**21**	**6**	**207**
Full Marks	450	525	675	650	725	625	625	575	**650**	**NC**	**5500**
Total Hrs	390	420	540	465	480	525	525	435	**450**	**450**	**4680**

Evaluation Criteria 2079 intake onwards
First Year: First Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 111 - VAN	Gross Anatomy I (Osteology, Arthrology and Biomechanics)	**1**	**2**	1	2	15	60	**10**	**4**	**20**	**8**	**15**	**6**	**30**	**12**	**75**
2	BVS 112- VAN	Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)	**2**	**2**	2	2	30	60	**20**	**8**	**20**	**8**	**30**	**12**	**30**	**12**	**100**
3	**BVS 113- BCH**	Veterinary Biochemistry	**2**	**1**	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
4	BVS 114- LPM	Ruminant Production and Management	**2**	**1**	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
5	BVS 115- ANU	Principles of Animal Nutrition.	**1**	**1**	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
6	BVS116 -VPY	Physiology I (Locomotor, Cardiovascular , Blood and respiratory)	**2**	**1**	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
Total Credit Hours & Full Marks			**10+8**														**450**

First Year: Second Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS121-VAN	Veterinary Histology and Embryology	2	2	2	2	30	60	**20**	**8**	**20**	**8**	**30**	**12**	**30**	**12**	**100**
2	BVS 122-ANU	Principles and Practices of Fodder Production and Pasture Management	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
3	BVS 123-BCH	Physiological Biochemistry	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
4	BVS 124-LPM	Non Ruminant Production (Pig and Poultry)	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
5	BVS 125-EXT	Sociology and Principles of Vet and AH Extension	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
6	BVS 126-LPM	Animal Housing and Sanitation	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
7	BVS 127-AST	Biostatistics and Computer Application	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
Total Credit Hours & Full Marks			**12+8**														**500**

Second Year: Third Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 211-VAN	Splanchnology and Applied Anatomy	2	2	2	2	30	60	**20**	**8**	**20**	**8**	**30**	**12**	**30**	**12**	**100**
2	BVS 212-VPA	Parasitology I (General vet Parasitology and Cestode Parasites)	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
3	BVS 213-VPY	Physiology II (Digestive, Excretory and Nervous System)	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
4	BVS 214-VPP	General Pathology	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
5	BVS 15-ANU	Applied Nutrition I (Ruminant)	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
6	BVS 216-VMI	Microbiology I (General Veterinary Microbiology)	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
7	BVS217-LPM	Bee, Pet and Lab Animal Management	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
8	BVS218-ANB	Principles of Genetics and Animal Breeding	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
9	BVS219-VPT	General and Systemic Pharmacology	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
Total Credit Hours & Full Marks			**16+10**														**650**

Second Year: Fourth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS221-VPY	Physiology III (Reproduction, Lactation and Endocrinoloy	2	1	2	1	30	30	20	8	10	4	30	12	15	6	**75**
2	BVS 222-VPA	Parasitology II (Helminthology and Leeches)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	**75**
3	BVS 223-VPT	Veterinary Neuropharmacology	2	1	2	1	30	30	20	8	10	4	30	12	15	6	**75**
4	BVS 224-VMI	Microbiology II (Veterinary Immunology and Serology)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	**75**
5	BVS 225-VPP	Systemic Pathology	2	1	2	1	30	30	20	8	10	4	30	12	15	6	**75**
6	BVS226-ANU	Evaluation of Feed Stuff	1	1	1	1	15	30	10	4	10	4	15	6	15	6	**50**
7	BVS227-ANU	Applied Nutrition II (Non ruminant)	1	1	1	1	15	30	10	4	10	4	15	6	15	6	**50**
8	BVS228-ANB	Animal Breeding and Biotechnology	2	0	2	0	30	0	20	8	_	_	30	12	_	_	**50**
9	BVS229-AQU	Principles of Aquaculture	1	1	1	1	15	30	10	4	10	4	15	6	15	6	**50**
Total Credit Hours & Full Marks			**15+8**														**575**

Third Year: Fifth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS 311-NPT	Veterinary Chemotherapy	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
2	BVS 312-VPY	Physiology IV (Growth Environment andClimatology)	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
3	BVS 313-VPH	Environmental Hygiene	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
4	BVS 314-ANU	Applied Human Nutrition	2	0	2	0	30	0	20	8	_	_	30	12	_	_	50
5	BVS 315-VMI	Microbiology III (Systematic Veterinary Bacteriology and Mycology)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
6	BVS316-VAP	Parasitology III (Veterinary Entomology and acarology)	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
7	BVS317-EXT	Extension Technique in Vet Practice and Livestock Production	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
8	BVS318-VPP	Special Pathology I	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
9	BVS319-LPT	Abattoir Practices and APT	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
10	BVS310-LPT	Milk and Milk Product Technology	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
Total Credit Hours & Full Marks			14+9														575

Third Year: Six Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS321-BCH	Clinical Biochemistry	1	1	3	3	15	30	10	4	10	4	15	6	15	6	50
2	BVS 322-VPH	Veterinary Epidemiology	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
3	BVS 323-VPA	Parasitology IV (Veterinary Protozoology)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
4	BVS 324-VMI	Microbiology IV (Systematic Veterinary Virology)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
5	BVS 315-VPP	Special Pathology II (Poultry, Fish and Diagnostic Pathology)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
6	BVS316-VOG	Theriogenology I (Animal Reproduction and Endocrinology))	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
7	BVS317-VMC	Internal Medicine I (Systemic)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
8	BVS318-VCS	Veterinary Clinical Service I	0	1	0	1	0	30	_	_	10	4	-	-	15	6	25
9	BVS319-VPT	Veterinary Toxicology	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
Total Credit Hours & Full Marks			15+9		225+270												600

Four Year: Seven Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS421-AEC	Farm Management and Production Economics	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
2	BVS 422-VOG	Theriogenology II (Gynaecolgy and Obstretic)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
3	BVS 423-VSR	Anaesthesiology	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
4	BVS 424-VSR	General Surgery	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
5	BVS 415-VMC	Internal Medicine II (Metabolic and Deficiency)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
6	BVS416-VMC	Preventive Medicine I (Bacterial, Fungal and Rickettsial)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
7	BVS417-VCS	Veterinary Clinical Service II	0	2	0	2		60	_	_	20	8	_	_	30	12	50
8	BVS418-AQU	Fish Diseases	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
9	BVS419-VPH	Milk and Meat Hygiene and Public Health	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
Total Credit Hours & Full Marks			15+10		225+300												625

Fourth Year: Eight Semester

Sn	Course Code	Subjects	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS421-LPT	Meat, Meat Products Technology	1	1	2	1	15	30	10	4	10	4	15	6	15	6	50
2	BVS 422-VOG	Theriogenology III (Animal Infertility)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
3	BVS 423-VSR	Radiology and Diagnostic Imaging	1	1	1	1	15	30	10	4	10	4	15	6	15	6	50
4	BVS 424-VSR	Regional and Clinical Surgery I	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
5	BVS 425-VMC	Preventive Medicine II (Viral, Protozoal and Parasitic Diseases)	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
6	BVS426-VMC	Ethics and Jurispredence	1	0	1	0	15	0	10	4	_	_	15	6	_	_	25
7	BVS427-VCS	Veterinary Clinical Service III	0	2	0	2	0	60	_	_	20	8	_	_	30	12	50
8	BVS428-BCH	Molecular Biology and Biotechnology	2	1	2	1	30	30	20	8	10	4	30	12	15	6	75
9	BVS429-AEC	Agriculture Marketing and Cooperatives	2	0	2	0	30	0	20	8	_	_	30	12	_	_	50
Total Credit Hours & Full Marks			13+8		195+240												525

Fifth Year: Nineth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BVS511-BPH	Zoonosis and Public Health	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
2	BVS 512-ANB	Livestock and Poultry Breeding	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
3	BVS 513-VOG	Theriogenology IV (Vet Andrology and Reproductive Techniques)	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
4	BVS 514-VSR	Regional and Clinical Surgery II	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
5	BVS 515-VMC	Animal Welfare	1	0	1	0	15	0	**10**	**4**	_	_	**15**	**6**	_	_	**25**
6	BVS516-VCS	Veterinary Clinical Service IV	0	2	0	2		60	_	_	**20**	**8**	_	_	**30**	**12**	**50**
7	BVS517-VMC	Wildlife, Pet and Lab Animal Medicine	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
8	BVS518-EXT	Social Mobilization and Community Development	2	1	2	1	30	30	**20**	**8**	**10**	**4**	**30**	**12**	**15**	**6**	**75**
9	BVS519-LPM	Wildlife Production and Management	1	1	1	1	15	30	**10**	**4**	**10**	**4**	**15**	**6**	**15**	**6**	**50**
10	BVS510-VCS	Veterinarian in Society	1	0	1	0	15	0	**10**	**4**	_	_	**15**	**6**	_	_	**25**
Total Credit Hours & Full Marks			**12+9**		**180+270**												**525**

Fifth Year: Tenth Semester

Sn	Course Code	Subject	Credit Hour		Wk		Hrs		Evaluation								Total
									Internal				External				
									Th		Pr		Th		Pr		
			Th	Pr	Th	Pr	Th	Pr	FM	PM	FM	PM	FM	PM	FM	PM	
1	BLT421	Internship	-	6	-	6	-	6hr/ day	-	-	-	-	-	-	150	75	150
Total Credit Hours & Full Marks			6		450												150*

- Students must secure at least 50 % marks in each criteria/entity separately to pass the final internship evaluation examination. However the result in transcript / certificate will appears as Satisfactory(S) or Unsatisfactory (US) rather than marks.

Summary of Curriculum in credits and hours

Semester	I	II	III	IV	V	VI	VII	VIII	IX	X	Total
Credits	18	20	26	23	23	24	25	21	**21**	**NC**	**201**
Full Marks	450	500	650	575	575	600	625	525	**525**	**"S'**	**5025**
Total Hrs	**390**	**420**	**540**	**465**	**480**	**525**	**525**	**435**	**450**	**450**	**4680**

SEMESTERWISE COURSES AND CREDITS

FIRST YEAR

Semester I

Course Code	Name of the Course	Credit Hours
BVS 111 -VAN	Gross Anatomy I (Osteology, Arthrology and Biomechanics)	1+2
BVS 112-VAN	Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)	2+2
BVS 113-BCH	Veterinary Biochemistry	2+1
BVS 114-LPM	Ruminant Production and Management	2+1
BVS 115-ANU	Principles of Animal Nutrition.	1+1
BVS 116-VPY	Physiology I (Locomotor, Cardiovascular, Blood and respiratory)	2+1
Total		**10+8**

Semester II

BVS121-VAN	Veterinary Histology and Embryology	2+2
BVS 122-ANU	Principles and Practices of Fodder Production and Pasture Management	2+1
BVS 123-BCH	Physiological Biochemistry	2+1
BVS 124-LPM	Non Ruminant Production (Pig and Poultry)	2+1
BVS 125-EXT	Sociology and Principles of Vet and AH Extension	1+1
BVS 126-LPM	Animal Housing and Sanitation	1+1
BVS 127-AST	Biostatistics and Computer Application	2+1
Total		**12+8**

SECOND YEAR

Semester III

BVS 211-VAN	Splanchnology and Applied Anatomy	2+2
BVS 212-VPA	Parasitology I (General vet Parasitology and Cestode Parasites)	2+1
BVS 213-VPY	Physiology II (Digestive, Excretory and Nervous System)	2+1
BVS 214-VPP	General Pathology	2+1
BVS 215-ANU	Applied Nutrition I (Ruminant)	1+1
BVS 216-VMI	Microbiology I (General Veterinary Microbiology)	2+1
BVS 217-LPM	Bee, Pet and Lab Animal Management	1+1
BVS 218-ANB	Principles of Genetics and Animal Breeding	2+1
BVS 219-VPT	General and Systemic Pharmacology	2+1
Total		**16+10**

Semester IV

BVS 221-VPY	Physiology III (Reproduction, Lactation and Endocrinoloy	2+1
BVS 222-VPA	Parasitology II (Helminthology and Leeches)	2+1
BVS 223-VPT	Veterinary Neuropharmacology	2+1
BVS 224-VMI	Microbiology II (Veterinary Immunology and Serology)	2+1
BVS 225-VPP	Systemic Pathology	2+1
BVS 226-ANU	Evaluation of Feed Stuff	1+1
BVS 227-ANU	Applied Nutrition II (Non ruminant)	1+1
BVS 228-ANB	Animal Breeding and Biotechnology	2+0
BVS 229-AQU	Principles of Aquaculture	1+1
Total		**15+8**

THIRD YEAR

Semester V

BVS 311-VPT	Veterinary Chemotherapy	2+1
BVS 312-VPY	Physiology IV (Growth Environment andClimatology)	1+1
BVS 313-VPH	Environmental Hygiene	1+1
BVS 314-ANU	Applied Human Nutrition	2+0
BVS 315-VMI	Microbiology III (Systematic Veterinary Bacteriology and Mycology)	2+1
BVS 316-VPA	Parasitology III (Veterinary Entomology and acarology)	1+1
BVS 317-EXT	Extension Technique in Vet Practice and Livestock Production	1+1
BVS 318-VPP	Special Pathology I	2+1
BVS 319-LPT	Abattoir Practices and APT	1+1
BVS 310-LPT	Milk and Milk Product Technology	1+1
Total		**14+9**

Semester VI

BVS 321-BCH	Clinical Biochemistry	1+1
BVS 322-VPH	Veterinary Epidemiology	2+1
BVS 323-VPA	Parasitology IV (Veterinary Protozoology)	2+1
BVS 324-VMI	Microbiology IV (Systematic Veterinary Virology)	2+1
BVS 325-VPP	Special Pathology II (Poultry, Fish and Diagnostic Pathology)	2+1
BVS 326-VOG	Theriogenology I (Animal Reproduction and Endocrinology))	2+1
BVS 327-VMC	Internal Medicine I (Systemic)	2+1
BVS 328-VCS	Veterinary Clinical Service I	0+1
BVS 329-VPT	Veterinary Toxicology	2+1
Total		**15+9**

FOURTH YEAR

Semester VII

BVS 411-AEC	Farm Management and Production Economics	2+1
BVS 412-VOG	Theriogenology II (Gynaecolgy and Obstretic)	2+1
BVS 413-VSR	Anaesthesiology	1+1
BVS 414-VSR	General Surgery	2+1
BVS 415-VMC	Internal Medicine II (Metabolic and Deficiency)	2+1
BVS 416-VMC	Preventive Medicine I (Bacterial, Fungal and Rickettsial)	2+1
BVS 417-VCS	Veterinary Clinical Service II	0+2
BVS 418-AQU	Fish Diseases	2+1
BVS 419-VPH	Milk and Meat Hygiene and Public Health	2+1
Total		15+10

Semester VIII

BVS 421-LPT	Meat & Meat Products Technology	1+1
BVS 422-VOG	Theriogenology III (Animal Infertility)	2+1
BVS 423-VSR	Radiology and Diagnostic Imaging	1+1
BVS 424-VSR	Regional and Clinical Surgery I	2+1
BVS 425-VMC	Preventive Medicine II (Viral, Protozoal and Parasitic Diseases)	2+1
BVS 426-VMC	Ethics and Jurispredence	1+0
BVS 427-VCS	Veterinary Clinical Service III	0+2
BVS 428-BCH	Molecular Biology and Biotechnology	2+1
BVS 429-AEC	Agriculture Marketing and Cooperatives	2+0
Total		**13+8**

FIFTH YEAR

Semester IX

BVS 511-VPH	Zoonosis and Public Health	1+1
BVS 512-ANB	Livestock and Poultry Breeding	2+1
BVS 513-VOG	Theriogenology IV (Vet Andrology and Reproductive Techniques)	1+1
BVS 514-VSR	Regional and Clinical Surgery II	2+1
BVS 515-VMC	Animal Welfare	1+0
BVS 516-VCS	Veterinary Clinical Service IV	0+2
BVS 517-VMC	Wildlife, Pet and Lab Animal Medicine	1+1
BVS 518-EXT	Social Mobilization and Community Development	2+1
BVS 519-LPM	Wildlife Production and Management	1+1
BVS 510-VCS	Veterinarian in Society	1+0
Total		**12+9**

Semester X

BVS 520-VIP	Veterinary Internship Program	0+6

Total Credit Hour 122+79= 201+6 = 207

Note: Activities like Tracing Program, Study Circle and Entrepreneurial Training will be conducted as per the instruction and guideline given in the annex: II

10. COURSES AND CREDITS UNDER DIFFERENT DICSIPLINES

I. VETERINARY ANATOMY

Code	Name of the Course	Credit
BVS 111 -VAN	Gross Anatomy I (Osteology, Arthrology and Biomechanics)	1+2
BVS 112-VAN	Gross Anatomy II (Myology, Neurology, Angiology and Aesthesiology)	2+2
BVS 121-VAN	Veterinary Histology and Embryology	2+2
BVS 211-VAN	Splanchnology and Applied Anatomy	2+2
Total		**7+8**

II. VETERINARY BIOCHEMISTRY

Code	Name of the Course	Credit
BVS 113-BCH	Veterinary Biochemistry	2+1
BVS 123-BCH	Physiological Biochemistry	2+1
BVS 321-BCH	Clinical Biochemistry	1+1
BVS 428-BCH	Molecular Biology and Biochemistry	2+1
Total		**7+4**

III. VETERINARY PHYSIOLOGY

Code	Name of the Course	Credit
BVS 116-VPY	Physiology I (Locomotor, Cardiovascular, Blood and Respiratory)	2+1
BVS 213-VPY	Physiology II (Digestive, Excretory and Nevous system)	2+1
BVS 221-VPY	Physiology III (Reproduction, Lactation and Endocrinology)	2+1
BVS 312-VPY	Physiology IV (Growth Environment and Climatology)	1+1
Total		**7+4**

IV. VETERINARY MICROBIOLOGY

Code	Name of the Course	Credit
BVS 216-VMI	Microbiology I (General Veterinary Microbiology)	2+1
BVS 224-VMI	Microbiology II (Veterinary Immunology and Serology)	2+1
BVS 315-VMI	Mycrobiology III (Systematic Vet Bacteriology and Mycology)	2+1
BVS 324-VMI	Mycrobiology IV (Systematic Veterinary Virology)	2+1
Total		**8+4**

V. VETERINARY PARASITOLOGY

Code	Name of the Course	Credit
BVS 212-VPA	Parasitology I (General Vet Parasitology and Cestode Parasites)	2+1
BVS 222-VPA	Parasitology II (Helminthology and Leeches)	2+1
BVS 316-VPA	Parasitology III (Veterinary entomology and Acarology)	1+1
BVS 323-VPA	Parasitology IV (Veterinary Protozoology)	2+1
Total		**7+4**

VI. VETERINARY PATHOLOGY

Code	Name of the Course	Credit
BVS 214-VPP	General Pathology	2+1
BVS 225-VPP	Systemic Pathology	2+1
BVS 318-VPP	Special Pathology I	2+1
BVS 325-VPP	Special Pathology II (Poultry, Fish and Diagnostic pathology)	2+1
Total		**8+4**

VETERINARY CLINICAL SERVICES

Code	Name of the Course	Credit
BVS 328-VCS	Veterinary Clinical Service I	0+1
BVS 417-VCS	Veterinary Clinical Service II	0+2
BVS 427-VCS	Veterinary Clinical Service III	0+2
BVS 516-VCS	Veterinary Clinical Service IV	0+2
BVS 510-VCS	Veterinarian in Society	1+0
Total		**1+7**

VII. VETERINARY SURGERY AND RADIOLOGY

Code	Name of the Course	Credit
BVS 413-VSR	Anaesthesiology	1+1
BVS 414-VSR	General Suegery	2+1
BVS 423-VSR	Radiology and Diagnostic Imaging	2+1
BVS 424-VSR	Regional and Clinical Surgery I	2+1
BVS 514-VSR	Regional and Clinical suesery II	2+1
Total		**9+5**

VIII. VETERINARY PHARMACOLOGY AND TOXICOLOGY

Code	Name of the Course	Credit
BVS 219-VPT	General and Systemic Pharmacology	2+1
BVS 223-VPT	Veterinary Neuropharmacology	2+1
BVS 311-VPT	Veterinary Chemotherapy	2+1
BVS 329-VPT	Veterinary Toxicology	2+1
Total		**8+4**

IX. VETERINARY GYNAECOLOGY AND OBSTETRICS

Code	Name of the Course	Credit
BVS 326-VOG	Theriogenology I (Animal Reproduction and Endocrinology)	2+1
BVS 412-VOG	Theriogenology II (Gynaecology and Obstretic)	2+1
BVS 422-VOG	Theriogenology III (Animal Infertility)	2+1
BVS 513-VOG	Theriogenology IV (Vet Andrology and Reproductive Techniques)	1+1
Total		**7+4**

X. VETERINARY PUBLIC HEALTH AND EPIDEMIOLOGY

Code	Name of the Course	Credit
BVS 313-VPH	Environment Hygiene	1+1
BVS 322-VPH	Veterinary Epidemiology	2+1
BVS 419-VPH	Milk and Meat Hygiene and Public Health	2+1
BVS 511-VPH	Zoonosis and Public Health	1+1
Total		**6+4**

XI. VETERINARY MEDICINE

Code	Name of the Course	Credit
BVS 327-VMC	Internal Medicine I (Systemic)	2+1
BVS 415-VMC	Internal Medicine II (Metabolic and Deficiency)	2+1
BVS 416-VMC	Preventive Medicine I (Bacterial, Fungal and Rickettsial)	2+1
BVS 425-VMC	Preventive Medicine II (Viral, Protozoal and Parasitic Disease)	2+1
BVS 426-VMC	Ethics and Jurispredence	1+0
BVS 515-VMC	Animal Welfare	1+0
BVS 517-VMC	Wildlife, Pet and Lab animal Medicine	1+1
Total		**11+5**

XII. LIVESTOCK PRODUCTION AND MANAGEMENT

Code	Name of the Course	Credit
BVS 114-LPM	Rumunant Production and Management	2+1
BVS 124-LPM	Non Rumminant Production (Pig and Poultry)	2+1
BVS 126-LPM	Animal Housing and Sanitation	1+1
BVS 217-LPM	Bee, Pet and Lab Animal Management	1+1
BVS 519-LPM	Wildlife Production and Management	1+1
Total		**7+5**

XIII. ANIMAL NUTRITION

Code	Name of the Course	Credit
BVS 115-ANU	Principle of Animal Nutrition	1+1
BVS 122-ANU	Principles and Practices of Fodder Production and Pasture	2+1
BVS 215-ANU	Applied Nutrition (Ruminant)	1+1
BVS 226-ANU	Evaluation of Feed Stuff	1+1
BVS 227-ANU	Applied Nutrition (Non Ruminant)	1+1
BVS 314-ANU	Applied Human Nutrition	2+0
Total		**8+5**

XIV. ANIMAL GENETICS AND BREEDING

Code	Name of the Course	Credit
BVS 218-ANB	Principles of Genetics and Animal Breeding	2+1
BVS 228-ANB	Applied Breeding and Biotechnology	2+0
BVS 512-ANB	Livestock and Poultry Breeding	2+1
Total		**6+2**

XV. ANIMAL PRODUCT TECHNOLOGY

Code	Name of the Course	Credit
BVS 319-LPT	Abbatoir Practices and APT	1+1
BVS 310-LPT	Milk and Milk Product Technology	1+1
BVS 421-LPT	Meat and Meat Product Technology	1+1
Total		**3+3**

XVI. AQUACLTURE AND FISHERIES

Code	Name of the Course	Credit
BVS 229-AQU	Principles of Aquaculture	1+1
BVS 418-AQU	Diseases of Fish	2+1
Total		**3+2**

XVII. BASIC AND SOCIAL SCIENCES

Code	Name of the Course	Credit
BVS 125-EXT	Biostatistics and Computer Application	2+1
BVS 127-AST	Sociology and Principles of Vet and AH Extension	1+1
BVS 317-EXT	Extension Techniques in Vet Practices and Livestock Production	1+1
BVS 518-EXT	Social Mobilization and Community Development	2+1
BVS 411-AEC	Farm Management and Production Economics	2+1
BVS 429-AEC	Agriculture Marketing and Cooperatives	2+0
Total		**10+5**

XVIII. VETERINARY INTERNSHIP PROGRAM AND OTHER ACTIVITIES

BVS 520-VIP	Veterinary Internship Program	0+6

SEMESTERWISE

TOPICAL BREAKDOWN OF THE SYLLABUS

FIRST YEAR

FIRST SEMESTER

Course Code: BVS 111 -VAN

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 description 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**

S.N.	Topics	No. of Pr
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 or forelimb:	
	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	1
	Skull,	1
	Cervical Vertebra,	1
	Thoraaic Vertebra,	1
	Lumbar Vertebra,	1
	Sacral Vertebra,	1
	Coccygeal Vertebra,	1
	Ribs,	1
	Sternum	1

References

2.	Gross study and description of different types of joints of bovine and their comparison with otherspecies	
	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

1. Dyce, K.M., W.O. Sack and C.J.G. Wensing .2017. Text Book of Veterinary Anatomy, 5th Edition, W.B. Saunders Company
2. McLeod, W.M. 1964. Bovine Anatomy, 2nd Edition, Burger Publishing Company.
3. Neil, D.S. May.1977. The Anatomy of Sheep, 3rd Edition, University of Queensland Press, Sydney.
4. Sisson, S. and J.D. Grossman 1977. The Anatomy of the Domestic Animals. 5th edition, MacMillan, India Vol. 1 & 2.
5. 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.
6. Ghosh, RK. (2018) Primary Veterinary Anatomy. 7th edition. Current books international

Course Code: **BVS 112-VAN**
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 animal 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.

Aesthesiology: 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.N.	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,	2
	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 fetal circulation, &	1
	Lymph circulation.	1
6.	Gross study of sense organs and common integuments	
	Eye,	1
	Ear,	1
	Nose,	1
	Skin, &	1
	Horn and Hoof.	1
	Total	30

S.No.	**Topic**	**No.of Practicals**
1.	Dissection of muscles of all body regions of bovine, their location, and comparison with otherspecies.	
	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 domesticanimals.	
	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 ofanimals	
	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

1. D

yce, K.M., W.O. Sack and C.J.G. Wensing 2009. Text Book of Veterinary Anatomy, 4thEdn, W.B. Saunders Company.
2. McLeod, W.M. 1964. Bovine Anatomy, 2nd Edition, Burger Publishing Company.
3. May, NDS 1977. The Anatomy of Sheep, 3rd Edition, University of Queensland Press, Sydney.
4. Sisson, S. and J.D. Grossman 1977. The Anatomy of the Domestic Animals, 5th Edition, MacMillan, India.
5. Sisson, S. and J.D. Grossman 1975. The Anatomy of the Domestic Animals, Vol. 1 & 2, 5thEdn. W.B. Saunders Company Philadelphia, London, Toronto.
6. Gosh RK 2018. Primary Veterinary anatomy, 7thEdn. Current Books International Publications, Kolkata, India.
7. Pasquini, C, T Spurgeon and S Pasquini 2003. Anatomy of domestic Animals: Systemic &Regional Approach, 10thEdn. Sudz Publishing, TX, USA.

Course Code: **BVS 113-BCH**
Course Title: **Veterinary 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 membrane equilibrium. Acids, Base, pH, buffer systems, Henderson- Hasselbalch equation.Thermodynamic concept of biological reactions. Biological significance of important monosaccharides (pentose, hexose and amino sugars), disaccharides (maltose, isomaltose, lactose and sucrose), oligosaccharides (cellobiose,limitdextrin),polysaccharides, (starch,glycogen, cellulose, Amylose, amylopectin 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

SN	TOPICS	Lecture No.
1	Introduction of biochemistry and its scope and importance of biochemistry 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 membrane	3
3.	Aqueous system, membrane equilibrium and its function. Ionization of water, dissociation of acids, pH, buffer systems, Henderson-Hasselbalch equation and thermodynamics concept of biological reactions.	3
4.	Biochemistry of carbohydrate :Biological significance ofmonosaccharides (pentose, hexose and amino sugars), disaccharides (maltose, isomaltose, lactose and sucrose), oligosaccharides (cellobiose,limitdextrin),polysaccharides, (starch,glycogen, cellulose, Amylose, amylopectin 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.	3

	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	
7.	Biochemistry of nucleic acids: Chemistry 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 fat soluble vitamin	2
9	Definition Classification, function 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

SN	Topic	Hours
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.	2
4.	Preparation of colloidal solutions	1
5.	Titration curve of amino acids versus acids and bases.	1
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

1. Lehninger, D.L. Nelson, and M.Cox Michael. Lehninger Principle of Biochemistry latest Edition. Macmillan worth Publisher.
2. Voet Donald and Voet Judith G. Fundamentals of Biochemistry. Life at the Molecular level. Latest Edition. John Wiley & Sons, Inc.

Course Code: BVS 114-LPM
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 indigenous and exotic breeds of cattle buffalo, sheep and goat. 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 and kids. General management such as grooming, dehorning, identification, castration, barn sanitation, milking methods and practices. Docking, dipping and drenching. Judging and selection of dairy animal.

Course
Theory

S. No.	Topic	No. of Lectures
1	**Introduction:**	
	Historical back ground of ruminant production	1
	Future scope, importance and present situation of ruminant and ttheir production	2
	Terminology, zoological classification and constraints of ruminant production in Nepal.	2
2	**Breeds and their characteristics**	
	Exotic cattle breeds and their characteristics	2
	Jersey, Holstein Friesian, Brown Swiss, Ayrshire	
	Indigenous cattle breeds and their characteristics	2
	Hariyana, Sahiwal, Red Sindhi, Siri, Achame, Lulu, Yak, Nak and Chauri	
	Indigenous buffalo breeds and their characteristics	
	Murrah, Surti, Jaffarabadi, Nili-rabi, Mahsana,Lime, Parkote and Gaddi	2
	Exotic sheep and goat breeds and their characteristics	
	Merino, Rambuillet, Romney, Suffoclk, Sannan, Damascus	
	Indeginous breeds of sheep : Bhyanglung, Kage, Baruwal,Lampuchre	2

	e. Indigenous goat breeds and theircharacteristics f. Barbari, Beetle, Jamunapari, Kasmiri, Khari, Sinhal Chyngra Terai, and Anglo-nubion Saanen Boer	
3.	Housing	
	a. Selection of site for establishing new livestock farm b. Housing system for cattle and buffalo. c. Merit and demerit of housing system d. Provision of housingsystem e. Building requirements f. Housing for sheep and goat	1 2
4.	Care and management Care and management of pregnant cattle/buffalo/sheep/goat Care and management of animal during giving birth Management of newly born calf Weaning and raising young calf artificially Management of lactating cow/buffalo Dry cow/buffalo management Heifer management Managing lambs/kids from weaning to market Bull and buck management 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**

Practicals

S. No.	Topic	No. of Lectures
1	A visit to 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 Blood less methods 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

1. Banerjee, G. C.1991. A Text Book of Animal Husbandry. Oxford and IBH Publishing, New Delhi (78^{Th} Edition)
2. Jagdish Prasad, 2004. Principle and Practices of Dairy Farm Management. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata
3. Jagdish Prasad, 2001. Animal Husbandry and Dairy Science. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata

Course Code: **BVS 115-ANU**
Course Title: **Principles of Animal Nutrition**
Credit Hours: **2 (1+1) Full Marks: 50 Theory: 25 Practical: 25**

Objectives:

Upon the completion of this course, students will be able to understand the basicprinciples of animal nutrition and will be able to recognize the function and deficiencysymptomsofnutrients.

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; Characterization and nutritional importance of mineralsand vitamins, feed additives and their role. Digestion, absorption and metabolism of various nutrients in ruminants and non ruminants and birds; Feeding standard in different species and age group of animals.

Course BreakdownTheory

S.No.	Topic	No. of Lectures
1.	Introduction of animal nutrition and its role in animal husbandry.	1
2.	Comparative composition of plant and animal cell and tissues.	1
3.	Feedstuff and feed ingredients with nutrient contents ;	1
4	Utilization and characteristics of energy rich feed ingredients.	1
5.	Protein rich feed in gradients.	1
6.	Function of water in animals' body	1
7.	Classification, function and foodsource of protein	1
8.	Classification, function and feed source of carbohydrates	1
9.	Classification, functions and feed sources of lipid.	1
10.	Function, deficiency symptom and requirement of microminerals.	1
11.	Function, deficiency symptom and requirement of water soluble vitamins.	1
12	Function, deficiency symptoms and requirement of fat soluble vitamins.	1
13.	Feed additives used in animals feeding.	1
14	Digestion, absorption and metabolism of various nutrients in ruminants and non ruminants and birds	1
15	Feeding standard in different species and age group of animals.	1
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Sampling of feed ingredients for proximate analysis	1
2.	Identification of energy rich feed ingredients.	1
3.	Identification of protein rich feed ingredients.	1
4.	Preparation of standard solution for chemical analysis.	1
5.	Determination of drymatter.	1
6.	Determination of ether extract.	1
7.	Determinationof crudefiber.	1
8.	Determination of crude protein.	1
9.	Digestion process.	1
10.	Distillation 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 pig.	1
15.	Feeding standard for birds.	1
	Total	**15**

REFERENCES:

1. Benerjee, G.C.1984. A Text Book of Animal Husbandry. Mohan Primalani, Oxford and IBH Publishing Company Pvt. Ltd.
2. Benerjee, G. C 1986. A Text Book of Animal Nutrition., Oxford and IBH Publishing Company Pvt.Ltd.
3. Morrison,F.B.1984.Feeds and Feeding.CBS Publishers and Distributors , Jain Bhawan, Bhola Nath Nagar, NewDelhi,India
4. Ranjhan, S.K.1993. Animal Nutrition and Feeding Practice in India.Vikas Publishing House. Pvt.Ltd, India.

Course Code: **BVS 116-VPY**
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, hemograph, 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.

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 of leucocytes in immunity	1
8.	Thrombocytes formation, maturation and fate and its role in blood coagulation.	1

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

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**

References

1. Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.
2. Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson. Arthur C. Guyton.Text Book of Medical Physiology
3. Ganong, W.F. 1991. Review of Medical Physiology, 15th Ed., Prentice- Hall International Inc.

FIRST YEAR

SECOND SEMESTER

Course Code: **BVS121-VAN**
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 ofdevelopment.

Course Breakdown
Theory

S.No.	Topic	No.of Lectures
1.	Animal cell, cell structure	1
2.	Basic tissues	
	Epithelial tissue,Glands(exocrine and exocrine)	1
	Connective tissue, Cartilages and Bones	1
	Blood, lymph and Red marrow	1
	Muscular tissue,and Nervous tissue	1
3.	Definition, embryology, Gametogenesis, ovulation	1
4.	Fertilization, cleavage, gastrulation,	1
5.	Formation of germ layers and Development of general body form and early features	1
6.	Foetal membranes and placenta	1
7.	Development of digestive and respiratory system	1
8.	Development of cardiovascular system, foetal circulation	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	
	Tongue, test buds, Oesophagus, stomach (ruminant and non-ruminant), intestine	1

	Liver, gall bladder 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(Eye, Ear and skin)	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(eye, ear and skins)	1
	Total	**30**

References

1. "Text book of Veterinary histology" by Dellmann and Eurell
2. "Color atlas of Veterinary histology" by Bacha and Bacha
3. "Atlas of normal histology" by DiFlore, "Veterinary Developmental Anatomy" by William
4. "Applied veterinary histology" by W.J.Banks
5. "Bailey's textbook of histology" by Copenhover
6. "Theory and practice of histological techniques" by Bancroft and Gamble
7. "Veterinary Embryology" by Mc Geady
8. "The embryology of Domestic animals" by Noden and de Lahunta

Course Code: **BVS 122-ANU**
CourseTitle: **Principles and Practices of Fodder Production and Pasture Management**
Credit Hours: **3(2+1)** **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives:

Upon the completion of the course, students will be able to understand principles and practices off odder 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 soilt ype. Factors affecting chemical composition and nutritive value of fodder; 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 Practicals
1	Introduction of feeds and feeding situation in Nepal, Common terminology off odder and pasture	1
2	Edaphic factors affecting pasture and fodder crops	
	Climate and its variation	1
	Soil types	1
	Factors associated with fodder production	
	Chemical composition and nutritive value	1
	Species and varietal differences	1
3	Fodder plant growth, development and yield	
	Morphology of forage grasses: vegetative growth, tiller, and reproductive growth in forage grasses	1
4	Principle of grass seed production Reproductive development Component of seed yield and actual seed yield	1
5	Cultivation practices of common annual and perennial fodder/grasses and legumes	
	Oats	
	Jawar, Bajra	1
	Teosinte, Maize	1
	Napier, Blue Panic	1
	Siratro, Centrocema	1
	Molasses, Mulato	1
	Berseem, Lucerne	1
	Jointvetch, Desmodium	1
	Stylosanthes, Foragepeanut	1
	Butter flypea, Glycine	1
6	Cultivation, establishment and yield of comm.	
	Pasture species:	
	Perennialryegrass, cocks foot	

	Tallfescue, Phalaris	1
	White clover	1
	Red clover, Lotus	1
7.1	Pastureestablishment: seedquality, sowing, soil environment	1
7.2	Cultivated seedbed sand management of pasture	1
7.3	Nutrition of grazing animal, nutritive value of pasture, herbage intake and composition	1
8	Pasture and soilfertility	
	Nutrient cycling, pasture growth and fertilizer	1
	N fixation and grass/legume ebalance	1
9	Preservation and conservation off odder/forage	
	9.1 Haymaking, steps, advantages and disadvantages	1
	9.2 Silage making process, steps, advantages and limitations	1
10	Silvi-pastoral system concept and importance	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Common features used in identifying vegetative grasses	1
2	Identification of seasonal fodders (grasses and legumes) at campus and vicinity	1
3	Identification of some common pasture grasses	1
4	Identification of some common pasture legumes	1
5	Identification off odder trees and common tree fodder	1
6	Preparation of her barium sheet	1
7	Cultivation of seasonal fodder covering winter and summer	2
8	Forage/fodder sampling	2
9	Proximate analysis	3
10	Determination of green and drymatter yield	1
11	Determining / estimating botanical composition of the pasture mass	1
	Total	**15**

REFERENCES:

1. Bayer,W. and A.W.Bayer.1998. Tropical Agriculture Forage Husbandry. ICAR, MacMillan.
2. Devkota, N.R.2005. A Practical Manual on Basics of Pasture Research and Study. Devkota and Devkota family; Publishing, Kathmandu, Nepal.P50.
3. Pandey, R.S.1997. Fodder and Pasture development in Nepal. UdayaR.D. Service (p.) Ltd. Kathmandu Nepal.
4. Pandey, K.K1982. Fodder tree and tree fodderin Nepal. Swiss Federal Institute of Forestry Reasearch. Birmensdrof, Switzerland.
5. Pathak, N.N. and R.CJakhmila.1983. Forage and live stock production. Bikash publishing house. New Delhi.

Course Code: **BVS 123-BCH**
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.

Theory

SN	Topic	Hours
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 reactions	2
8	Oxidoreductases, oxidases, oxygenase, dehydrogenases, Hydroperoxides & 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 &	3

	regulation of blood sugar, bioenergetics of carbohydrate metabolism	
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	1
14	Replication and transcription and translation	4
15	Metabolic functions of macro and micro nutrients	2
16	Metabolic functions of lipid and water soluble vitamins	2
17	Uses of isotopes in metabolic studies.	1
	Total	30

Practical

SN	Topic	Hours
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

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

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

Course Code: **BVS 124-LPM**
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

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, sow, pregnant and breeding boar.	2
4	Housing system of pig and poultry: site selection for housing, housing requirement, advantage and disadvantage of housing.	3
5	Nomenclature and breeds 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 of 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 managemental 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 ; 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 thegrowing stock:	2
14	Care and management of broilers, pullet, breeding and laying hen.	2
15	Maintenance of bio-security in a commercial farm.	1
	Total	**30**

Practical

SN	Topics	No. of Lectures
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 in poultry	2
7	Study of pig and poultry farm record	1
8	Vaccination of poultry	1
9	Study the housing system of 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

1. Banerjee, G. C.1991. A Text Book of Animal Husbandry. Oxford and IBH Publishing, New Delhi (8^{Th} Edition)
2. Prasad and Niraj 2012. Poultry Production and management. Kalyani Publishers Ludhiana, NewDelhi, Hydrabad, Chennai, Kolkata
3. Panda, P. C. 1995. Text Book on Egg and Poultry Technology. Vikas Publishing House Pvt Ltd576, Masjid Road, Jangpura, New Delhi-110014

Course Code: **BVS 125-EXT**

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; , communication to innovation; programme planning; livestock marketing extension; sharing and linkage with actors and their relationship to animal husbandry extension.

Course

Theory

S.No.	Topic	No.of Lectures
1	Introduction to sociology and its importance to Veterinay Extension Worker	1
2	Relationship of sociology with other social sciences	
	Rural sociology as applied to extension education	1
3	Primary concepts of rural-sociology Social group organization	1
4	Social stratification Leaders and leadership Cultural factors in society	2
5	Social norms, value and belief system	1
6	Social institutions,function and interrelationship Social problems and social control	1
7	Social process Social change	1
8	Philosophy of extension; Principles of extension in relation to livestock husbandry and livestock product's marketing	1
9	Sharing and linkage partnerships: an emerging concept in animal husbandry development and the extension service of DLS	1
11	Communication	
	Communication to innovation	1
	Types of communication and the communiation process	1
12	Adoption process and adopters categories	1
13	Programme planning and development and its principles; Qualities of a good extension worker	1
14	Livestock marketing extension	
	Role of livestock in development paradigm and Types of farming and system of farming	1
	Total	**15**

Practical

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

References

1. Malhialagan, P. (2012). Text Book of Animal Husbandry and Livestock Extension: Third Revised and Enlarged Edition. International Book Distribution Co, India.
2. Bhusan, V. and D. R. Sachdeva (2018). An Introduction to Sociology. 2nd edition.Kitab Mahal, Allahabad, India.
3. Harlambos and Holborn (2014). Sociology. Themes and Perspectives.8th edition. Collins Educational Harper Collins Publishers Limited, London.
4. Rao, S.C. N. 2019). Sociology: Principles of Sociology with and Introduction to Sociological thought. S. Chand and Company Ltd.: New Delhi.
5. Ban, A. W. Van Den and H. S. Hawkins (2002). Agricultural Extension.2nd edition. S. K. Jain for CBS Publishers and Distributors, New Delhi.

Course Code: **BVS 126-LPM**
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 tail and head to head, advantages and disadvantages. Poultry housing, (deep litter, cage,). Housing of small ruminants and swine.

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

Course 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 ruminant	1
9	Housing for swine	1
10	Housing for poultry(deep litter ,cage system, battery brooding etc)	1
11	Water: Importance, major functions and sources of water	1
12	Requirement of water for various species of farm animals and poultry birds	1
13	Sanitation: Drainage, disposal of cow dung, 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
15.	**Total**	**15**

References

1. Ranjhan, s.k. and N.H Pathak .1991.Text Book on Buffalo Production. Vikas Publishing House Pvt. Ltd. New Delhi.
2. May, Cherye.2010. Cattle Management, Roston, publishing Co, Irc.Roston, Virginia USA.

Course Code: **BVS 127-AST**
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 and can use computer for statistical analysis.

Syllabus:

Basicstatistics

An overview of statistics- introduction and importance, Frequency distribution, Measures of central tendency & dispersion, Probability & Probability distributions, correlation & Regression, Tests of significance (Z,t, F & ÷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 networks 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-simpler and omsampling–sample selection from an agricultural field by simple random sampling, probability proportional to size, stratified random sampling, systematic sampling, cluster sampling, multistage sampling, samplingerror.	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-Measures of skewness and kurtosis	1
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, KarlPearson's coefficient of correlation (linear correlation), properties	1
9	Regression (linear), Regression equations of yonxandofxony. 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 meantest (pairedt-test), Test for correlation coefficient, Ftest, Chi-squaretest–test Of independence and goodness offit.	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 (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,, Chi^{2}test	3
8.	Introduction with programming Computer	2
	Total	**15**

REFERENCES:

1. Agrawal, B.L.1996. Basic Statistics (3rdEdition), New Age Internatiional Pvt.Ltd. New Delhi.
2. Chandel, S.R.S.1984. Ah and Book of Agricultural Statistics, Achal Prakashan Mandir, Kanpur, India.
3. Gupta, S.C. and V.K.Kapoor.1988. Fundamentals of Applied Statistics, Chand and Com. New Delhi.
4. Singh, S. and R.P.S. Verma. 1982. Agricultural Statistics, Rama Publishers Meerut. Tripathi, P.N. 1991.
5. Annual on Introductory Agricultural Statistics, Tribhuvan University, IAAS, Chitwan Nepal. Kalicharan, N.2001. An Introduction to Computer Studies. Cambridge University Press.
6. Taxali, R.K.2001. Software Made Simple. Tata McGRaw Hill Publishing Company Limited.

SECOND YEAR

THIRD SEMESTER

Course Code: **BVS 211-VAN**
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 enables the students to dissect specimens, identify the sites for surgical operations and conduct post-mortem examination.

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 Terminologies 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 to body cavities , and 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, prostrate gland and bulbourethral 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 and vulva	1
	Mammary gland	1
7	Gross study of endocrine system	
	Pituitary gland and adrenal gland	1
	Thyroid , parathyroid and pineal gland	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.	,Laparotomy, 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

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4. Tyagi, R. P. S. and J. Singh. .(2017) Ruminant Surgery. A text Book of surgical diseases of cattles, buffaloes, camels, sheep, and goats, 1st edition, CBS Publishers and distributors, New Delhi.
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Course Code: **BVS 212-VPA**

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 define different types of parasites and their association, host parasite relationship, immunity against parasites and also to assess the knowledge about identification of eggs, adult cestode parasites, their life cycle, 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 hosts, Resistance of hosts to parasitic infections/infestation, Immunity against parasitic infections, Nomenclature of parasites, Standardized Nomenclature of Animal Parasitic Diseases (SNOAPAD), Classification of parasites, characteristics of phyla (Platyhelminthes, Nemathelminthes and Acanthocephala, Arthropoda and Protozoa) .

Salient morphological features, Life cycle, transmission, pathogenesis, epidemiology, diagnosis, treatment and general control measures of following cestode parasites of animals and birds.

Cestodes: Mesocestoides, Equine tape worms (Anoplocepahala, Paranoplocephala), 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 Lecture
1	Introduction (definition of parasitology, terms use in parasitology, short history of parasitology)	2
2	Animal association (Symbiosis, mutualism, commensalism phoresis and parasitism, Types of host and parasites	2
3	Host parasite relationship, tissue reaction caused by parasites to their hosts, Mode of transmission of parasites	2
4	Resistance of host to parasitic infection/infestation Immunity against parasitic infections	3

5	Nomenclature of Animal Parasites and Parasitic Diseases	2
6	Classification of parasites 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 of the following tapeworms; 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 adult cestode parasites and their larval stages.	3
2	Demonstration of lesions caused by adult cestode parasites and their larval stages.	3
3	Visit of slaughter house to observe adult and larval stages of cestode parasites.	3
4	Demonstration of the types of final hosts and their intermediate hosts.	3
5	Faecal examination methods and identification of eggs of cestode parasites.	3
	Total	**15**

References

1. Change, T.C. 1973. General Parasitology. Academic Press, Florida, USA (1st Edition).
2. Levine, N. D. 1983. Text Book of Veterinary Parasitology. CBS Publishers and Distributers (1st Indian Edition).
3. Soulsby, E. J. L. 1986. Helminths, Arthropods and Protozoa of Domesticated Animals. The English Language Book Society and Bailliere Tindall andCassell Ltd (7thEdition).
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Course Code: **BVS 213-VPY**

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 nervous system, 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 secretions. 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 functions	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.	Digestive physiology of poultry	1
7.	Kidney structure of nephron, histological peculiarities blood supply of kidneys, determination of glomerular filtration rate (GFR), Urine formation	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, generation of action potential	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**

Practicals

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

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2. Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson.
3. Ganong, W.F. 1991. Review of medical physiology, 15th Ed., Prentice- Hall International Inc.

Arthur C. Guyton Text Book of Medical Physiology

Course Code: **BVS 214-VPP**
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 medicalterminology.

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 ofcancer.

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, amyloidosis	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, paraneoplstic syndrome	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	Gross lesions description and interpretation technique	1
5	Collection of gross pathological specimens and gross morphological diagnosis	1
6	Technique of post mortem examination of large animals	1
7	Technique of post mortem examination of small animals	1
8	Study of histopathological slide showing growth disturbances,and pigmentation	1
9	Study of histopathological slide showing circulatory disturbances (congestion, hemorrhage, edema and hyperemia)	1
10	Study of histopathological slide showing degenerative process (hydropic degeneration, and fatty degeneration), amyloidosis, gout, and calcification	1
11	Study of histopathological slide showing necrotic and apoptotic condition	1
12	Study of histopathological slide showing acute infammation	1
13	Study of histopathological slide showing chronic infammation	1
14	Collection, preservation and dispatch of morbid animals	1
15	Histopathological slide showing charactristics of neoplasm and simple, mixed and miscellaneous neoplasm	1
	Total	**15**

References

1. Kierszenbaum, 2007. Histology and Cell Biology - An Introduction to Pathology, 2nd Ed. Meuten DJ.2003. Tumors in Domestic Animals. Iowa State Press, 4th Ed.
2. Robbins & Cotran, 2009. Pathologic Basis of Disease, Kumar, et al. 8th Ed. Slauson and Cooper, 2002. Mechanisms of Disease, *3*rd Ed.
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Course Code: BVS 215-ANU
Course Title: Applied Animal Nutrition-I (Ruminant)
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 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 form eat and milk production. Feeding of sheep, Racing cattle and buffaloes for meat production. Feeding ruminants during scarcity periods.

Course BreakdownTheory

S.No.	Topic	No.of Lectures
1.	Digestion, absorption and metabolism of nutrients in ruminants	2
2.	Feede valuation: a. Measurement of digestibility, various methods of determining, digestibilities. Invitro and non-vivo digestibility. Limitation of digestibility cofficiency. Factors affecting digestibility 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. Animal scolorimetory: 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 dairycattle and buffalos, goats, sheep, yak and nak.	2
5.	Feeding of young calves, kids and lambs	1
6.	Raising cattle and buffaloes form eat 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: digestiontrail.	2
3.	Urea-treatment of rice and wheat straw	2
4.	Urea molasses mineral blocks preparation	2
5.	Ureamolasses liquid feeding	2
6.	Preparation of concentrate mixture	2
7.	Preparation of hays	1
8.	Preparation of silase.	1
	Total	**15**

REFERENCES:

1. Ranjhan, S.K. 1993. Animal Nutrition and Feeding Practices.Vikas Publishing House Pvt. Ltd.

2. Banerjee G.C.1998. A Text Book of Animal Husbandry, Oxfordand IBH publishing Co. Pvt. Ltd. 66 Janpath, New Delhi.

3. Mcdonald, P., R.A. Edwards and S.R.D. Greenhalgh.1995. Animals Nutrition: LBs with longman.

4. Aroro, S.P. and H.Kaur. Principle of Animal Nutrition and Nutrition Dynamics.

Course Code: **BVS 216-VMI**
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 effects 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, and 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 requirements 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 equipment	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 and motility test	1
13.	Antibiotic sensitivity test	1
14.	Slide preparation of fungi	1
15.	HA and HI	1
	Total	**15**

References

1. Chakraborty, P. A Textbook of Microbiology. 2013. 3rd Edition. New Central Book Agency (P) Ltd. Kolkata, India.
2. Quinn, P. J., Markey, B.K., Leonard, F.C., FitzPatrick, E.S. and Fanning, S. 2016. Concise Review of Veterinary Microbiology. 2nd Edition. Wiley Blackwell Publication. West Sussex, The UK.
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4. Songer, J.G. and Post, K.W. 2004. Veterinary Microbiology; Bacterial and Fungal Agents of Animal Diseases

Course Code: BVS 217-LPM
Course Title: Bee, Pet and Lab Animal Management
Credit Hours: 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives:

Upon the 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 itse xtraction. Disease, insects and other enemies of honey bees. Introduction importance of pet animals in Nepal. Common breeds pet animals/birds (dogs/cats) Vices of pet animals and their control measure scare 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 guineatig setc. 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	1
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, guineapig and rabbit	1
14.	Prophylactic measure against common disease and hygienic Care and control of parasites	1
	Total	**15**

Practical		
S.N	**Topic**	**Hours**
1.	Anatomical and morphological study of honeybee.	1
2.	Types of beehives.	1
3.	Honey extraction.	1
4.	Beeforages	1
5.	Mites and insect pests ofhoneybee.	1
6.	Handling of pet animals for examination(dog/cats)	1
7.	Control of external and internal parasites	1
8.	Detection of heat, mating and whelping	1
9.	Care of new born (nail and tooth-care)	1
10.	Administration of medicines with different routes.	1
11.	Identification of body parts and handling of labanimals	1
12.	Marking for identification of labanimals	1
13.	Selection of breeding stock of labanimals	1
14.	Balanced ration for labanimals	1
15.	Common disease and parasites of labanimals	1
	Total	**15**

References

1. Moore, L. J., & Kosut, M. (2013). *Buzz: Urban beekeeping and the power of the bee*. NYU Press.
2. Crane, E. (2009). Beekeeping. In *Encyclopedia of Insects* (pp. 66-71). Academic Press.
3. Lopate, C. (Ed.). (2012). *Management of pregnant and neonatal dogs, cats, and exotic pets*. John Wiley & Sons.
4. Wolfensohn, S., & Lloyd, M. (2008). *Handbook of laboratory animal mgmt and welfare*. John Wiley

Course Code: **BVS 218-ANB**
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 genetics and animal breeding

Syllabus
Structure of DNA and RNA. DNA replication, transcription and translation, Gene regulation and Lac-operon concept, Protein polymorphism, Cell division and Gametogenesis, Chromosomal study: Karyotyping, Chromosomal variation and Aberration, Mendelian genetics: Experiments and Laws, Gene interactions, Dominance and Epistasis, Linkage, Crossing over and Genetic distance, Population Genetics: Allelic and genotypic frequency, Hardy Weinberg Law, Causes of change in gene and genotypic frequencies, Quantitative Genetics: Variance, Heritability and Repeatability, Selection, Basis of Selection, Methods of Selection, Selection parameters, Mating systems, Animal genetic resources and their conservation in Nepal

Practical: Problems related to theory topics, calculation of gene and genotypic frequency, linkage, crossing overetc.

Course
Theory

S.No.	Topic	No. Of Lectures
1.	Structure of DNA and RNA	1
2.	DNA replication, Transcription and Translation	3
3.	Gene regulation and Lac-operon concep	2
4.	Protein polymorphism	1
5.	Cell division andGametogenesis	2
6.	Chromosomal study: Karyotyping, Chromosomal variation and Aberration	2
7.	Mendelian genetics: Experiments and Laws	2
8.	Gene interactions, Dominance and Epistasis	2
9.	Linkage, Crossing over and Genetic distance	2
10.	Population Genetics: Allelic and genotypic frequency, Hardy Weinberg Law, Causes of change in gene and genotypic frequencies	3
11.	Quantitative Genetics: Variance, Heritability and Repeatability	3
12.	Selection, Basis of selection, Methods of Selection, Selection parameters	3
13.	Mating systems	2
14.	Animal genetic resources and their conservation in Nepal	2
	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, replication, transcription andtranslation3	
4.	Calculation of gene and genotypic frequency: complete dominant, incomplete dominant, sex linked gene, multiple genes, selection, mutation,migration	3
5.	Estimationof repeatability	2
6.	Estimation ofheritability	2
7.	Estimation ofselectionparameters	2
8.	Estimationofheterosis	1
	Total	**15**

References

1. Chandar, N & Viselli, S, 2019. Cellular & Molecular Biology. 2nd edition
2. Klug, W.S., Cummings, M.R., Spencer, C.A. & Palladiono, M.A, 2016. Concepts of Genetics. 11th edition. Pearson Education. England
3. Hartwell, L.H., Goldbery, M.L., Fischer,J.A. & Hood,L. 2018. Genetics: From Genes to Genomes. 6th edition.
4. Nischoll, D.S.T. 2008. An Introduction to Genetic Engineering. 3rd edition. Cambridge University Press. UK.
5. Snustad,D.P., & Simmons, M.J., 2012. Principles of Genetics. 6th edition. John Wiley & Sons,Inc. USA.

Course Code: **BVS 219-VPT**
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, students 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 antihypertensiveagents, 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 andtocolytics.

Pharmaco therapeutics 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, termsrelatedtodrugactivityandfactorsmodifying the drug effect anddosage.	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 drugformulations.	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

1. Brander, G.C., Pugh, D.N., Bywater, R.J. and Jenkins,W.L.,1991.Veterinary Applied Pharmacology and Therapeutics. Bailliere Tindal, London.
2. Gooodman Gilman A., Rali, T.W., Nies, A.S and TaylorP. (1992).The Pharmacological basis of Therapeutics, Mcgraw-Hill, Singapoore.
3. Richard H. Adams.2001. Veterinary Pharmacology and Therapeutics. 8th Edition. IOWA State University Press, USA.
4. Jim E Riverie, Mark G. Papich. 2009. Veterinary Pharmacology and Therapeutics. John Wiley and Sons

SECOND YEAR

FOURTH SEMESTER

Course Code: BVS 221-VPY
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 break down
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 bodyandThymus 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

15	Endocrine physiology of testes	1
16	Thermoregulation of testes, sexual behavior	1
17	Avian reproduction	1
19	Mammary gland: Functional organization, structure and development	2
20	Endocrine control of initiation and maintenance of lactation	1
21	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, use of ultrasound mschine	1
9	Determination of lactose in milk	2
10	Estimation of progesterone and oestrogen by RIA and ELISA techniques	2
	Total	**15**

References

1. Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.
2. Dukes Physiology of Domestic Animals – Edited by Melvin J Swenson.
3. Ganong, W.F. 1991. Review of Medical Physiology,15th Ed., Prentice- Hall International Inc. Arthur C. Guyton Text Book of Medical Physiology

Course Code: **BVS 222-VPA**
Course Title: **Parasitology II (Helminthology and Leeches)**
Credit Hours: **3(2+1)** **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives

Upon the completion of this course, students will be able to identify the trematodes, nematodes, acanthocephalan and leeches parasites, their eggs, and their larval stages and can explain their morphology, life cycle, pathogenesis, diagnosis, and treatment and control measures.

Syllabus

General description of trematodes, nematodes, acanthocephala, leeches which affect 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 schistosomes, and Ornithobilharzia), Amphistomes/immature amphistomosis (Paramphistomum, Gigantocotyl, Gastrothylax, Cotylophoron, Gastrodiscus, Gastrodiscoides, Pseudodiscus), Lung flukes (Paragonimus) and Oviduct flukes (Prosthogonimus).

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 the control of diseases caused by helminth parasites.

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 amphistomosis (Paramphistomum, Cotylophoron, Gigantocotyle, Gastrothylax, Gastrodiscus, Gastrodiscoides, Pseudodiscus).	2
6	Lung fluke- Paragonimus Oviduct fluke- Prosthogonimus	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 samples for eggs of cestodes, trematodes, 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 of 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

1. Levine, N. D. 1983. Text Book of Veterinary Parasitology. CBS Publishers and Distributors (1st Indian Edition).
2. Soulsby, E. J. L. 1986. Helminths, Arthropods and Protozoa of Domesticated Animals. The English Language Book Society and Bailliere Tindall and Cassell Ltd. (7thEdition).
3. Urguhart, G. M. 1996. Veterinary Parasitology Blackwell Science Ltd. (2ndEdition).
4. B. B. Bhatia, K. M. L. Pathak and P. D. Juyal. 2016. Text book of Veterinary Parasitology. Kalyani Publisher (4th edition)

Course Code: **BVS 223-VPT**
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 central nervous system (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 andblockers.

Autacoids: Histamine and antihistamine agents, 5-hydroxytryptamine and itsantagonists, prostaglandins, angiotensin andbradykinin.

Drugs acting on 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 nervoussystem:	
	Neurohumoraltransmission,	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 CNS:	
	Pharmacology of neurotransmitters	1
	History of general anaesthetics	1
	Theories ofanaesthesia.	1
	Inhalent, intravenous and dissociative anaesthetics;	4

	Hypnotics andsedatives;	1
	Tranquilizers, psychotropicdrugs,	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

1. Brander, G.C., Pugh, D.N., Bywater, R.J. and Jenkins, W.L.1991. Veterinary Applied Pharmacology and Therapeutics. Bailliere Tindal, London.
2. Gooodman Gilman A., Rali, T.W., Nies, A. Sand Taylor P.1992. The Pharmacological Basis of Therapeutics, Mcgraw-Hill, Singapoore.
3. RichardH.Adams.2001.Veterinary Pharmacology and Therapeutics. 8th Edition. IOWA State University Press, USA.

Course Code: BVS 224-VMI
Course Title: Microbiology II (Veterinary Immunology and Serology)
CreditHours: 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 Histocompatibility 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 (CFT), 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).

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.	Phagocytosis	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 compromised and immune suppressant	1
10	General immunoglobulin structure	1
11	Structure and functions of specific immunoglobulins	1
12	The lymphoid system, cells involved in the 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 and immunodiffusion	1
19.	Hemagglutination and Hemagglutination inhibition test	1

20	Complement fixation test	1
21	ELISA	1
22	Major histocompatibility 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 Hypersensitivity	1
26	Type IV, Type V, Type VI Hypersensitivity	1
27	Immunization	1
28	Type of vaccines	1
29	Autoimmunity/autoimmune disease	1
30	Recent advances in immunology	1
	Total	**30**

Practicals

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) hemagglutination 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 commercially available different types of vaccines	1
	Total	**15**

References

1) Chakraborty, P. A Textbook of Microbiology. 2013. 3rd Edition. New Central Book Agency (P) Ltd. Kolkata,
2) Tizard, I.R. 2012. Veterinary Immunology. 9th Edition
3) Callahan, G.N. and Yates, R.M. 2014. Basic Veterinary Immunology. 2nd Edition
4) Day, M.J. and Schultz, R.D. 2014. Veterinary Immunology- Principles and Practice. CRC Press. New York, US

Murphy, K and Weaver, C. 2017. Janeway's Immunobiology. 9th Edition. Garland Science. New York, USA

Course Code: **BVS 225-VPP**
Course Title: **Systemic Pathology**
Credit Hours: **3(2+1)** **FullMarks: 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	Lectures
1	Cardiovascular system-the causes, the pathogenesis and the morphological and functional consequences of cardiovascular disease in domestic animals.	1
2	Developmental defects and Disease of pericardium, myocardium and endocardium	1
3	Disease of artries and vein	1
4	Disease of lymphoid system system-the function and architecture of this system and the lesions that may develop in the lymphoid organs.. Condition affecting spleen and thymus	1
5	Conditions affecting blood	1
6	Disease affecting hoematopoietic system - components of normal blood and the diseases of blood and blood forming organs as well as explaining the consequences of these diseases.	1
7	Anemia	1
8	Primary immunodeficiency disease	1
9	Secondary immunodeficiency disease	1
10	Autoimmunity	1
11	Respiratory system- the causes, the pathogenesis and the morphological and functional consequences of respiratory disease in domestic animals.	1
12	Developmental malformation and Disease of nasal cavities, larynx andbronchi	1
13	Disease of lung and pleura	1
14	Disease of Alimentary Tract - the causes, progression and consequences of alimentary tract disease in domestic animals.	1
15	disease of mouth and pharynx and esophagus, stomach and forestomach	1
16	Disease of intestine and peritonium	1

17	Disease of liver and pancrease	1
18	Disease of urinary system- the causes, progression and consequences of urinary tract disease in domestic animals	1
19	Disease of kidney, bladder, ureter, and urethra	1
20	Disease of male genital system and accessory sex glands- the causes, progression and consequences of male reproductive diseases in domestic animals.	1
21	Disease of female genital system-the causes, progression and consequences of female reproductive diseases in domestic animals.	1
22	Disease of mammary gland- the aetiology, pathogenesis and pathology of mastitis and mammary tumours	1
23	Disease of Nervous system- the aetiology, pathogenesis and manifestations of nervous disorders.	1
24	Disease of brain, spinal cord and meninges	1
25	Disease of muscle- the causes and consequences of the diseases of the muscles, bones, ligaments and joints of domestic animals.	2
27	Disesae of eyes and ear- the causes, progression and effects of disease of the eye and ear.	1
29	Disease of endocrine glands- the causes and effects of the major endocrine disorders in domestic animals.	1
30	Disease of skin ,hoof, nails and horns- the aetiology, pathogenesis and manifestations of skin, hoof, nail and horns disease in animals	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1	Post-mortem examination, lesion description and interpretation of large animals	1
2	Post-mortem examination lesion description and interpretationof small animals	1
3	Post-mortem examination of lesion description and interpretationwild 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

1. Jaap Van Dijk, Erik Gruys, Johan Mouwen,2006. Color Atlas of Veterinary Pathology 2006. ISBN-13: 978-0-7020-2758-1 Saunders
2. Jones, Hunt, and King. Williams & Wilkins. 1997. Veterinary Pathology., 6th Ed.
3. 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.
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Course Code: **BVS 226-ANU**
CourseTitle: **Evaluation of Feed Stuffs**
Credit Hours: **2(1+1)** **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives:

Upon the completion of this course, students will be able to recogrize good quality of feed stuffs, characterize feed stuffs chemically and biologically.

Syllabus:

Introduction, scope, importance, history and value of feed stuffs 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 feeding redients and mixed feeds. Factors affecting the storability. Invitro and vivo characterization of feed stuffs.

Course

Theory

S.No.	Topic	No. of Lecture
1.	Introduction, Importance, scope, and value of feed stuffs of analysis	1
2.	History of feed stuffs analysis	1
3	Methods, advantages and advantages of feed stuff analysis	1
4.	Characteristics of feed stuffs	1
5.	Chemical composition of feeding stuffs	1
6.	Difference between chemical composition and nutritional value of feed stuffs	1
7.	Antinutritional factors presenting feeding stuffs	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 feeding redients 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 invirto and invivo characterization of feed stuff	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 feeding redients and mixed feed	3
5.	Determination of ADF, NDF and lignin (Vas test method of CF Determination)	3
6.	Determination of Ca and Pin feed staffs.	2
7.	Determination of coefficant of digestibility of feeding redients and Mixed feeds	3
	Total	**15**

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2. Reddy, D.V. 2001. Applied Nutrition: LIvestock, Poultry, Human, Pet, Rabbitand Laboratory Animal Nutrition, Oxford and IBH Publishing, NewDelhi.

CourseCode: **BVS 227-ANU**
CourseTitle: **Applied Animal Nutrition II (Non-ruminant)**
Credit Hours: **2(1+1) Full Marks: 50 Theory: 25 Practical: 25**

Objectives:
Upon the completion of this 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 (broiler slayer, 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 BreakdownTheory

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.	1
9.	Feeding and breeding stocks (boars, sow, gilt)	1
10.	Feeding of Equine	1
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 feeding redient 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 feed stuffs for non-ruminant	3
8.	Formulation Rabbits	1
9.	Types of feeds for rabbits and horses	1
	Total	**15**

REFERENCES:
1. Donald M.C., P.R. A. Edwards and I.F.D. Green Halgh. 1987. Animal Nutrition (4th Edition).

ELBS/Longman Publication.
2. Nutrient Requirements for Poultry. 2010. National Research Courcil, Washington D.C. Nutrient Requirement for Swine. 2011. National Research Council.Washington D.C.

Course Code: **BVS 228-ANB**
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 principles and fundamentals of biotechnology for genetic improvement of livestock

Syllabus

Introduction of basic molecular biology, Isolation of DNA and RNA, Radiolabeling of nucleic acids,Nucleic acid hybridization, Polymerase chain reaction, Gel electrophoresis, DNA sequencing, Restriction enzymes, DNA modifying enzymes and DNAligase, Host cell types, plasmid, bacteriophage and other vectors, Cloning strategies: cloning from mRNA, genomicDNA, Expression of clonedgenes, Transformation of genes, Selection, screening and analysis ofrecombinants, Analysis of gene structure and function, Protein expression and purification, Molecular breeding approaches in domestic animals, Recent advances in AI, ET and NT, Transgenic animal production and its role in genetic improvement, Genetic principle of disease resistance and gene therapy, Animal biotechnology in Nepal, Genetic progress achieved through biotechnological approaches.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1.	Introduction of basic molecularbiology	1
2.	Isolation of DNA and RNA, Radiolabeling of nucleicacids	2
3.	Nucleic acid hybridization	2
4.	Polymerase chain reaction	1
5	Gel electrophoresis	1
6	DNA sequencing	2
5.	Restriction enzymes, DNA modifying enzymes and DNAligase	2
6.	Host cell types, plasmid, bacteriophage and other vectors	2
7.	Cloning strategies: cloning from mRNA, genomicDNA	2
8.	Expression of clonedgenes	1
9.	Transformation of genes	1
10.	Selection, screening and analysis ofrecombinants	1
11.	Analysis of gene structure and function	1
12.	Protein expression and purification	1
13.	Molecular breeding approaches in domestic animals	1
14.	Recent advances in AI, ET and NT	2
15.	Transgenic animal production and its role in genetic improvement	1
16.	Genetic principle of disease resistance and gene therapy	2
17.	Animal biotechnology in Nepal	2
18.	Genetic progress achieved through biotechnological approaches	2
	Total	**30**

References

1. Chandar, N & Viselli, S, 2019. Cellular & Molecular Biology. 2nd edition
2. Klug, W.S., Cummings, M.R., Spencer, C.A. & Palladiono, M.A, 2016. Concepts of Genetics. 11th edition. Pearson Education. England
3. Hartwell, L.H., Goldbery, M.L., Fischer, J.A. & Hood,L. 2018. Genetics: From Genes to Genomes. 6th

edition.
4. Nischoll, D.S.T. 2008. An Introduction to Genetic Engineering. 3rd edition. Cambridge University Press. UK. Snustad, D.P., & Simmons, M.J., 2012. Principles of Genetics. 6th edition.

Course Code: **BVS 229-AQU**
Course Title: **Principles of Aquaculture**
Credit Hours: **2(1+1)** **Full Marks: 50** **Theory: 25** **Practical: 25**

Objectives:

Upon the completion of the course, 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	Biology of cultivated fish species: Morphological characters, feeding habits, growth rate and reproductive behavior of Common carp, Chinese carps, Indigenous major carps, Tilapia, Trout, Cat fishes, Sahar, and Fresh water prawn.	2
3.	Water quality management: Physical parameters–Temperature and Turbidity; Chemical parameters-DO and pH; Biological parameters-Plankton	2
4.	Pondmanagement: 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	3
7.	Common fish diseases and parasites: Introduction, causal organisms, symptoms and control measures of Saprolegniasis, Tailrot/finrot,White spot disease, Dactylogyrosis, Argulosis; and Asphyxiation	2
	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 car pbreeding	3
10.	Study of fishing gears and pond netting	1
11.	Examination of skinand gills	1
12.	Identification of common drugs and chemicals used in fish health management	1
13.	Labwrapup	1
	Total	**15**

REFERENCES:

1. Augusty, K.T.1979. Fish Farming in Nepal. Archana Printers & Publishers, Kottayam29, India.
2. ICAR. 2006. Hand book of Fisheries and Aquaculture. Indian Council of Agricultural Research (ICAR), New Delhi.
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4. Jhingran,V.G. andR.S.V.Pullin.1985.AHatchery Manual for the common, Chinease and Indian Major Carps. Asian Development Bank, ICLARM, Manila, Philippines.
5. 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.
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8. Woynarovich, E. and L.Horvath.1984. The Artificial Propagation of Warm Water Finfishes, a Manual for Extension.

THIRD YEAR

FIFTH SEMESTER

Course Code: **BVS 311-VPT**
Course Title: **Veterinary Chemotherapy**
Credit Hours: **3 (2+1)** **FullMarks: 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 andfluoroquinolones.

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

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

Antiprotozoal agents: Drugs used in trypanosomosis, theileriosis, babesiosis, coccidiosis, amoebiosis, giardiasis and trichomoniasis.

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

New drugs and drug formulations. Therapeutic drug monitoring.

Course Breakdow Theory

S.No.	Topic	No.of Lectures
1	Antibacterial agents: general principles in antibacterial chemotherapy,	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 andvancomycin.	2
3	Antifungal agents: Topical and systemic agents including anti-fungal antibiotics.	2
4	Anthelmintics: Drugs used against cestodes, trematodes, nematodes, drug resistance, broad spectrum anthelmintics.	3
5	Antiprotozoal agents: Drugs used in trypanosomiasis, theileriosis, babesiosis, coccidiosis, amoebiosis, giardiasis and trichomoniasis.	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**

Practicals

S.No.	Topic	No.of Practicals
1.	Bacterialsensitivitytestfordifferentchemotherapeuticagentsby disc diffusionmethod	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 Potassium 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

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

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

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

Jim E Riverie, Mark G. Papich. 2009. Veterinary Pharmacology and Therapeutics. John Wiley and Sons.

Course Code: **BVS 312-VPY**
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. Effects of various climatic components on health and production. Physical reactions 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 and regulation of growth, factors affecting efficiency of Growth.	3
3.	Climaticeffects 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, Management of heat stress in animals and birds.	2
	Total	15

Practical

References

S. No.	Topic	No.of Practicals
1.	Measurements of growth in various species and plotting of growth curve	3
2.	Climatic changes related to environmental physiology	3
3.	Climatology- instruments and equipments used in climatology, meteriological assessments Study of different behaviors in domestic animals reared under different conditions Effect of climatic variables on growth and production	3 3 3
	Total	**15**

1. Cunningham, J. G. 1997. Text Book of Veterinary Physiology, 2nd Edition, W. B. Saunders Company Ltd.
2. Ganong, W.F. 1991. Review of Medical Physiology, 15th Ed., Prentice- Hall International Inc.

Course Code: BVS 313-VPH
Course Title: Environmental Hygiene and Public Health
Credit Hours: 2(1+1) Full Marks: 50 Theory: 25 Practical: 25

Objectives
The main objective of 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

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,	2
5	Sources of air pollution within animal houses and its effect on animal health and production	1
6	Ventilation and ventilation systems within animal houses and specialized laboratories	1
7	Bacteriology of water and air,	2
8	Disposal of sewage and farm refuses	1
9	Health implications of farm wastes,	1
10	Sanitation and disinfection of animal houses,	
11	Methods of prevention and control of air and water borne diseases of man and animals,	2
11	Atmospheric pollution and methods of control	1
12	Farm waste recycling	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 to nearest waste disposal and purification plant.	1
	Total	**15**

References

1. Park and Park. Text Book of Preventive and SocialMedicine, 25th edition
2. Ray,M. Environmental Pollution: Impact of technology on Quality oflife Philp R.B. Environmental Hazards and HumanHealth, 1st edition
3. Philp R.B, Ecosystems and Human Health: Toxicology and Environmental Hazards. 3rd edition

Sherikar, A.T., Bachhil, V.N. and D.C. Thapliyal (Ed.). .2013. TextBook of Elements of Veterinary Public Health. ICAR, New Delhi.

Course Code: **BVS 314-ANU**
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. Classification, dilatory, filer and its role, Types of fiber, Physiologic effect of dilatory, fiber, dietary fiber recommendation, Special functions of carbohydrate in tissue, lipid essential fatty acids and its role, types of fat functions of fat in human nutrition and health. Cholesterol and its role in human nutrition, Proteins: essential and non- essential amino acids, functions of protein, protein requirement, factors affecting protein requirements, protein turnover, functions or dilatory protein, measures of protein requirements, vitamins, functions or fat- and water-solublevitamins, Deficiency symptoms, requirements and food sources of vitamins. Minerals: Minerals in human nutrition, major minerals its functions, deficiency symptoms and food sources. trace elements its functions, deficiency symptoms and food sources water, electrolyte and minerals balance, energy metabolism and physical work performance. Nutritional deficiency disorder: Protein energy malnutrition causes of malnutrition. Method to solve malnutrition problem, food facilities: naturally occurred toxicants in foods chemicals contamination in foods. Foods's 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.).

Cours**e breakdown**

SN	Topics	Hr
1	Nutrition and human health, human health needs major Nepalese health problem.	1
2	Nutritional guides for health, promotion: cancer and heartdisease, foods Andits classification	2
3	Relation of food and nutrition to health Nutrition and aging,nutrition and mental function, weight control, nutrition cancer, heart disease and diabetes mellitus	2
4	Bioactive phytochemicals in foods and their mechanism of action to promote health	2

5	Carbohydrates: a. classification b. Dietary fiber and in rote. Physiologic effects of dietary fiber. Dietary fibers Recommendation Special function of carbohydrates inbodytissues.	3
6	Lipids: Classification, function, requirements and food source cholesterol and its role to Promote human health. Cholesterol andhealthconcern .	3
8	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 symptomsofproteins	3
9	Minerals: Major and Minor minerals functions of minerals in human body deficiency symptoms as minerals, mineral requirement, foodsource.	3
10	Water, electrolyte and mineral balance	2
11	Energy metabolism and physical work performance, factors influencing base metabolism Energy requirements for various physiological functions.	2
12	Nutritional deficiency disorders: Protein energy malnutrition, cases of malnutrition, Methods of solve malnutrition, governments strategy to solve malnutrition	2
13	Food toxicities: Naturally occurring toxicants in food, chemical toxicants of foods.	1
14	Food processing: Elect of food processing onnutritionalstatus	1
15	Diet, nutritional anddegenerative disease (a) Coronary heartdisease (b) Diabetes mellitus (c) Cancer (d) Gastro- intestinal problems (e) Rent disorders (f) Urolithiasis (g) Food factors andCataract.	3
	Total	**30**

References

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

MahatabB., N.PralhadRao,V.Reddy (Eds)1986. Text book of Human Nutrition. , Oxford and IBH Publishing Co.Pvt.LTD. New Delhi, Calculta.

Course Code: **BVS 315-VMI**
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, students 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, resistance and diagnosis

Bacteria: Enterobacteriaceae (E. coli, Salmonella, Yersinia, Klebsiella, Shigella and Proteus), Pasteurellaceae (Pasteurella, Actinobacillus, Haemophillus, Mannheimia), Actinobacteria (Actinomyces, Mycobacteria, Corynebacteria, Nocardia, Dermatophilus), Bacillus Staphylococcus, Streptococcus, Enterococcus, Clostridium, Erysipelothrix, Listeria, Pseudomonas, Burkholderia, Campylobacter, Arcobacter, Helicobacter, Sphaerophorus Spirochaetes (Borrelia, Brachyspira, Leptospira), Aeromonas, Vibrio, Spirillium, Rickettsia, Ehrlichia, Coxiella, Chlamydia, Chlamydophila, Francisella, Moraxella, Taylorella,Mollicutes (Mycoplasma, Acholeplasma)

Fungi: Dermatophytes, Rhinosporidium, Sporotrichum, Mycetomal fungi, Candida, Histoplasma, Cryptococcus, Aspergillus, Zygomycetes, Penicillium, Dimorphic fungi, Fungi causing mastitis, abortion and mycotoxicosis.

SN	Topics	No. of Lecture
	Study of the important pathogenic bacteria in relation to their morphology, staining, isolation, growth, colonial, biochemical and antigenic properties, pathogenicity, resistance, diseases caused and diagnosis:	
1.	Escherichia	1
2.	Salmonella	1
3.	Yersinia, Klebsiella	1
4.	Proteus, Shigella	1
5.	Pasteurella, Mannheimia	1
6.	Actinobacillus	1
7.	Actinobacillus, Hemophillus	1
8.	Actinomyces, Nocardia	1
9.	Mycobacteria	1
10	Corynebacteria, Dermatophilus	1
11	Bacillus	1
12	Staphylococcus	1
13.	Streptococcus, Enterococcus	1
14.	Clostridium	1
15.	Erysipelothrix, Listeria	1

16.	Pseudomonas, Burkholderia	1
17.	Campylobacter, Sphaerophorus	1
18.	Arcobacter, Helicobacter	1
19.	Borrelia, Brachyspira, Leptospira	1
20	Aeromonas, Vibrio, Spirillium	1
21	Rickettsia, Coxiella	1
22	Chlamydia, Chlamydophila	1
23	Francisella, Moraxella, Taylorella	1
24	Mycoplasma, Acholepasma	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, Enterotoxemia, Tuberculosis, Johne's disease, Clostridial infections, Wooden tongue, Lumpy jaw, Anthrax, Glanders, Aspergillosis, Tetanus and Dermatophytosis,	1
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

1. Chakraborty, P. A Textbook of Microbiology. 2013. 3rd Edition. New Central Book Agency (P) Ltd. Kolkata, India
2. Quinn, P. J., Markey, B.K., Leonard, F.C., FitzPatrick, E.S. and Fanning, S. 2016. Concise Review of Veterinary Microbiology. 2nd Edition. Wiley Blackwell Publication. West Sussex, The UK.
3. McVey, D.S, Kennedy, M and Chengappa, M.M. 2013. Veterinary Microbiology. 3rd Edition. Wiely Blackwell Publication. West Sussex, The UK.
4. Carter, G.R. and Wise, D.J. 2004. Essentials of Veterinary Bacteriology and Mycology.
5. Songer, J.G. and Post, K.W. 2004. Veterinary Microbiology; Bacterial and Fungal Agents of Animal Diseases.

Course Code: BVS 316-VPA

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 (Phlebotomus). The mosquitoes (Culex, 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 andOtobius.

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

1. Chang, T. C. 1973. General Parasitology. Academic Press, USA (1st Edition)
2. Kettle, D. S. 1993. Medical and Veterinary Entomology. CAB International, Wallingford, Oxon OX108DE, UK.
3. 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).
4. B. B. Bhatia, K. M. L. Pathak and P. D. Juyal. 2016. Text book of Veterinary Parasitology. Kalyani Publisher (4th edition)

Course Code: **BVS 317-EXT**

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 farmingcommunity.

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.ofLectures
1.	Meaning, concept, definition of extension teachinglearningprocess	2
2.	Steps in extension teaching process, cone of experience andcriteria for effectiveteachinglearning	2
3.	Extension teaching method – individual, group and massand their approaches and meritand demerits	3
4.	Classification of audio-visual aids and selection criteria ofaudio-visual aids, emerging concept of information technologiesforextension	2
5.	Multimedia projection and computer aided teaching aidfor animal husbandryextension	2
6.	Selection of different extension method fordissemination of animal husbandry technologies andmedia-mix	2
7.	Role of private, governmental and non-governmentalagencies in agriculturalextension development	2
	Total	**15**

Practical

S.No	Topic	No.of Practicals
1.	Graphics in communication – Line, Bar, Pie and pictorialgraphs	2
2.	Preparation of various kind of charts – Flow, tree, suspense, flipetc.	1
3.	Preparation of pamphlet, leaflet andbooklet	1
4.	Preparation of poster and pictorial book, radio script,drama	1
5.	Interaction visit and meeting with DLS, ADB/N, andLDO and study their program planning process, plan of work, organizational setup and calendar of operation	3
6.	Interaction visit and meeting with anNGO/CBOs/Co-peratives/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 grassroot level study their program planning process, plan of work and implementation	2
8.	Preparation of general community level plan of productionin livestock (selective and simulated)	1
9.	Visit and interaction meeting with commercial farmer'sgroup formed by DLS for extension program	1
	Total	**15**

References

1. S. Sandhu. 2021. A Text Book of Agricultural Communication Process &Method.3rd edition
2. B. S. Dongol. 2004. Extension Education. Prativa Singh Dongol printers Gopal tole Kathmandu, Nepal.
3. B. Kumar and B. S. Hunsra. 2000. Extension Education for Human Resource Development. 5th edition
4. Herbert F. Lionberger and Paul H. Gwin.1982. Communication Strategies – A Guide for Agricultural Change. University of Missouria, Colombia.
5. P. Dahama and O. P. Bhatnagar. 2019. Education and Communication for Development. 2nd edition Oxford and IBH publishing company Private Limited. NewDelhi.
6. Mathialagan. 2009. A text book of Animal Huabandry & Livestock Extension. International Book ook distributing Co.India.
7. P. Oakley and C. garforth. 2018. A guide to Extension Training. University of Reading UK.

Course Code: BVS 318-VPP

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/pesticidepoisoning

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, infectious necrotic hepatitis	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, porcine respiratory and reproductive syndrome(PRRS)	1
21	infectious bovine rhinotracheitis, caprine encephalitis-arthritis complex	1
22	Rinder pest, PPR and Blue tongue, Lumpy Skin Disease	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)	1
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

1. Jaap Van Dijk, Erik Gruys, Johan Mouwen,2006. Color Atlas of Veterinary Pathology 2006). ISBN-13: 978-0-7020-2758-1 Saunders
2. Jones, Hunt, and King. Williams & Wilkins. 1997. Veterinary Pathology., 6th Ed.,
3. Jubb, Kennedy. 2007. Palmer Pathology of Domestic Animals. Academic Press, 5th Ed., Thomsons' Special Veterinary Pathology .2005. Carlton, McGavin and Zachary. Mosby Publications.
4. Vegad, J.L. Vegad .TextBook of Special Veterinary Pathology-Infectious Diseases of Livestock and Poultry. IBDC publishers
5. Zachary & McGavin. 2012. Pathologic Basis of Veterinary Disease, 5^{th} Ed.

Course Code: **BVS 319-LPT**

Course Title: **Abattoir 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

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 mortem and post mortem)	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 and slaughter slab	2
2	Animals and birds care at the stockyard/cages	1
3	Inspection of animals before slaughter and after slaughter (ante mortem and post mortem inspection)	1
4	Inspection of birds before slaughter and after slaughter (ante mortem 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

1. Lawrie, R.A. 1985. Meat Science 4th ed. Oxford Newyork
2. Price and Scheing ert (latest ed. The science of meat andmeatproduction, Freexran and Company, Sanfranciesco
3. Wiggin and Welson (latest ed). Color atlas of meat and poultry inspection-VanNostrand Reixhold Company N.Y. Sanfrancisco
4. 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.
5. The science of meat products. AMIF, WHF Freeman and Company Sanfrancisco and London

Course Code: **BVS 310-LPT**

Course Title: **Milk & 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 diagramatical 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 Theory

S.No.	Topic	No. Of Lectures
1.	Definition milk and diagramatic 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, plate form test,	
	straining, filtration and clarification	1
8.	Cooling system, transportation, emulsification homogenization	1
9.	Pasteurization, sterilization, packaging, distribution and storage of milk and	
	Milk 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) paneer, 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

1. Clarence, H.E., W.B. combs and H.Macy.1994. Milk and Milk Products, TATA. MC Graw-Hill Publishing Co. Ltd. India
2. Prashad, J.1997 Animal Husbandry and Dairy science. Kalyani publishers, India
3. Sukumar, De. 2000. Outline of Dairy Technology. Oxford Univ. press, New Delhi.

THIRD YEAR

SIXTH SEMESTER

Course Code: **BVS 321-BCH**
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 flamephotometer.

Course Breakdown

Theory

S.No.	Topics	Hrs
1	The analytical concepts of accuracy, precision, specificity, limit of detection, quality control and the use of reference data in interpretation of biochemical results.Basis of biochemical and immunological tests. Relationship of the value of a test to clinical specificity, clinical sensitivity, prevalence and predictive value.	3
2	The distribution of key electrolytes between body compartments and the effects of disease on these analytes.Form an understanding of body water and acid/base homeostasis and their interpretation.	3
3	The measurements from the urine (volume, specific gravity) and plasma (urea and creatinine concentrations, creatinine clearance) to glomerular function and renal failure. The biological consequences of acute and chronic renal failure and protein losing nephropathies..	2
4	the biochemical basis and diagnostic value of tests used to assess gastrointestinal disease (including pancreatic function test) and to determine the energy status of animals.	1
5	Clinical application of enzymes, identification and the basis of treatment of enzyme deficiency, disorders of metabolism with detailed emphasis on diabetes, ketosis, obesity, atheroschlerosis, jaundice, disease related tohormones.	2
6	The biochemical hallmarks of hepatocellular damage and cholestasis. The multifarious biochemical functions of the liver and the ways in which liver function can be assessed.	1

7	The use of immunoassays to quantify the concentration of hormones in animals.Enzyme linked immunosorbent assay. Dot immunoassay, agglutinationtest et	1
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.Appreciation and differentiation of symptoms caused by various types of toxic materials including agrochemicals, plants and drugs.	1
9	Determination of serum cortisol and thyroxine in diagnosis of endocrine disease.The role of hormone and specific protein tests in pregnancy and oestrus detection..	1
	Total	15

S.No.	Topics	No. of Lectures
1	Quantitative estimation of plasma protein andseperation of proteins by electrophoresis.	2
2	Quantitative estimation of cholesterol, bilirubin, AST, ALTin serum.	1
3	Quantitative estimation of gmaglutamyl trasferase and lactate dehydrogenase in serum.	1
4	Quantitative estimation of blood urea nitrogen and creatinine in serum.	1
5	Quantitative estimation of 3-hydroxybutyrate and non-esterified fatty acids and glucose in serum.	1
6	Estimation of Li, Na and fluoride in extra cellular fluids	1
7	Enzyme linked immunosorbent assay test (hormones etc.)	1
8	Tube agglutination test, slide agglutination tests, dot immunossay etc	1
9	Blood gas analysis (electrolyte and acid- base)	2
10	Extraction and estimation of toxic materials such as arsenic, lead, antimony, mercury, copper, zinc from samples.	1
11	Detection of Nitrates, nitrites, cyanides and tannins in body fluids and tissues of animals.	1
12	Biochemical test interpretation from clinical cases of different species.	2
	Total	**15**

References

1. 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.
2. Schalm's Veterinary Hematology, 6th Edition, Douglas J. Weiss (Editor), K. Jane Wardrop (Editor) Jul 2010, Wiley-Blackwell.
3. MG Kerr Veterinary Laboratory Medicine, 2nd Edition, Blackwell Science Ed.Villiers E. Ristic J. Gli esami di laboratorio. Indicazioni, esecuzione, interpretazione. Cane e gatto. A cura di S. Paltrinieri, A. Giordano, F. Dondi BSAVA Ed.
4. Meyer D. J., Harvey J. W. - Veterinary laboratory medicine: interpretation and diagnosis - Delfino Editore, 2007, 3rd edition.
5. J.J. Kaneko, J.W. Harvey, M.L. Bruss - Clinical biochemistry of domestic animals. AP Press, sixth edition, 2008.

Course Code: BVS 322-VPH

Course Title: Veterinary Epidemiology

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

Objectives

This course is an introduction to epidemiology, a discipline that studies diseases in populations and provides a framework for clinical medicine, disease prevention and health policy

Syllabus

Definition, objectives and applications of epidemiology, ecological concepts of epidemiology, disease spread, patterns of disease distribution, multifactorial causation of disease, concept of prevalence and incidence, types of epidemiological studies, parameters of diagnostic tests, 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.	Introduction to basic epidemiology-Definition, objectives and applications of epidemiology. Ecological concepts of epidemiology	2
2	Disease process and its spread, Pattern of disease distribution in the community; epidemic, endemic, sporadic and pandemic	2
3	Measures of disease occurrence: prevalence, incidence (risk and rate), mortality, case-fatality, attack rate and adjusted measure of health	
4	Measures of association (attributable risk and fraction, Odds Ratio and Relative Risk).	1
5	Determinants of disease. Multifactorial diseases; Koch's postulates, Evans' rules. Association and causality in the Epidemiology. Hill's rules.	2
6	Outbreak investigations	3
7	Interpretation of diagnostic 2X2 tables	1
8	Appraising the literature (description of evidence, external and internal validity, comparison with other evidence)	1
9	Evidence-based medicine:Levels/Strength of evidence	1
10	Experimental studies and randomizedclinical trials.	1
11	Types of epidemiological studies -Observational: Cohort, case-control, andcross-sectional, Case series, case reports, textbooks,expert opinion	2
12	Sampling (probability and non- probability, sampling technique) and sample size calculations, Causality and bias, random error, confounding and interection	2
13	Disease surveillance systems: Terminology, concepts, Nature and collection of data.	2
14	Diagnostic testing in epidemiology: evaluation and interpretation of qualitative and quantitative tests (sensitivity and specificity, accuracy and precision, predictive value, serial vs parallel testing and screening tests, likelihood ratio.	3
15	Prevention, control and eradication of diseases	1
16	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	1
17	Laws regulating animal diseases and Regulations regulating handling, import,	1

	export of biomaterials.	
18	Veterinary economics and risk-assessment and analysis.	3
	Total	**30**

Practical

S. No.	Topic	No.of Practicals
1	Visit to the veterinary hospitals/organized farms etc. for the survey, collection of data, samples for epidemiological investigation	2
2	Graph preparation for disease distribution like epidemic, endemic, sporadic and pandemic with case examples	1
3	Exercise with case examples to measurement of disease occurrence	1
4	Exercise with case examples to Measures of association	1
5	Outbreak investigations with case examples	3
6	Evaluation of diagnostic tests	1
7	Use of different epidemiological software like OpenEpi, SPSS, EpiEnfo (CDC), AusVet to analyze epidemiological Data	3
8	GIS (Geographical information system)	2
9	Cost calculation for control of disease outbreak and risk assessment and analysis	1
	Total	**15**

References

- Villarroel, Practical Clinical Epidemiology for the Veterinarian. Wiley Blackwell (2015).
- Smith, Veterinary Clinical Epidemiology, 4th Edition. CRC Press (2020).
- Gordis, Epidemiology. 5th Edition. WB Saunders Company (2014).
- CDC Self Study Book (available free online) https://www.cdc.gov/ophss/csels/dsepd/ss1978/index.html
- OpenEpi (http httphttp:// www .openepi.com/Menu/OE_Menu.htm) 2015).
- Research Randomizer (http httphttp://www.randomizer .org /)2015).
- Statistix10 (30 -Day trial version) (http httphttp://www .statistix.com/free-trial /) https://epitools.ausvet.com.au/
- https://www.cdc.gov/epiinfo/index.html

Course Code: **BVS 323-VPA**
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 regulations for the 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 regulations for the 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 of different organs/tissue of hosts affected by protozoan parasite	2
3	Preparation 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

1. Levine, N. D. 1983. Text book of veterinary parasitology. CBS Publishers and Distributors (1st Indian Edition).
2. 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).
3. B. B. Bhatia, K. M. L. Pathak and P. D. Juyal. 2016. Text book of Veterinary Parasitology. Kalyani Publisher (4th edition)

Course Code: **BVS 324-VMI**
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, transmission, pathogenicity, 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, Blue tongue, Calf rotavirus. Birnaviridae: Infectious bursal disease. Picornaviridae: Foot and mouth disease (FMD), Duck viral hepatitis, Avian encephalomyelitis. Togaviridae: Swine fever, Mucosal disease, 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 Newcastle disease, Orthomyxoviridae: Swine, equine and avian influenza. Filoviridae: Ebola virus. Arenaviridae: Lassa virus. Bunyavirdae: Phlebovirus. Flaviviridae: Classical swine fever, Bovine viral diarrhoea. Retroviridae: Avian leucosis group, Equine infectious anaemia. Hepadnaviridae: Hepatitis B virus. Lentiviruses- Equine infectious anemia, Sheep pulmonary adenomatosis, Maedi, Visna. Prions: Scrapie (sheep), Bovine spongiform encephalopathy, Mad cow disease, Exotic and emerging animal and poultryviruses.

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 virus,Aviadenovirus (Inclusion body hepatitis), Egg drop syndrome virus	1
4.	Papovaviridae: Papilloma virus, Polyoma virus, Vacuolating virus	1
5.	Poxviridae: Cowpox virus, Fowl pox virus, Capripoxvirus, Pseudocowpox virus	1
6.	Herpesviridae: Mallignant catarrhal fever, Pseudorabies virus, Marek's Disease virus, Infectious Laryngyotracheitis virus,	1

7.	Asfarviridae: African swine fever virus	2
8.	Irridoviridae	2
9.	Parvoviridae: Canine and other Parvoviruses	1
10.	Circoviridae: Chicken infectious anaemia virus	1
11.	Reoviridae: Reovirus, Rotavirus, Blue tongue virus, African horse sickness virus	1
12.	Birnaviridae: Infectious bursal disease virus	1
13.	Picornaviridae: FMD virus, Duck hepatitis virus, Avian encephalomyelitis virus	1
14.	Togaviridae: Swine fever virus, Mucosal disease virus, Equine Encephalitis virus	2
15.	Coronaviridae: Infectious bronchitis virus, Transmissible gastroenteritis virus	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 influenza virus, Equine influenza virus, Avian influenza virus	2
19.	Filoviridae: Ebola virus, Arenavirdae: Lassa virus	1
20	Bunyaviridae: Phlebovirus. Flaviviridae: Classical swine fever virus, Bovine viral diarrhea virus	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 virus, Maedi and Visna virus	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 of 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.	Demonstration of cell culture	1

10.	Recognition of CPE in cell culture	1
11.	Serological tests like ELISA for HIV, RPHA for HbsAg, Haemagglutination	2
12.	Diagnostic procedures for Peste des petits ruminants (PPR), FMD, Newcastle disease (RD), Blue tongue, Infectious bronchitis (IB), Infectious bursal disease (IBD) and other viral agents.	3
	Total	**15**

References

1. Chakraborty, P. A Textbook of Microbiology. 2013. 3rd Edition. New Central Book Agency (P) Ltd. Kolkata, India.
2. Quinn, P. J., Markey, B.K., Leonard, F.C., FitzPatrick, E.S. and Fanning, S. 2016. Concise Review of Veterinary Microbiology. 2nd Edition. Wiley Blackwell Publication. West Sussex, The UK.
3. McVey, D.S, Kennedy, M and Chengappa, M.M. 2013. Veterinary Microbiology. 3rd Edition. Wiely Blackwell Publication. West Sussex, The UK.
4. Maclachlan, N.J. and Dubovi, E.J. 2016. Fenner's Veterinary Virology. 5th Edition
5. Murphy, F.A., Gibbs, E.P.J., Horzinek, M.C. and Studdert, M.J. 1999. Veterinary Virology. 3rd Edition.

Course Code: BVS 325-VPP

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 miscellaneousconditions.

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 respiratorydisease), 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 upon 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

1. Jaap Van Dijk, Erik Gruys, Johan Mouwen, 2006. Color Atlas of Veterinary Pathology. ISBN-13: 978-0-7020-2758-1 Saunders
2. Mugera G.M. 2000. Veterinary Pathology in the Tropics- For Students &Practitioners. New Age International (P) Ltd, NewDelhi.
3. Newton, C.R. & A. Graham Introduction to Biotechniques – PCR. II Edition. 1997 Published by BIOS Scientific Publishers ltd. Oxford.
4. Sirois, Margi, McBride, Douglas F. C.V. Mosby, Livestock and Poultry.. IBDC publishers Veterinary Clinical Laboratory Procedures 1996. USA
5. 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: **BVS 326-VOG**

Course Title: **Theriogenology I (Animal Reproduction 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 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. Period of ovum, embryo, and foetus, organogenesis. Foetal membranes - placenta, umbilical cord. Anomalies of the development. Teratology - inherited and non-inheritedanomalies.

Course breakdown

Theory

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

10.	Sexual behavior, coitus and oogenesis	1
11.	Mechanism of Ovulation, transport of ova	1
12.	Fertilization and zygote formation	1
13.	Shape and location of pregnant uterus	1
14.	Position of foetus in uterus	1
15.	Number of foetuses, twining and multiple birth in uniparous	2
16.	Sex parity and bacterial flora of the pregnant uterus	1
17.	Pregnancy and its duration in different species	2
18.	Hormonal control and rate of gestation and reproduction	1
19.	Abnormalities of fertilization and gestation	2
20.	Period of ovum, embryo and foetus	1
21.	Period of organogenesis	1
22.	Foetal membranes and placentation	2
23.	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 various conditions of uterus in vivo and in vitro(collected reproductive organs from slaughter house	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 domestic animals and its treatments	1
	Total	**30**

References

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

Course Code: BVS 327-VMC
Course Title: Internal Medicine I (Systemic)
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives:

Upon the completion of this course, students will be able to perform acomplete 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:

Historyand 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, cardio vascular system and uro-genital 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 eakdown

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	Indigestioninanimals,tympany	1
5	Traumaticreticulitis,diaphragmatichernia	1
6	Vagusindigestion, abomasaldisplacement	2
7	Gastritisinsmall animals, vomiti on inswine	1
8	Colicin horses, enteritis	2
9	Caecalob struction, 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,clinicalsign	1
14	diagnosis, differential diagnos is and treatments of rhinitis, epistaxix Laryngitis, bronchitis	1
15	Pneumonia, pulmonary emphysema, pleurisy, broken windin Horses and respiratory failure	2
16	Pneumothorax,hydrothorax, lungsabscess,asthma	1
17	Definition,classification,etiology,pathogenesis,clinicalsign	2
	diagnosis,differentialdiagnosisandtreatmentsof pericarditis,	
	myocarditis,endocarditis	

18	Hypertrophyanddilatationofheart,congestiveheartfailure,	2
	haemorrhage,toxaemia,	
19	Anaemia,leukaemia,leukopenia	1
20	Lyphangitis,Lymphadenitisanddiseasesoflymphaticsystem	1
21	Nephritis,nephrosis,renalcolic,albuminurea,haemoglobinurea	2
22	Urinaryincontinence,uremia,urethritis,urolithiosis,cystitis,	2
	pyelonephritis,andorchitis	
	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	Collection, preservation and storage off aecal samples	1
7	Collection and examination of blood samples	1
8	Collection and examination of urine samples	1
9	Collection and examination offices for lab test	1
10	Prescription writing techniques	1
11	Method of administration of drugs by in trauterine route	1
12	Method of administration of drugs by injections	1
13	Method of administration of drugs drenching	1
14	Case record of atleast 30 cases	1
	Total	**15**

REFERENCES:

1. Blood D.C. and O.M. Radostits. 2007. A Text Book of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).
2. Chakravarti, A .2011. TextBook of Clinical Veterinary Medicine. Kalyani Publishesrs , India
3. Merk Veterinary Manual, 2010.Merk and Co, USA (10th Edition).

Course Code: **BVS 328-VCS**
Course Title: **Veterinary Clinical Service I**
Credit Hours: **1(0+1)** **Full Marks: 25** **Theory: 0** **Practical: 25**

Objectives:
Upon the completion of this course, students 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
BreakdownPractical

S.No.	Topic	No. of Practical
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 is 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, epidural, subconjunctival and intramammary infusion.	1
8	Handling, examination, diagnosis and treatment of sick animals under field conditions.	1
9	Pregnancy diagnosis techniques by rectal palpation.	1
10	Faecalexamination techniques VIZ Directs mear methods, floatation techniques methods and sedimentation techniques methods.	1
11	Techniques of skin scraping methods.	1
12	Examination of cases of anoestrus, silent estrous and conception failure	1
13	Prescription writing	1
14	Post mortem techniques in poultry	1
	Total	**15**

REFERENCES:

1. Blood, D.C. and G.M.Radostitis.2007. A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats and Horses (10thEdition). ELBS publication.
2. Hefez, E.S.E. and B. Hafez. 2000. Reproduction in Farm Animals (Seventh Edition). Lippincott Williamsand Wilkins

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

Course Code: BVS 329-VPT
Course Title: Veterinary Toxicology
Credit Hours: 3 (2+1) Full Marks: 75 Theory: 50 Practical: 25

Objectives

Upon the completion of the course, students 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 causingthiamine deficiency. Drug toxicity and toxicity caused by agrochemicals: organophosphates, carbamates, chlorinated hydrocarbons, pyrethroids. herbicides, fungicides, rodenticides andurea.

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 feed additives andpreservatives.

Course breakdown

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, datura, 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 and agricultural byproducts for residual of drugs & agrochemicals.	3
7	Case recording of clinical cases of poisoning.	2
	Total	**15**

References

1. Garg, S.K., 2000. Veterinary Toxicology, CBS Publishers & Distributors, New Delhi.
2. Roy B.K (2001) Veterinary Pharmacology and Toxicology, Kalyani Publishers, New Delhi. Sandhu, H.S. and Brar, R.S.,2000.TextBook of Veterinary Toxicology,
3. Kalyani Publishers, Ludhiana.
4. Gupta RC. 2011. Veterinary Textbook: Basic and Clinical Principles. Academic Press

FOURTH YEAR

SEVENTH SEMESTER

Course Code: **BVS 411-AEC**
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	2
12.	Farm efficiency measures	1
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: **BVS 412-VOG**
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 (PD) 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, Uterine, vaginal 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

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	3
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.	Uterine ,Cervical and Vaginal prolapse	2
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	1
	Total	**30**

Practical

S.No.	Topic	No.of Practicals
1.	Various methods of Pregnancy diagnosis	2
2.	Observation of normal parturition	1
3.	Handling and use of Gynecological Instruments	2
4.	To flush 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

1. Arthur, G.H. 1977. Veterinary Reproduction and Obstetrics. The ELBS and Bailliere Tindall (latest Edition).
2. Hefez, E.S.E. 1997. Reproduction in Farm Animals. Lea and Febiger Philadelphia (latest Edition).
3. Robert, S.J. 1971. Veterinary Obstetrics and Genital Diseases. CBS Publishers and Distributors, New Delhi (latest Edition). Course Code: BVS 519-LPM

Course Code: **BVS 413-VSR**
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 stages 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 andeuthanasia.

Course break down
Theory

S.No.	Topic	No.of Lecture
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 and intravenous)	3
7.	General anaesthesia; Anaesthetic drugs (parenteral and inhalation) Balance anaesthesia and stages 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

1. Blaze and Glowaski 2004. Veterinary Anaesthesia- A Quick Reference, Elseviers Saunders.
2. Hall, LW, KW Clark, and CM Trim, 2001. Veterinary Anaesthesia. 10th Ed., WB Saunders Company, London, Edinburgh.
3. Lumb, WV and EW Jones, 1996. Veterinary Anaesthesia. Williams & Wilkins -A WaverelyCopmany, Baltimore, Philadelphia, London.
4. Muir, WM, JAE, Hubbell, R Bednarski and P Lerche 2012. Handbook of Veterinary Anesthesia, 5thEdn. Elsevier publication.
5. Paddleford, RR 1999. Manual of Small Animal Anaesthesia, 2nd Ed., WB Saunders Company, Philadelphia, London.
6. Seymour, C and R Gleed, 1999. Manual of Small Animal Anaesthesia and Analgesia, 1stEdn, British Small Animal Veterianry Association, Kingsley House, Church Lane, UK.
7. Nandi, SK, S Halder and M Hoque 2014. A text book on Veterinary Surgery and Radiology, 2ndEdn. Kalyani Publishers, New Delhi, India.
8. Fossum, TW 2018. Small Animal Surgery, 5th Edition. Elsevier Publication.

Course Code: **BVS 414-VSR**
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 for 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 for 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 patients2 Introduction, consequences of malnutrition, metabolic changes associated with starvation,Dietary requirement, enteric feeding, parenteral 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 fluid compartments and body water distribution, various electrolytes solutions, replacement solutions and colloids, Assessment of dehydration, hypovolaemic shock, assessment of fluid requirements, intraoperative fluid therapy and blood transfusion	3
14.	Affections and managements of-Blood vessels, lymphatics, 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	1
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 sutures 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

1. Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.
2. Oehme, FW and JE Prier, 1976. Text Book of Large Animal Surgery, 3rdEdn, Williams & Wilkins A WaverelyCopmany, Baltimore, Philadelphia, London.
3. Slatter, HS 1993. Textbook of Small Animal Surgery. Vol-I & II, 2ndEdn, WB Saunders Company, Philadelphia, London.
4. Tyagi, RPS and J Singh, 2002. Ruminant Surgery, CBS Publishers and Distributors, Delhi, India.
5. Venugopalan, A 2020. Essentials of Veterianry Surgery. 8thEdn, Oxford & IBH Publishing Co. Pvt. Ltd.
6. Fossum, TW 2018. Small Animal Surgery, 5th Edition. Elsevier Publication.
7. Tobias KM 2011. Veterinary Surgery: Small Animal, 1st Edition. Saunders Publication.
8. Hendrickson, DA, AN, Baird 2013.Turner and McIlwraith's Techniques in Large Animal Surgery, 4thEdn.Wiley-Blackwell publication.
9. Nandi, SK, S Halder and M Hoque 2014. A text book on Veterinary Surgery and Radiology, 2ndEdn. Kalyani Publishers, New Delhi, India.

Code : **BVS 415-VMC**
Course Title: **Internal Medicine II (Metabolic and deficiency)**
Credit Hours: **3 (2+1)** **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives:

Upon the completion this course, students will be able to learn the skills on interpretation of results of diagnostictests, identifying ewproblems and subsequently diagnose the animals affected by metabolic disease, deficiency diseases and diseases of muscle, skin, eye and ears.

Syllabus:

Definition, classification, etiology, pathogenesis, clinicalsign, 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, K, B. complex and Cindomestic animals and poultry; Nutritional haemoglobinuria. Diseases of neonates. Diseases of skin and musculo-skeletal system, senseorgans of domestic animals.

Course Breakdown

Theory

S.No.	Topic	No. of Lectures
1	Definition, classification, etiology, pathogenesis, clinicalsign	2
	diagnosis, differential diagnosis and treatments of milk feverd owner's cow syndrome	
2	Hypomagnese mictetany, Ketosis.	2
3	Diabetes mellitus and diabetes in sipidus	1
4	Nutritional haemoglobin uria, goiter, rheumatism	1
5	Rickets, Osteomalacia, Hypothyroidism	2
6	Pregnancy toxaemia in cows	1
7	Azoturia, Eclampsia in bitches, Obesity	2
8	Vitamin deficiency-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, photo sensitization, parakeratosis,	2
	hyperkeratosis	
14	Conjunctivitis, Keratitis, otitis	1
15	Common poisoning cases	2
16	Ethno-veterinary medicine	1
17	Diseases of newborn 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 labtest	1
4	Examination of blood for labtest	3
5	Collection of body fluids for metabolic profile test	2
6	Caserecords	5
	Total	**15**

REFERENCES:

1. Blood D.C. and O.M. Radostits. 2007. A Text Book of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).
2. Chakravarti, A .2011. TextBook of Preventive Veterinary Medicine. Kalyani Publishesrs, India Merk Veterinary Manual, 2010.Merc and Co, USA (10th Edition).

Course Code: BVS 416-VMC
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 be 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), Campylobacteriosis(Vibriosis),Chlamydiosis, Botulism, Contagious CaprinePleuropneumonia (CCPP), Foot rot, Enterotoxaemia, Strangles, Glanders, Swine erysipelas, Salmonellosis, Mycoplasmosis, Fowl Typhoid, Fowl cholera, Colibacillosis, Aspergillosis, Mycotoxicosis, Sporotrichosis, Ringworm, Degnala disease, Khari disease, Q fever, Anaplasmosis.

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 erysipelas	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, Degnala disease and Khari disease	2
23	Q fever and Anaplasmosis	1
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1	Collection, preservation and dispatch of materials forbacteriology 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

1. Blood D.C. and O.M. Radostits. 2007. A Text Book of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10th Edition).
2. Chakravarti, A .2011. TextBook of Preventive Veterinary Medicine. Kalyani Publishesrs , India Merc. Veterinary Manual, 2010.Merc and Co, USA (10th Edition).

CourseCode: **BVS 417-VCS**
CourseTitle: **Veterinary Clinical Service II**
CreditHours: **2(0+2)** **Full Marks: 50** **Theory: 0** **Practical: 50**

Objectives

Upon the completion of this course, students 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	1
	indigestion, ruminal impaction, tympany	
5	Diagnos is and treatment of common clinical cases like enter it is,	2
	Traumatic-reticulo-peritonitis	
6	Diagnos is and treatment of common clinical cases like traumatic pericarditis	1
7	Treatment of cases of metritis, cervic it is 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 New castle Diseases	1
16	Treatment of Ascarid worms and tape worms in poultry	1
17	Treatment, control and prevention of ticks, licea nd flea Infestation in cattle, buffalo and dogs	1
18	Treatment, 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	Allergyandits treatment	1
24	Handling, storage and securit y of drugs and instruments	1
	Total	**30**

REFERENCES:

1. Blood, D.C. and G.M.Radostit is.2007. A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats, and Horses (10thEdition). ELB Spublication.

2. Hefez, E.S.E. and B. Hafez. 2000. Reproduction in Farm Animals (Seventh Edition). Lippincott Williams and Wilkins

3. Kumar A. (2004). Veterinary surgical techniques. Vikas Publishing House Pvt. Ltd. India

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

Course Code: **BVS 418-AQU**
Course Title: **Fish Diseases**
Credit Hours: **3 (2+1)** **Full Marks: 75** **Theory: 50** **Practical: 25**

Objectives:

Upon the completion of this 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; Commondrugs, chemicals, probiotics and their application.

Course Breakdown

Theory

S.No.	Topic	No.of Practicals
1.	Introduction: Importance of health management, Status of fish disease, OIE listed diseases, Host- pathogen – environment interaction, Modes of disease transmission, Factors affecting is health: Genetic and physiological profiles, environment, feed and feeding, injuries and pathogens, Signs of sickness of fish	6
2	Commonfishdiseases:Causes,symptomsandtreatments	4
a	Infectious diseases: Bacterial- Ulcer, Dropsy, Eyedisease, Finrot; 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	
b	Non-infectious diseases- Asphyxiation, Gas bubble disease, A flatoxin, Mechanical trauma, Temperature, pH, Nutritional diseases	
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	**18**

Practical

S.No.	Topic	No.of Practicals
1.	Study of external organs of fish	1
2.	Study of internal organs of fish (Carp,Cat fish and Tilapia)	3
3.	Identification of commonly used equipments in fish health	1
	examination	
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:

1. Brown, E.E. and J.B. Gratzek. 1980. Fish Farming Hand Book. AvI publishing company, Inc. Westport Connecticut.
2. Jha, D.K.1991. Laboratory Manual of Fish Diseases Nepal. Tribhuvan University. IAAS, Rampur.
3. Kabata, Z.1985. Parasites and Diseases of Fish Cultured in the Tropics. Taylor and Farancis. London.
4. Lucky, Z. 1977. Methods for the Diagnosis of Fish Diseases. GlennL. Hoffman(Ed.). Amerind Publishing Company Pvt.Ltd. New Delhi India.
5. 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.
6. Schaperclaus, W.1991. Fish Disease, vol.I and II. Amerind Publishing Co., New Dehli.

Course Code: **BVS 419-VPH**
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 casualty 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) measures and CodexAlimentarius.

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. Hygienic handling/ management of dairy equipment.	2
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	Specificaation 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 bacteriological examination.	1
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 platecount, 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 health 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

1. SJ Forsythe and PR Hayes, **Food Hygiene, Microbiology and HACCP**, 3rd ed. 1998, an Aspen Publisher, Gaithersberg, Maryland.
2. John de Vries (editor), **Food Safety and Toxicity**, 1997, CRC press, New York
3. Leo ML Nollet & Fidel Toldra (editors), **Safety Analysis of Foods of Animal Origin**, 2011, CRC Press.
4. Joseph Gracey, David S. Collins and Robert Huey, **Meat Hygiene**, 11th ed., 2015, WB Saunders Company Ltd., London, UK
5. James M. Jay, **Modern Food Microbiology**, 7th ed., 2005 an Aspen Publishers, Gaithersberg, Maryland.

FOURTH YEAR

EIGHTH SEMESTER

Course Code: **BVS 421-LPT**
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 carcas, their utilization and handling. Microbiology, deterioration and contamination of meat. Comminuted and emulsified meat product common 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

1. Lawrie, R.A. 1985. Meat Science 4th ed. Oxford Newyork
2. Price and schweigert (latest ed. The science of meat and meat production, Freeman and Company, Sanfrancisco
3. Wiggin and Welson (latest ed). Color atlas of meat and poultry inspection-VanNostrand Reixhold Company N.Y.Sanfrancisco
4. 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.
5. AMIF-The science of meat products WHF Freeman and Company Sanfrancisco and London

Course Code: **BVS 422-VOG**
Course Title: **Theriogenology III (Animal Infertility)**
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 foetalmembrane.

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

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

10.	Managemental problem- identification and solution	1
11.	Embryotomy/Fetotomy its procedure and removal	2
12.	Mutation, forced extraction andtreatment	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.	Performing foetotomy	2
4.	Performing Hysterectomy	3
5.	Performing caesarean section	3
6.	Post delivery care after forced parturition, Post operative care	2
	Total	**15**

References

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

Course Code: **BVS 423-VSR**
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 and 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 and therapy	1
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, ultrasonic therapy	2
10.	Use of cold and hot application, massage and planned exercise, infrared and ultraviolet rays etc and their precautions	2
	Total	**15**

References

1. Hoque, M and GR Singh, 2004. Ultrasonography in Animals- Technical Bulletin, ICAR Publication, Izatnagar India.
2. Lavin, LM 2006. Radiography in Veterinary Technology, 4th Edn, WB Saunders Company, Philadelphia, London.
3. McConnel, F and A Holloway 2014. Manual of Canine and Feline Radiography and Radiology: a foundation manual. BSAVA Publication.
4. Thrall, DE 2018. Textbook of veterinary Diagnostic Radiology, 7th Edn. Elsevier Publication.
5. Dennis, R, RM Kirberger, F Barr, RH Wrigley 2010. Handbook of Small Animal Radiology and Ultrasound: Techniques and Differential Diagnoses 2nd Edn. Saunders Publication.
6. Singh, AP and Singh, J 2004. Veterinary Radiology- Basic Principles and Radiographic Positioning, 1st Edn, CBS Publishers and Distributors, Delhi, India.
7. Singh, GR and M Hoque, 2004. Manual of Veterinary Radiology, ICAR Publication, Izatnagar India.
8. Nandi, SK, S Halder and M Hoque 2014. A text book on Veterinary Surgery and Radiology, 2nd Edn. Kalyani Publishers, New Delhi, India.

Course Code: **BVS 424-VSR**
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, 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 cheek, 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	3
3.	Differentiation between fracture and dislocation, affections of the joints, ligaments and tendons	2
4.	Affections of the vertebral columns including contusion, fracture of the ribs, injuries to the costal cartilage, fracture of the sternum, sternal fistula and pneumocele	2

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.	Subluxation of sacro-iliac ligaments, rupture of round ligament, trochanteric 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 nasolacrimalduct andsquint	2
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, sinusitis, pus in the sinus	1
15.	Affections and treatments of lips and cheek: hare lip, tumors, ulceration of lip, lip fold pyoderma, Teeth: Congenital abnormalities, irregular molars	1
16.	Affections and treatment of tongue: strangulation,sublingual abscess, necrosis and gangrene, self sucking	1
17.	Affections and treatment of salivary gland: fistula, mucoceles and ranula, neoplasm, abscess, sialoliths and sialocele	1
18.	Affections and treatment of palate: cleft, lampas, 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 horns, horn cancer, fracture and fistula of the horn, disbudding and amputation	1
20.	Affections and treatment of neck: yoke gall, yoke abscess, yoke tumor, torticolis 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 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 stringhalt	1
8.	Operation of the corneal ulcer, technique ofsub-conjunctivalinjection, 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

1. Alexander, JW 1985. Leonard's Orthopaedic Surgery of the Dog and Cat. 3rdEdn, WB Saunders Company, Philadelphia.
2. Bojrab, MJ 1990. Current Techniques in Small Animal Surgery. 2ndEdn, Lea &Febiger 600 Washington Square, Philadelphia.
3. Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.
4. Slatter, HS 1993. TextBook of Small Animal Surgery. Vol-I & II, 2ndEdn, WB Saunders Company, Philadelphia,London.
5. Venugopalan, A 2020. Essentials of Veterianry Surgery. 8thEdn, Oxford & IBH publishing Co. Pvt. Ltd.
6. Nandi, SK, S Halder and M Hoque 2014. A text book on Veterinary Surgery and Radiology, 2ndEdn. Kalyani Publishers, New Delhi, India.
7. Fubini, SL and NG Ducharme 2016. Farm Animal Surgery, 2ndEdn. Saunders Publication.
8. Stashak, TS, 1987. Adams Lameness in Horses. 4th Ed. Lea and Febiger, Philadelphia.
9. Pollitt, CC, 1995. Colour Atlas of the Horse's Foot. Mosby-Wolfe, Philadelphia, USA.
10. Fossum, TW 2018. Small Animal Surgery, 5th Edition. Elsevier Publication.
11. Tobias KM 2011. Veterinary Surgery: Small Animal, 1st Edition. Saunders Publication.
12. Hendrickson, DA, AN, Baird 2013. Turner and McIlwraith's Techniques in Large Animal Surgery, 4thEdn. Wiley-Blackwell publication.

Course Code: **BVS 425-VMC**
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 infectiousdiseases.

Syllabus

Definition, incidence, etiology, transmission, pathogenesis, clinical signs, diagnosis, treatment, prevention and control of Rabies, Pseudorabies, Foot and Mouth Disease FMD, Infectious bovine rhinotracheitis, Rinderpest, Bovine viral diarrhea, Lumpy skin disease, Bovine malignant catarrh (Bovine malignant catarrhal fever), Ephemeral fever, Pox disease, Scrapie, Blue tongue, Contagious pustular dermatitis, Peste des petits ruminants (PPR), African horse sickness, Infectious equine anaemia, Infectious equine rhinopneumonitis, Equine influenza, Virus encephalomyelitis of horse, Classical swine fever (Hog cholera), African swine fever, Swine influenza, Swine vesicular disease, Canine distemper, Infectious canine hepatitis, Canine Parvo virus infections, Avian influenza, Newcastle disease (Ranikhet disease), Infectious bursal disease, Infectious bronchitis, Marek's disease, Avian leucosis complex, Fowl pox, Litchi disease, EDS – 76, Avian encephalomyelitis, Trypanosomiasis, Theileriosis, Babesiosis, Coccidiosis, Amphistomiasis, Fascioliasis, Schistosomiasis, Echinococcosis, Cysticercosis, Trichomoniasis,

Course

Theory

S.No.	Topic	No of. Lectures
1.	Rabies andPseudorabies,FMD	2
2	Infectious bovine rhinotracheitis, Bovine viral diarrhea and Rinderpest	2
3	Bovine malignant catarrh and Ephemeral fever, Lumpy skin disease	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 Viral encephalomyelitis of horse,	2
8	Classical swine fever (Hogcholera) and African swine fever	1
9	Swine influenza and Swine vesicular disease,	1

11	Canine Distemper, Infectious canine hepatitis and Canine Parvo virus infections,	2
12	Avian influenza,	1
13	Newcastle Disease (Ranikhet disease) and Infectious bursal disease,	2
14	Avian leucosis complex and Marek's disease,	2
15	Infectious bronchitis and Fowl pox,	1
16	Litchi disease, EDS – 76 and Avian encephalomyelitis,	1
17	TrypanosomiasisandTheileriosis,	2
18	Babesiosis and Coccidiosis,	2
19	Amphistomiasis and Fascioliasis,	1
20	Schistosomiasis and Echinococcosis,	1
21	CysticercosisandTrichomoniasis,	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

1. Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10^{th} Edition).
2. Chakravarti, A . 2011. TextBook of Preventive Veterinary Medicine. Kalyani Publishesrs, India Merc. Veterinary Manual, 2010.Merc and Co, USA (10^{th} Edition)

Course Code: BVS 426-VMC
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.

Course 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	Slaughterhouse and meat inspection act, 2055 and Regulation, 2057 (2001)	1
10	Insurance of livestock.	1
11	Nepal veterinary council act, 2055 and rules, 2057 (2000)	2
12	Animal health and livestock service act, 2055 and regulation, 2056	1
13	Laws relating to Nepali MulukiAin and issues related to animal welfare.	1
	Total	**15**

References

1. Blood D.C. and O.M. Radostits. 2007. A TextBook of the diseases of cattle, sheep, pigs, goats and horses. ELBS Publication (10thEdition).
2. Dabas, S.P.S and O.P. Saxena. 2001. Veterinary Jurisprudence and Post mortem. International, Book Distributing Co. (2nd Edition).
3. Nepal Veterinary Council Rules, 2057 (2000)

CourseCode: **BVS 427-VCS**
CourseTitle: **Veterinary Clinical Service III**
Credit Hours: **2(0+2)** **Full Marks: 50** **Theory: 0** **Practical: 50**

Objectives:

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

Syllabus:

Handling of cases brought at veterinary teaching hospital, clinical examination ofanimals, 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) in field conditions	1
2	Diagnosis and treatment of common clinical cases like pneumonia	1
3	Diagnosis and treatment of common clinical cases like haemoglobin uria 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 for age poisoning	1
8	Handling of cases of retention of placenta	1
9	Management of prepartum and postpartum prolapsed 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 infractures and dislocation and other affections of joints, fascial paralysis	1
15	Diagnosis and treatment of ephemeral ever 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 uterinetorsion 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 andp reventive measures in Degnala disease in bovine	1
	Total	**28**

REFERENCES:

1. Blood, D.C. and G.M.Radostitis. 2007. A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats and Horses (10thEdition). ELBS publication.

2. Hefez, E.S.E. and B. Hafez. 2000. Reproduction in Farm Animals (Seventh Edition). Lippincott Williamsand Wilkins

3. Kumar A. (2004). Veterinary surgical techniques. Vikas Publishing House Pvt. Ltd. India

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

Course Code: **BVS 428-BCH**
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, nutritional and fermentation biotechnology, and bio-informatics and their application in animal biotechnology, bio-manufacturing and disease diagnosis.

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 and gene therapy.

Theory

SN	Topics	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	1
13	DNA microarray technology	1
14	Proteomics	1
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**

Practicals

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

1. Gerald Karp, John Wiley and Sons. Cell and molecular Biology, Concepts and experiments
2. Jenkins N. 1999. Methods in Biotechnology. Animal Cell Biotechnology – Methods & Protocols. Published by Human Press Inc., New Jersey.
3. Malacinski and Freifelder Jones and Bartlelt Publishers.Essentials of molecular Biology,
4. 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.
5. William H. Elliott & Daphne C. Elliott. 1997. Biochemistry and Molecular Biology. Published by Oxford University press, Oxford.

Course Code: **BVS 429-AEC**
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 andopportunities.

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 cyclicprice variation; spatial price variation; spatial distribution of commodities and regional equilibriummodels	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 theirpromotion	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

FIFTH YEAR

NINETH SEMESTER

Course Code: BVS 511-VPH

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 in the 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

Theory

S. No.	Topic	No.of Lectures
1.	Definitions and objectives of zoonoses	1
2.	Classification of zoonoses: Direct, Cyclo, Meta, Saprozoonoses	1
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, clostridialfood poisoning, campylobacteriosis, toxoplasmosis and sarcocystosis.etc.	7
6.	Methods of prevention, control and eradication of zoonotic diseases.	2
7.	Socio-economic conditions and Human health	1
8.	Zoonotic pathogens as agents of bio-terrorism	1
	Total	**15**

Practical

S. No.	Topic	No. of Practical
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 probablerelationshipsofthesehumandiseaseconditionswith animal diseases present in the area.	4
	Total	**15**

References

1. Acha, PN and B. Szyfres. 2005. Zoonoses and Communicable diseases common to man and animals. Pan American Health Organization, USA, 3rdEdition.
2. Krauss H, 2003 Zoonoses: Infectious diseases Transmitted from Animals to Human Being 3rd edition
3. Martin.E., Jones.E.H., Hubbart,W.T and Hagstard H.V 2001 :Zoonoses: Recognition Control and Prevention
4. Pathak K.M.L: Fundamentals of Parasitic Zoonoses
5. Thapliyal. 1996. Fundamental Animal Hygiene and Epidemiology. International Book Distributing Company.

Course Code: **BVS 512-ANB**
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 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 and egg production in poultry for hilly region of Nepal. Formation and maintenance of control population of poultry. Selection criteria of breeding for chicken meat and egg production. Disease resistance and mechanism in poultry. Development and maintenance of inbred lines in poultry. Utilize dw (dwarfgene) for broiler production. Intra population selection schemes in poultry. Egg production characters of laying poultry. Diallel crossing. Random sample test and its important in poultry research. Effect of dwarf gene on economic performance of poultry.

Course

S.No.	Topic No.	No. Of Lectures
1	Concept of heritabilityand repeatability	1
2	Breeding values, dominance and epitasis values	2
3	Variance and different types ofgene actions	2
4	Inbreeding, coefficient of inbreeding and relationship, measure of inbreeding and relationship, resemblance among relatives, inbreeding method for development of breed, strain, linesand family	3
5	Different mating systems crossingin the light of cattle, buffalo, sheep, goat, pig and poultry	3
6	Lab animals their breeding, handlingand uses	2
7	Selection parameters, principles, method, basic and genetic effects ofselection.	1
8	Effective Selection procedure for genetic improvement of cattle,buffalo, goat, sheep, pigand 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 traitsin poultry	2
11	Formation and maintenances of control populationof poultry	1
12	Disease resistance mechanism in poultry.	1
13	Development, use and maintenance of inbred lines in poultry	2
14	Utilize *dw* (dwarf gene) forbroiler production.	1
15	Intra population selection schemesofpoultry.	1
16	Egg production characters of layingpoultry.	1
17	Diallelcrossing	1
18	Random sample test and is important inpoultryresearch.	1
	Total	**30**

Practical S.No.	Topic	No. of Practials
2.	Estimation of breeding value, dominance and epistaticvalue	1
3.	Calculation of variance and different geneaction	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 ofselection.	1
7.	Preparation of breeding plan for cattle, buffalo, sheep, goat, pig, andpoultry	3
8.	Formation and maintenance of control population ofpoultry.	1
9.	Diallelcrossing.	1
10.	Random sample test and important in poultryresearch	1
	Total	15

REFERENCES:

1. GeoffSimm.2002. Genetic Improvement of Cattle and Sheep. The Book Depository Limited, UK

2. Lasley, J.F.1987. Genetics of Livestock Improvements. Prentice-Hall, Inc Englewood Cliffs, NJ.

3. RichardM. Bourdon.2013. Understanding Animal Breeding. The Book Depository Limited, UK

4. Warwick, E.J. and J.E. Legates. 1979. Breeding and Improvements of Farm animals 7thed. Mc Graw-Hill Book Company, NewYork.

Course Code: BVS 513-VOG

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 skill in 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

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, Cloning	2
	Total	**15**

Practical

S.No.	Topic	No.of Practicals
1.	Sterilization of A. V. equipment	1
2.	A.V. preparation	1
3	Preparation of bull, Collection of semen	2
4.	Evaluation, Live and dead count, Total concentration	2
5.	Extension of semen, Filling, Sealing, Preservation and storage of semen	3
6	Artificial Insemination	2
7.	Synchronization, superovulation	2
8.	Embryo Transfer Technique Cloning Technique	1 1
	Total	**15**

References

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

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

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

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

Course Code: **BVS 514-VSR**
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, caesarean 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, abomasaldisplacements	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,	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, cryptorchidism, 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 venereal 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	Caesarean 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 the 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	1
12.	Ovario-hysterectomy	1
13.	Caesarean 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

1. Bojrab, MJ 1990. Current Techniques in Small Animal Surgery. 2nd Edn, Lea &Febiger 600 Washington Square, Philadelphia.
2. Harari, J 1996. Small Animal Surgery. The National Veterinary Medical Series, 1st Edn, Williams &Wilkins.
3. Kumar, A 2004. Veterinary Surgical Techniques, Vikas Publishing House Pvt. Ltd, India.
4. Slatter, HS 1993. Text Book of Small Animal Surgery. Vol-I & II, 2nd Edn, WB Saunders Company, Philadelphia, London.
5. Tyagi, RPS and Singh, J2002. Ruminant Surgery, CBS Publishers and Distributors, Delhi, India.
6. Nandi, SK, S Halder and M Hoque 2014. A text book on Veterinary Surgery and Radiology, 2nd Edn. Kalyani Publishers, New Delhi, India.
7. Fossum, TW 2018. Small Animal Surgery, 5th Edition. Elsevier Publication.
8. Tobias KM 2011. Veterinary Surgery: Small Animal, 1st Edition. Saunders Publication.
9. Hendrickson, DA, AN, Baird 2013. Turner and McIlwraith's Techniques in Large Animal Surgery, 4th Edn. Wiley-Blackwell publication.

Course Code: **BVS 515-VMC**
Course Title: **Animal Welfare**
Credit Hours: **1 (1+0)** **Full Marks: 25** **Theory: 25** **Practical: 0**

Objectives:

Upon the completion of this course, students will be able to define animal welfare within the context of the five freedoms, understand the various spectrum of animal welfare, anifest 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 ownpractice 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.

CourseBreakdown

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 or ganizations	1
15	Development of veterinary ethics and roles of veterinarian on animal welfare	1
	Total	**15**

REFERENCES:

1. World Society forAnimals 2007. Concepts in Animal Welfare: Animal Welfare Syllabus (CDROM format). London: University of Bristol and WSPA.
2. Legood, G.ed. 2000. Veterinary Ethics: An Introduction. NewYork: Continuum.
3. Fraser, A.F. and D.M. Broom 1997. Farm Animal Behavior and Welfare (Third Edition). Cambridge: CABI Publishing.
4. Gregory, G.G.1998. Animal Welfare and Meat Science. Cambridge: CABI Publishing.
5. Stafford, K.2006. The Welfare of Dogs–Animal Welfare Series Volume4. Dordrecht: Springer.

CourseCode: **BVS 516-VCS**
CourseTitle: **Veterinary Clinical Service IV**
Credit Hours: **2(0+2)** **Full Marks: 50** **Theory: 0** **Practical: 50**

Objectives:

Upon the completion of this course, students will be able to diagnose and treat thecasesofdifferentanimals.

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 salmonellas is in poultry	1
6	Treatment and control measures off owl Typhoid	1
7	Treatment and prevention of visceral and articulargout 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 of medial patellar ligament	2
11	Treatment and prevention of retention of urine	1
12	Bacteriological culture and antibiotic sensitive test	2
13	Examination of bloods mear 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 cornealopacity	1
19	Treatment and prevention of udderoedema	1
20	Treatment and prevention of stress and as cites in poultry birds	1
21	Practice of feeding of sick animals	1
22	Vaccination and disease prevention and control programmes in the field	1
23	Ambulatory clinics (Medicine, gynaecology and surgery) in the field conditions	3
	Total	**30**

REFERENCES:

1. Blood, D.C. and G.M. Radostitis. 2007. A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats, and Horses (10thEdition). ELBS publication.
2. Hefez, E.S.E. and B. Hafez. 2000. Reproduction in Farm Animals (Seventh Edition). Lippincott Williamsand Wilkins
3. Kumar A. (2004). Veterinary surgical techniques. Vikas Publishing House Pvt. Ltd. India
4. Venugopalan, A.2002. Essentials of Veterianry Surgery (8thEdition). Oxford & IBH publishing Co.Pvt.Ltd.

Course Code: **BVS 517-VMC**
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 ofanaesthesia, 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 metabolicdiseases 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 etiology, mode of transmission, epidemiology, 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 andprevention.

Course

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 transportation of wild and zoo animals.	1
5.	Principles of anaesthesia, anaesthetics, chemicals of restraining, Capturemyopathy.	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 a n d c a t s (bacterial, viral, parasitic, fungal, nutritional etc.) - their etiology, mode of transmission, 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, preparationof balanced diet for new borne, growing and sick animals as oral and intravenousfeeds.	2
5	Care of pups, weaning, and 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 incatsandkittens.	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

1. Craig. E. Greene. 1998. Infectious Diseases of the Dog and Cat.2nd Edn. W.B. Saunders Company, London, U.K

Course Code : **BVS 518-EXT**

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 in developmental process over the period of time to currents stage in their historical perspectives. Rural poverty, its 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

Theor

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, and the lessons 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	2
11	Actors of rural development and poverty alleviation programs, linkages and coordination, problems and issues.	2
12	Micro-Enterprise Development program (MEDEP) for povery alleviation in Nepal	1
13	Introduction to gender concepts, gender segregation and stratification, discrimination, equity and social inclusion.	1
14	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
15	Origin and concept of WID, WAD, GAD and GESI	1
	Total	**30**

Practical

S.No.	Topic	No. of Practicals
1	Conducting baseline survey in a rural community and analyzing the situation on its poverty and development	2
2	Preparing village profile	2
3	Exposure on techniques of organizational development through audio visual media, role play and making site visits to observethe 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 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 of any disease outbreak at the grassroots.	1
	Total	**15**

References

1. Khan, S. S. and J. S. Sah. 2001. Social Mobilisation Manual Based on yangja Experience, Social Mobilisation Experimentation and Learning centre.
2. UNDP. 2021. Governance and Poverty Reduction: National Human Development Report, Kathmandu
3. Katar Singh, 2019. Rural Development: Principles, Policies and Management, 4th edition, *Sage Publications,* New Delhi. Thousand Oaks. London

Course Code: **BVS 519-LPM**
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 beable 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 law 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 their control strategies.

Course Breakdown

Theory

S.N	Topic	Lecture Hours
1	Introduction, definition and values of wild life.	1
2	Present and future status of wild life conservation and management in Nepal	1
3	Wild life law enforcement	1
4	Distribution, habitats and housing of various class of wild animals	2
5	Care of various class of wild animals	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, reserves and other protected areas in Nepal	1
9	International organization concerning wildlifec onservation.	1
10	Common diseases of wild animals and their control strategies.	2
	Total	**15**

Practical

S.N	Topic	Lecture Hours
1	A visit to Chitwan National park for observation [oneday]	1
2	External body parts of different class of wild animals	1
3	Identification of feeds and fodder for wildlife	1
4	Visit to central zoo for practical demonstration i.e, Restraining, Capturing, Handling of zoo 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	Control of internal and external parasites	1
9	Study about administration of drugs	1
10	Physical examination of wild animals	1
11	Checklist of wild animals and birds found in Chitwan National Park.	1
	Total	**15**

References:

Decker, D. J., Riley, S. J., & Siemer, W. F. (Eds.). (2012). Human dimensions of wildlife management. JHU Press.

1. Adams, C. E. (2009). Urban wildlife management. CRC press.
2. Gibbs, J. P., Hunter Jr, M. L., & Sterling, E. J. (2011). Problem-solving in conservation biology and wildlife management. John Wiley & Sons.
3. Gilbert, F. F., & Dodds, D. G. (2001). The philosophy and practice of wildlife management (No. Ed. 3). Krieger Publishing Company.
4. Lameed, G. A. (Ed.). (2017). Global Exposition of Wildlife Management. BoD–Books on Demand.

Course Code: **BVS 510-VCS**
Course Title: **Veterinarian in Society**
Credit Hours: **1(1+0)** **Full Marks: 25** **Theory: 25** **Practical: 0**

Objectives

Upon the completion of this course, students will be able to familiar with the different roles of veterinarians in society and the importance of veterinary profession in safe guarding animal and public health. The objective of the course is also to raise awareness of foreign, emerging and exotic animal diseases among students and veterinarians.

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. Biomedical 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

SN	TOPICS	Lec No.
1.	Man, animalandsociety; Mananimalinteraction, Ethano-veterinary medicine; Social–ecological interactions in animal rearing.	1
2.	Client oriented approach to physical examination of animals; client service, client dealing, delivering bad news, concepts in interaction with animal owner/clients.	1
3.	Bio-medicalethics 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 in stitutions, 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:

1. Maggie,S. and G.Stutchfield 2008.Veterinary Practice Management-A Practical Guide, Elsevierlimited.
2. JerroldT.1995, Veterinary Ethics-Animal Welfare, Client. DonLadig, R.R. Donnelley & Sons Company.
3. Lagoni,B. and Hetts 1994, The Human-Animal Bond and Grief,.W.B.Saunders Company, The Curtis Center, In dependence Square West, Philadelphia, PA19106.
4. Thomas, E.C. and P.Seibert, J.R.2000, Veterinary Practice Management Secrets. Hanley&Belfus, INC. Medical Publishers, Philadelphia, PA19107.
5. Tjalma, R.A 1959. The Role of Veterinary Epidemiology in Relation to Public Health. *BrVetJ*115:265–270.
6. Calvin, W.S.1984. Veterinary Medicine and Human Health, 3rd ed. Baltimore: Williams & Wilkins.
7. Ahl, A.S.&B.Buntain.1997: Risk and the food safety chain:animal health, public health and the environment. *Rev. Sci. Tech. Off. Int. Epiz.* 16 (1),322-330.

FIFTH YEAR

TENTH SEMESTER

Course Code: **BVS 520-VIP**

Course Title: **Veterinary Internship Program**

Credit hours: **6(0+6)** **Full Marks: 150** **Theory: 0** **Practical: 150**

Objectives

The objective of this program is to offer pre-service field training to the undergraduate students of BVSc and AH in the field of Veterinary Science and Animal Husbandry particularly in Veterinary Hospital, Disease Diognostic Laboratories, and livestock farms where the internees will develop skill and confidence in clinical services and handling of livestock.

Syllabus

1. The internship will commence after the completion of academic courses in final year and the students must have passed all required courses up to 4th year of B V Sc and AH. The student will be placed on rotational basis in Veterinary Hospital, Veterinary Polyclinics, Disease Diagnostic Labs, Livestock and Poultry farms, or Hatchery for a period of six months (one semester). The internees will be actively involved in rendering veterinary services under the supervision of experienced and licensed veterinarian.

2. In case of unsatisfactory work/performance and /or shortage of attendance (less than 80%) the period of internship shall be extended up to two (2) months by the appropriate authority. If the performance is still unsatisfactory in the extended period, the internee has to re-register afresh for the entire semester in following semester.

3. The internship has two components:

    a. Field work and
    b. Preparation of field report and seminar

4. The evaluation is based on performance of internee as assessed by field supervisor, internship report and seminar of the report and viva voice.

5. The internee must secure the minimum of 50% marks for successfully completion of internship. The justification is required for giving full marks or less than 50 % marks.

6. Guidelines for the execution of the internship program is given in Annex I

ANEXES

ANNEX I

Internship and Guideline for Internship Program of B.V.Sc. and AH Students

1. Definition
   1.1 Internship: Unless otherwise stated, internship harein is a pre-service field work training organized for Bachelor of Veterinary Science and Animal Husbandry (BVSc and AH) as an integral part of the Degree Program at the Faculty of Science and Technology, Purbanchal University , Nepal. Internship will commence after the completion of the academic courses in final year and students must have passed all required courses up to 4th year of BVSc and AH program and will not exceed one semester.

   1.2 Faculty: The word faculty herein used describes the group of academic departments of BVSc and AH at constituent or affiliated Campus/Institute or individual(s) from these departments.

   1.3 Internship Advisory Committee (IAC): The Internship Advisory Committee (IAC) will formulate policy and expedite the implementation and monitoring of the program at Campus level. The IAC will comprise of

1.3.1	Dean/Campus Chief/Principal /Director	Chairman
1.3.2	Faculty coordinator/Head of the Department	(1) Member
1.3.3	Senior faculty member	(1) Member

   1.4 Member Secretary of IAC: The Chairman of IAC will assign one of the members of IAC as Member Secretary

   1.5 Internship Site: It is a Veterinary Hospital, Veterinary Clinic, Veterinary Disease Diognostic Center or Lab, Livestock and Poultry Farm, where the internee under the program would be involved. The site will be decided by the IAC in consultation with DLS, NARC and private farms or organizations.

   1.6 Site Advisor: A site advisor is a person who is in-charge of particular site to guide/supervise the activities of internee. Site Advisor will be nominated by IAC.

2. Objective: The main objective of the program is to offer pre-service field training to the students of BVSc and AH in the field of veterinary science and animal husbandry particularly in Veterinary Hospital/ Veterinary Clinic, Disease Diagnostic Lab, Livestock or Poultry Farm or Hatchery, Wildlife conservation etc.

3. Nature of Work: The nature of internship at field level must be an involvement of the internee in the day to day operations of two different components (hospital/clinic/ diagnostic lab and livestock farm) in small group decided by IAC.

4. Duration of Internship: Duration of internship program will be of six month (one semester). The breakdown of duration will be as follow:

4.1 Orientation and arrival to working site	1 week
4.2 Field work	5 month
4.3 Preparation of field report and presentation	3 weeks

5. Site Selection: Selection of site for the internee will be based on the availability of at least two major components i.e Veterinary Hospital and Livestock Farm. Normally 1 to 2 internees will be sent to each site. The rotation of the enternees at different units will be done i.e. hospital, lab and farm.

6. Term of References

6.1 Member Secretary of Internship Advisory Committee (IAC): He/she will be the contact person and will coordinate all the faculty and internship sites.

6.2 Site Advisor:

- 6.2.1 To orient the interns on work plan and working sites
- 6.2.2 To conduct class one a week and helpintens in their works
- 6.2.3 To monitor and evaluate day to day activities
- 6.2.4 To evaluate the performance of interns and report to Campus
- 6.2.5 To assist IAC for developing work plan/policy formulation

6.3 Duties and Responsibilities of Student

- 6.3.1 The internship is a full time training and the interns are not allowed to accept full or part time paid appointment.
- 6.3.2 Assist the teacher/site supervisor in all activities of the units they are posted in.
- 6.3.3 Participate in clinical activities with clinical faculty.
- 6.3.4 Share emergency and night duties on rotation in hospital even in Saturday or public holidays.
- 6.3.5 Hand on diagnostic and treatment procedures for hospitalized cases under the supervision of the attending veterinarian.
- 6.3.6 Administer primary care to emergency cases and paerticipate in service such as anaesthesia, radiology, ultrasonography, endoscopy, laboratory and diagnostic procedures. Medicine and surgery rounds are held periodically, present cases and participate in topical discussion.
- 6.3.7 Maintain a log book of day to day work which may be varied by the supervisor.
- 6.3.8 Attendence should be more than 80%. However the entern may be granted maximum of 10 days for casual leave for valid reasons.
- 6.3.9 Prepare project/field report/case study or survey report during internship. It may be supervised by more than one teachers and present it in the seminar organized in final semester examination of internship.
- 6.3.10 On the event of his/her inability to complete the field work should directly report to IAC and the remaining part of the work should be completed wherever suggested by the IAC.

7. Evaluation:

After the completion of the term of intership, the individual intern should produce 4 copies of typed field work report/case study (number of page should not be less than 25 pages) along with the log book countersigned by the site Advisor/unit in-charge. The final report should contain but not limited to Abstract, Introduction, Objectives, Methodology, Results, Discussion, Conclusion and References. The overall evaluation consists of

7.1 Pre defense seminar	50 marks
7.2 Internship defense seminar	50 marks
7.3 Grading by site Advisor	50 marks

The final report, seminar/ presentation and viva voice will be evaluated by a team of experts (3 to 5 Members) appointed by Dean/Campus Chief/Principal/Director.

8. Evaluation Criteria for Site Advisor:

8.1 Attendence	10%
8.2 Ability to identify problems	10%
8.3 Ability to solve the problem	10%
8.4 Discipline	10%
8.5 Deligence/sencerity	10%

7. The intern must secure the minimum of 50% marks for successfully completion of internship. The justification is required for giving full marks or less than 50 % marks. The final scoring of the intern will be graded as Satisfactory 'S' or Unsatisfactory 'US'

8. In case of unsatisfactory work/performance and /or shortage of attendance (less than 80%) the period of internship shall be extended up to two (2) months by the appropriate authority. If the performance is still unsatisfactory in the extended period, the internee has to re-register afresh for the entire semester in following semester.

Annex II

Other non credit courses and activities to be performed to complete the five years BVSc and AH program:

A. Tracking programs
B. Study circle
C. Entrepreneurial training

Besides the regular B.V.Sc. and A.H. credit courses, students will have to perform following requirement to successfully complete the degree. These will be non-credit activities but shall be mentioned in the degree transcript along with the grades obtained.

A. TrackingPrograms

The tracking programs have been developed to allow students to exercise more control over the specific direction of their profession and motivate them for self-teaming throughvirtual classroom, distant learning, internet etc. A student has to compulsorily take anytwo programs of two credits each (2x2=4 credits) for one semester duration each during fourth year (**7th and 8th semester**) of B.V.Sc.&A.H. Degree course under the supervision of one faculty member as designated by the Dean/ Campus Chief/ Director of the program. Evaluation of the students for this program shall be done internally on Satisfactory / Unsatisfactory basis. Incase 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) Neuro sciences
iv) Clinical/Interventional Nutrition
v) Dermatology/integument Science
vi) Alternate Veterinary Medicine
vii) Ophthalmology
viii) Anesthesiology
ix) SmallAnimalCriticalCare
x) Non-MammalianMedicine
xi) SportsAnimalMedicine
xii) Drugdesigning

B. Study Circles

Each student of B.V.Sc.&A.H. degree course shall have to enroll himself/herself for atleast two Study Circle activities during the third year of 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
x) Livestock products study circle

The Faculty Dean/Principal/Campus Chief/Director 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 start the activities right from the beginning of fifth semester and present a Seminar on the topics of his/her Study Circleduring the six 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 college buildings. The Dean/Principal/Campus Chief/Director 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 internally on

Satisfactory/Unsatisfactory basis. 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.

C. 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 at 9th semester. This training is aimedat developing entrepreneurial skill for self employment. The university/college/institute shall provide to student groups (team of upto five students) with technical support and infrastructure for these activities. Inputs, day-to-day work andfinancial accounting shall be undertaken by the students. The profits/loss, if any, shall be kept/borne by the students. However, incase of loss, the Dean/ Principal of the faculty / college through the Entrepreneurship Committee consisting of 2-3 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 in advertent. Proposed List of 17 Entrepreneurial activitiesis as follows:

1) Goat Production
2) Sheep Production
3) Pig Production
4) Broiler and Egg Production
5) Pet Production
6) Dairy Production
7) Meat Production and Processing
8) Feed Production-Mineral Mixture
9) Milk Products
10) Food safety-residue Analysis
11) Clinical Investigatory laboratory
12) Quality Control-Evaluation (Microbial)
13) Shoeing and Shoe Manufacture
14) Production of Diagnostic kit
15) Pharmaceutical Formulations,
16) Fish Production
17) Existing economics of livestock enterprises

Besides, above activities university/institute may offer other activities of local and regionalinterest

Annex III. Comprehensive Examinationon Core Competencein Veterinary skills:

The competence inveterinary skills examination shall be based on an evaluation of core competence in professional skills as detaile dbelow;

1) Restraint of cow, sheep, horse, dog and pig. Haltering, snaring, muzzling, tadswitch, bandaging of horse for exercise and stable bandaging
2) Animal identification, Dentition and ageing of animals
3) Housing layout/requirements of livestock and poultry
4) Computation of ration of livestock of different breeds and age groups in health and disease
5) Fodder management and interpretation of feed quality evaluation
6) Physical evaluation of livestock health parameters (auscultation, percussion, recording of temperature, pulse, heartrate, respiration rate etc.)
7) Recording and interpretation of cardiovascular response
8) Testing of milk and milk products for quality, clean milk production
9) Carcass quality evaluation (ante-mortem & post-mortem examination)
10) Specific diagnostic tests for zoonotic diseases
11) Sample collection, handling-and dispatch of biological materials for laboratory examination
12) Staining techniques for routine clinico-pathological examinations
13) Relating post-mortem lesions to major livestock diseases
14) Hematological evaluation (total leukocyte count, differential leukocyte count, hemoglobin,

packed cell volume, erythrocytese dimentation rate etc.) and interpretation
15) Tests and their interpretation for haemoprotozoan diseases
16) Body fluids collection, examination and interpretation as an aid to diagnosis
17) Urine evaluation procedures and interpretation as indicators for diagnosis of diseases
18) Fecalexamination-procedures and interpretation
19) Examination of skin scrapings and interpretation
20) Interpretation of blood chemistry profile in diseases
21) Deworming procedures and doses for different species of animals/birds
22) Managing an outbreak of infectious /contagious disease
23) Approach to diagnosis of a given disease condition
24) Pre-anesthetic administration and induction, maintenance of general anesthesia and dealing with anesthetic emergencies
25) Local anesthetic administration
26) Nerve blocks-sites, functional application
27) Suturematerial, suturepattern and tying knots
28) Common surgical procedures including dehorning, docking, caesarian section, ovariohysterectomy, castration, rumenotomy
29) Application of plastercast/splint for fracture immobilization and other bandaging procedure inlarge and small animals.
30) Soundness in horses
31) Rectalexamination-palpation of pelvic/abdominal organs in cattle/horses/buffaloes,
32) Detection of oestrus, artificialinsemination, pregnancy diagnosis,
33) Management of vaginal/uterine prolapse and dystocia
34) Andrological examination of bull, handing, preservation and evaluation of semen
35) Vaccination procedures, vaccination schedules and vaccine types for different diseases
36) Handling of radiograph, interpretation of a given radiograph of large and small animals
37) Client management
38) Managing a clinical practice, ambulatory van, transporting a sick animal requirements
39) Dosage regimens of important drugs
40) Drug administration techniques indifferent species of animals-oral, parenteral, rectal, intra-peritoneal and intra-uterine
41) Identification of major livestock/poultrybreeds
42) Measuring climatic parameters and their interpretation
43) Communication technology tools

Comprehensive examination in core competences should be taken at the end of final semester (10 th semester); after completion of internship .The result is evaluated as ‘Satisfactory’ / ‘Unsatisfactory’. Students who do not meet the satisfactory level of competences should take additional trainings in certain skills to improve the practical skills.