DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Objective Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Academic Session 2023-2024

PART A

Program, Vission, Mission and Objectives

1. **Vision of the University:**
   To pursue enlightenment and creativity for producing world-class human resources to cater for the needs of changing time.

2. **Mission of the University:**

a. To ensure a world-class curriculum with talented academicians and conducive academic and research environment for generation and dissemination of knowledge.
b. To maintain international standards in education with focus on both knowledge and skills, and humanitarian and ethical values to meet the needs of the society and state.
c. To develop strategic partnerships with leading national and international universities, and organizations for academic as well as research collaborations.

3. **Name of the Program Offering Entity:**
   Department of Veterinary and Animal Sciences

4. **Vision of Program Offering Entity:**
   Exceptional teaching, impactful research, and outstanding service to solve significant problems, create and share new knowledge for the development of the livestock sector in Bangladesh as well as animal welfare, wild life conservation, public health, food security and safety for human being.

5. **Mission of the Program Offering Entity:**
   POEM1: To ensure opportunities for students to be world standard graduates in the field of veterinary medicine and animal science by implementing world class curriculum.
   POEM2: To improve and promote the health, production and welfare of animals as well as conservation of wild life through excellent teaching, innovative research, outreach and quality service.
   POEM3: To establish collaboration and enterpreneurship to serve the community people regarding food security, food safety and public health.

6. **Objectives of the Program Offering Entity**
   The goal of the POE is to be a pivotal contributor for the development of the country through livestock development, public health improvement, socio-economic development, and national planning, etc. To achieve the goal, the POE explicit the following objectives;

a) To be a leading hub of veterinary and animal science education for undergraduate, graduate and other degrees.
b) To conduct basic and applied research for the development of effective and sustainable technologies in veterinary medicine and animal science.
c) Disseminate and transfer of generated knowledge and technologies to the end users through training and outreach activities.
d) Periodic revisions of teaching, learning, evaluation to align with the changing environment and continued improvement.
e) Foster interest in animal welfare, ethics, public policy, One Health and wildlife conservation.
f) Enhance the quality and quantity of professional services, industrial and public networks.
g) Encourage quality research at the postgraduate level in the national and international context in the relevant fields.

7. **Name of the Program/Degree:** Doctor of Veterinary Medicine (DVM)

8. **Description of the Program:**

Department of Veterinary and Animal Sciences, Faculty of Veterinary and Animal Sciences, University of Rajshahi is serving to prepare quality graduates for improvement of animal production, betterment of health status of food and companion animal, and public health, as well as research and education. The students of this department are greatly benefited from the facilities of such a big and well organized campus of Rajshahi

University. Students are directly gaining knowledge from the world-renowned faculty in infectious disease, genomics, comparative medicine, raptor conservation, public health, epidemiology, and dairy, swine, and avian medicine; concerned or connected with the medical or surgical treatment of animals, especially domestic animals, but also includes wildlife and fishes. The DVM degree offered by the Department of Veterinary and Animal Sciences of Rajshahi University is a five year's program. The 5 years DVM curriculum is divided into 10 semesters (2 semesters/year; 9 semesters course works and 1 semester Internship) with a total credits of 200 (Theory: 127 credits, Practical: 62 credits, Internship: 06 credits, Board exam (Viva-Voce) : 05 credits) of which Health Science Courses are 134 credits (67.00%) [Preclinical and Paraclinical: 73 (55.30%), Clinical: 59 (44.70%)], Animal Science Courses are 38 credits (19.oo%), Social and Other Science Courses are 17 credits (8.5%), Internship 6 credits (3%) and Board exam (Viva-Voce) 5 credits (2.5%).

9. Graduate Attributes:

The POE encourages students to achieve the attribute of quality graduates in terms of academic brilliance, knowledge achievement, community management and leadership responsibility, cultural compassion, and international awareness.

In particular, the DVM graduates of Department of Veterinary and Animal Sciences should:

- be able to solve the problems related to animal health and production through the application of technical and scientific knowledge
- have the ability to initiate and integrate new ideas and an understanding of the importance and application of scientific method for livestock development.
- be motivated to be a dedicated veterinarian and prepared to be a leader in the community.
- deal with sincereity, accountability, integrity and honesty with professional colleagues, clients and the community population.
- have empathy and concern for animals and people.
- acquire broad knowledge in veterinary science and be able to develop intellectual and physical skills as per Day One Skill.
- be familier in all disciplines and courses of veterinary science for effective clinics and farm-based activities.
- be adaptable to changes in their specific field of employment and to advancements in veterinary science in general.
- be enthusiastic to serve the country regarding public health, food security and food safety.
- be aware of the global advancement in veterinary science and be well-equipped to contribute globally.

10. Program Educational Objectives (PEOs):

The Program Educational Objectives are (PEOs) are:

PEO1. To produce competent veterinary graduates with moral and ethical values providing diversified knowledge in veterinary, animal and wildlife sciences;

PEO2. To furnish the students with hands-on-training to mitigate the challenges in animal production, animal health and human health in terms of animal welfare, food security, food safety and public health.

PEO3. To support and upgrade the students regrading diverse career opportunities as well as for post-graduate education in the releavant field for livestock production and development.

11. Program Learning Outcomes (PLOs):

After successful completion of Doctor of Veterinary Medicine (DVM) program, the graduates will be able to-

PLO1. explicit scientific knowledge and attitude in terms of sustainable animal production through improvement and management of farm animals and wildlife.

PLO2. apply knowledge of "Day One Competences" for disease diagnosis, prevention and treatment of farm animals, pet and wildlife.

PLO3. show effective problem-solving activities and critical thinking necessary to promote lifelong learning for climate smart livestock production and entrepreneurship development.

PLO4. attain knowledge and understanding of emerging and re-emerging issues regarding one health approach including zoonosis, AMR, food safety, epidemiology, population and public health.

PLO5. develop pragmatic leadership activities, personal accountability for the wider benefit of the veterinary profession in multidisciplinary settings.

12. Mapping mission of the university with PEOs:

PEOs	Mission 1	Mission 2	Mission 3
PEO 1	3	3	3
PEO 2	3	3	2
PEO 3	2	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Mapping PEOs with the PLOs

PLOs	PEO 1	PEO 2	PEO 3
PLO1	3	3	3
PLO1	3	3	3
PLO1	3	3	3
PLO1	3	3	2
PLO1	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

14. Mapping courses with the PLOs (Odd no. courses are Theoritical and even no. courses are Practical)

Course Code	Course Title	PLOs				
		1	2	3	4	5
0841VAS101	Systemic Anatomy-I	√	√		√	
0841VAS102	Systemic Anatomy-I	√	√		√	
0841VAS103	General Histology & Embryology	√	√		√	
0841VAS104	General Histology & Embryology	√	√		√	
0841VAS105	General Animal Science	√		√		
0841VAS106	General Animal Science	√		√		
0512VAS107	Basic Biochemistry	√	√		√	
0512VAS108	Basic Biochemistry		√		√	
0841VAS109	Forrage and Fodder Production	√	√	√	√	
0841VAS110	Forrage and Fodder Production			√	√	
0542VAS111	Biostatistics	√	√	√	√	
0542VAS112	Biostatistics	√	√	√	√	
0231VAS113	Functional English			√		√
0841VAS115	Systemic Anatomy-II	√	√		√	
0841VAS116	Systemic Anatomy-II	√	√		√	
0841VAS117	Systemic Histology	√	√		√	
0841VAS118	Systemic Histology	√	√		√	
0841VAS119	Basic and Circulatory Physiology	√	√	√		√
0841VAS120	Basic and Circulatory Physiology	√	√	√		√
0841VAS121	Metabolism of Biomolecules	√	√		√	
0841VAS123	Farm Animal Production & Management	√		√		
0841VAS124	Farm Animal Production & Management	√		√		
0841VAS125	Animal Feeds & Feeding	√		√		
0841VAS126	Animal Feeds & Feeding	√		√		
0611VAS128	Computer Application	√	√	√		√
0841VAS130	**Board Exam (Viva-Voce)**	√	√	√	√	√
0841VAS202	Comparative Anatomy and Neuroanatomy	√	√			
0841VAS203	Systemic and Nutritional Physiology	√	√	√		√
0841VAS204	Systemic and Nutritional Physiology	√	√	√		√
0841VAS205	General Parasitology &		√	√	√	

	Platyhelminthes					
0841VAS206	General Parasitology & Platyhelminthes		√	√	√	
0841VAS207	General Microbiology and Hygiene	√	√		√	
0841VAS208	General Microbiology and Hygiene	√	√	√		
0841VAS209	General Pathology		√	√	√	
0841VAS210	General Pathology		√	√	√	
0841VAS211	General Poultry Science	√		√		
0841VAS212	General Poultry Science	√		√		
0841VAS213	Fundamentals of Dairy Science	√		√		
0841VAS214	Fundamentals of Dairy Science	√		√		
0841VAS216	Avian and Aquatic Animal Anatomy	√	√	√	√	
0841VAS217	Zoo, Aquatic, Avian and Laboratory Animal Physiology	√	√	√		√
0841VAS218	Zoo, Aquatic, Avian and Laboratory Animal Physiology	√	√	√		√
0841VAS219	Nemathelminthes and Malacology		√	√	√	
0841VAS220	Nemathelminthes and Malacology		√	√	√	
0841VAS221	Bacteriology and Mycology		√	√	√	
0841VAS222	Bacteriology and Mycology		√	√	√	
0841VAS223	Systemic Pathology and Oncology		√	√	√	
0841VAS224	Systemic Pathology and Oncology		√	√	√	
0841VAS225	General Pharmacology		√			
0841VAS226	General Pharmacology		√			
0841VAS227	Poultry Feeds & Feeding	√		√		
0841VAS228	Poultry Feeds & Feeding	√		√		
0841VAS229	Animal Genetics	√		√		
0841VAS230	Animal Genetics	√		√		
0841VAS232	**Board Exam (Viva-Voce)**	√	√	√	√	√
0841VAS301	Endocrinology & Reproductive Physiology	√	√	√		√
0841VAS302	Endocrinology & Reproductive Physiology	√	√	√		√
0841VAS303	Veterinary Arthropodology		√	√	√	√
0841VAS304	Veterinary Arthropodology		√	√	√	√
0841VAS305	Pathology of Infectious and Non-infectious Diseases		√	√	√	
0841VAS306	Pathology of Infectious and Non-infectious Diseases		√	√	√	
0841VAS307	Virology		√	√	√	
0841VAS308	Virology		√	√	√	
0841VAS309	Systemic Pharmacology		√			
0841VAS311	General Medicine, Animal Behavior and Welfare	√	√	√	√	
0841VAS312	General Medicine, Animal Behavior and Welfare	√	√	√	√	
0841VAS313	Animal Breeding	√		√		
0841VAS314	Animal Breeding	√		√		
0841VAS315	Poultry Production and Management	√		√		
0841VAS316	Poultry Production and Management	√		√		
0841VAS317	Protozoology		√	√	√	
0841VAS318	Protozoology		√	√	√	
0841VAS319	Immunology and Serology		√	√	√	
0841VAS320	Immunology and Serology		√	√	√	

0841VAS321	Therapeutics and Pharmacy		√			
0841VAS322	Therapeutics and Pharmacy		√			
0841VAS323	Systemic Medicine		√	√		
0841VAS324	Systemic Medicine		√	√	√	
0841VAS325	Anaesthesiology	√	√			
0841VAS326	Anaesthesiology	√	√			
0841VAS327	Dairy Animal Medicine	√	√	√	√	
0841VAS329	Veterinary Gynaecology	√	√	√	√	√
0841VAS330	Veterinary Gynaecology		√			√
0841VAS331	Livestock and Poultry Products Technology	√		√		
0841VAS332	Livestock and Poultry Products Technology	√		√		
0841VAS334	**Board Exam (Viva Voce)**	√	√	√	√	
0841VAS401	Veterinary Public Health		√	√	√	√
0841VAS403	Farm Animal Medicine	√	√	√	√	
0841VAS404	Farm Animal Medicine	√	√	√	√	
0841VAS405	General Surgery	√	√			
0841VAS406	General Surgery		√	√		
0841VAS407	Diagnostic Imaging and Soundness	√	√	√		
0841VAS408	Diagnostic Imaging and Soundness		√	√		
0841VAS409	Andrology & Artificial Insemination	√		√	√	√
0841VAS410	Andrology & Artificial Insemination		√	√	√	√
0841VAS411	Dairy Microbiology	√		√		
0841VAS413	Toxicology		√		√	
0314VAS416	Pet and Zoo Animal Pathology		√	√	√	
0841VAS417	Companion and Pet Animal Medicine	√	√	√	√	√
0841VAS418	Companion and Pet Animal Medicine		√	√	√	√
0841VAS420	Topographic and Surgical Anatomy	√	√	√		
0841VAS421	Food Microbiology		√	√	√	√
0841VAS422	Food Microbiology	√	√	√	√	
0841VAS423	Poultry Pathology		√	√	√	
0841VAS424	Poultry Pathology		√	√	√	
0841VAS425	Forensic Medicine, Jurisprudence and Veterinary Ethics		√	√	√	√
0841VAS427	Farm Animal and Clinical Surgery	√	√			
0841VAS428	Farm Animal and Clinical Surgery		√	√		
0841VAS429	Veterinary Obstetrics	√		√	√	√
0841VAS430	Clinics (Theriogenology)		√			√
0841VAS431	Dairy Technology	√		√		
0841VAS432	Dairy Technology	√		√		
0314VAS433	Epidemiology & Preventive Medicine	√	√	√	√	
0314VAS434	Epidemiology & Preventive Medicine		√	√	√	
0314VAS435	Rural Sociology and Livestock Extension Education			√		√
0314VAS436	Rural Sociology and Livestock Extension Education			√		√
0841VAS438	**Borad Exam (Viva Voce)**	√	√	√	√	√
841VAS502	Clinical Pathology and Necropsy		√	√	√	
0841VAS503	Zoo, Wild, Aquatic and Laboratory Animal Medicine	√	√	√	√	√

0841VAS504	Zoo, Wild, Aquatic and Laboratory Animal Medicine	√	√	√	√	
0841VAS505	Poultry Medicine		√		√	
0841VAS506	Poultry Medicine		√		√	
0841VAS507	Pet and Companion Animal Surgery	√	√			
0841VAS508	Pet and Companion Animal Surgery		√	√		
0841VAS509	Reproductive Biotechnology	√		√		√
0841VAS511	Broiler & Specialized Fowl Production	√		√		
0841VAS512	Broiler & Specialized Fowl Production	√		√		
0841VAS513	Livestock Economics and Agribusiness Management			√		√
0841VAS516	Hospital Practices		√	√	√	√
0841VAS518	Farm Practices	√		√	√	
0841VAS520	Disease Diagnostics and Control Practices		√	√	√	
0841VAS522	Zoo, Wild, Aquatic and Laboratory Animal Practices		√	√	√	√
0841VAS524	Livestock Development (Private Sector)	√	√	√		√
0841VAS526	Report, Project and Presentation	√	√			√
0841VAS528	**Board Exam (Viva Voce)**	√	√	√	√	√

Part B

15. Structure of the Curriculum

a) Duration of the program: Years: 5 ; Semesters: 10

The duration of DVM program is 5 years (10 semesters) of academic courses. If a student passes all the courses in each semester as per the curricular layout, he/she can have the degree in 10 semesters. But if a student obtains 'F' grade in any course, which he/she must repeat; or obtains 'D' grade, which he/she may like to repeat for improvement; or if a student misses any semester for any of his/her personal justified reasons, he/she requires more than 10 semesters. Under such situation he/she may be allowed an extension of maximum 2 years (4 semesters).

b) Admission Requirements:

To be eligible to apply for admission to DVM program, the candidate must have passed SSC (Science Group) HSC (Science Group) examination so requivalent examinations from a cognized Board or Institution. The candidate must have an acceptable GPA in both SSC and HSC as mentioned in the "Admission Notification" as decided by the Admission Committee of Rajshahi University.

c) Total minimum credit requirement to complete the program:

For the DVM degree a student will have to complete a total of 130 courses (64 Theory and 66 Practical) of 200 credits including an internship for a semester before final graduation.

d) Total class weeks in a Year/Semester: 24 weeks in a Semester and 2 Semesters per year, total 48 weeks/year.

e) Minimum CGPA requirements for graduation: 2.50.

f) Maximum academic years of completion: 7 years.

g) Category of Courses:

i. General Education Courses: (Interdisciplinary courses, beyond the discipline/program, that provides a well-rounded learning experience to the students of an academic program): 08 courses. For example: English, Livestock Economics and Agribusines, Computer Science, Sociology etc.

ii. Core courses (Courses that characterize the discipline): Pre clinical, Clinical and Production

iii. Elective Courses (Courses for specialization within the discipline): None.

iv. Capstone course/Internship/Thesis/Projects/Portfolio (as applicable for the discipline/ academic program): Internship for 1 Semester.

NB: Achievement of minimum "D" grade is compulsory in case of non-credit courses.

16. Year/ Semester wise distribution of courses:

a. First Year (First Semester and Second Semester)

First Year First Semester

Course Code (T+P)	Course Title (T+P)	Credits (T+P)	Contact Hours (T+P)
0841VAS101+0841VAS102	Systemic Anatomy-I	2+1	2+2
0841VAS103+0841VAS104	General Histology & Embryology	2+1	2+2
0841VAS105+0841VAS106	General Animal Science	2+1	2+2
0512VAS107+0512VAS108	Basic Biochemistry	2+1	2+2
0841VAS109+0841VAS110	Forrage and Fodder Production	2+1	2+2
0542VAS111+0542VAS112	Biostatistics	2+1	2+2
0231VAS113+0231VAS114	Functional English	0+0	2+0
Total		**1**2+6=**1**8	14+**1**2=26

First Year Second Semester

Course Code (T+P)	Course Title (T+P)	Credits T+P)	Contact Hours (T+P)
0841VAS115+0841VAS116	Systemic Anatomy-II	2+1	2+2
0841VAS117+0841VAS118	Systemic Histology	2+1	2+2
0841VAS119+0841VAS120	Basic and Circulatory Physiology	2+1	2+2
0512VAS121+0512VAS122	Metabolism of Biomolecules	2+0	2+0
0841VAS123+0841VAS124	Farm Animal Production & Management	2+1	2+2
0841VAS125+0841VAS126	Animal Feeds & Feeding	2+1	2+2
0611VAS127+0611VAS128	Computer Application	0+1	0+2
0841VAS130+0841VAS130	Board Exam (Viva-Voce)	0+1	0+0
Total		**12**+7=**1**9	**12+1**2=**2**4

b. 2nd Year (First Semester and Second Semester)

Second Year Second Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact Hours (T+P)
0841VAS201 + 0841VAS202	Comparative Anatomy and Neuroanatomy	0+1	0+2
0841VAS203 + 0841VAS204	Systemic and Nutritional Physiology	2+1	2+2
0841VAS205 + 0841VAS206	General Parasitology & Platyhelminthes	2+1	2+2
0**512**VAS207 + 0**512**VAS208	General Microbiology and Hygiene	2+1	2+2
0841VAS209 + 0841VAS210	General Pathology	2+1	2+2
0841VAS211 + 0841VAS212	General Poultry Science	2+1	2+2
0841VAS213 + 0841VAS214	Fundamentals of Dairy Science	2+1	2+2
	Total	**12+7=19**	**12+14=26**

Second Year Second Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact Hours (T+P)
0841VAS215 + 0841VAS216	Avian and Aquatic Animal Anatomy	0+1	0+2
0841VAS217 + 0841VAS218	Zoo, Aquatic, Avian and Laboratory Animal Physiology	2+0	2+0
0841VAS219 + 0841VAS220	Nemathelminthes and Malacology	2+1	2+2
0841VAS221 + 0841VAS222	Bacteriology and Mycology	3+1	3+2
0841VAS223 + 0841VAS224	Systemic Pathology and Oncology	2+1	2+2
0841VAS225 + 0841VAS226	General Pharmacology	2+1	2+2
0841VAS227 + 0841VAS228	Poultry Feeds & Feeding	2+1	2+2
0841VAS229 + 0841VAS230	Animal Genetics	2+1	2+2
0841VAS231 + 0841VAS232	Board Exam (Viva Voce)	0+1	0+0
	Total	**15+8=23**	**15+14=29**

c. Third Year (First and Second Semester)

Third Year First Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact hours (T+P)
0841VAS301 + 0841VAS302	Endocrinology and Reproductive Physiology	2+1	2+2
0841VAS303 + 0841VAS304	Veterinary Arthropodology	2+1	2+2
0841VAS305 + 0841VAS306	Pathology of Infectious and Non-Infectious Diseases	2+1	2+2
0841VAS307 + 0841VAS308	Virology	3+1	3+2
0841VAS309 + 0841VAS310	Systemic Pharmacology	2+0	2+0
0841VAS311 + 0841VAS312	General Medicine, Animal Behavior and Welfare	2+1	2+2
0841VAS313 + 0841VAS314	Animal Breeding	2+1	2+2
0841VAS315 + 0841VAS316	Poultry Production and Management	2+1	2+2
	Total	**17+7=24**	**17+14=21**

Third Year Second Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact hours (T+P)
0841VAS3**17** + 0841VAS3**18**	Protozoology	2+1	2+2
0841VAS3**19** + 0841VAS32**0**	Immunology and Serology	2+1	2+2
0841VAS32**1** + 0841VAS32**2**	Therapeutics and Pharmacy	2+1	2+2
0841VAS32**3** + **0**841VAS32**4**	Systemic Medicine	2+1	2+2
0841VAS32**5** + 0841VAS3**26**	Anaesthesiology	2+1	2+2

0841VAS**327** + **0**841VAS**328**	Dairy Animal Medicine	2+0	2+0
0841VAS3**29** + **0**841VAS33**0**	Veterinary Gynaecology	2+1	2+2
0841VAS33**1** + 0841VAS33**2**	Livestock and Poultry Products Technology	2+1	2+2
0841VAS33**3**+ 0841VAS33**4**	Board Exam (Viva Voce)	0+1	0+0
	Total	1**6**+**8**=2**4**	16+**14**=3**0**

d. Fourth Year (First and Second Semester**)**

Fourth Year First Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact hours (T+P)
0841VAS40**1** + 0841VAS402	Veterinary Public Health	2+0	2+0
0841VAS403 + 0841VAS404	Farm Animal Medicine	3+1	3+2
0841VAS405 + 0841VAS406	General Surgery	2+1	2+2
0841VAS407 + 0841VAS408	Diagnostic Imaging and Soundness	2+1	2+2
0841VAS**4**09 + 0841VAS410	Andrology & Artificial Insemination	2+1	2+2
0841VAS411 + 0841VAS4**1**2	Dairy Microbiology	2+0	2+0
0841VAS4**1**3 + 0841VAS414	Toxicology	2+0	2+0
0841VAS415 + 0841VAS416	Pet and Zoo Animal Pathology	0+1	0+2
0841VAS417 + 0841VAS418	Companion and Pet Animal Medicine	2+1	2+2
0841VAS419 + 0841VAS420	Tophographic and Surgical Anatomy	0+1	0+2
	Total	1**7**+**7**=2**4**	1**7**+**14**=**31**

Fourth Year Second Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact Hours (T+P)
0841VAS421 + 0841VAS422	Food Microbiology	2+1	2+2
0841VAS423 + 0841VAS424	Poultry Pathology	2+1	2+2
0841VAS425 + 0841VAS426	Forensic Medicine, Jurisprudence and Veterinary Ethics	2+0	2+0
0841VAS427 + 0841VAS428	Farm Animal and Clinical Surgery	2+1	2+2
0841VAS429	Veterinary Obstetrics	2+0	2+0
0841VAS430	Clinics (Theriogenology)	0+1	0+2
0841VAS431 + 0841VAS432	Dairy Technology	2+1	2+2
0841VAS433 + 0841VAS434	Epidemiology & Preventive Medicine	2+1	2+2
0314VAS435 + 0314VAS436	Rural Sociology and Livestock Extension Education	2+1	2+2
0841VAS437 + 0841VAS438	Borad Exam (Viva Voce)	0+1	0+0
	Total	16+**8**=2**4**	16+14=**30**

e. **Fifth Year (First and Second Semester)**

Fifth Year First Semester

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Contact Hours (T+P)
0841VAS501 + 0841VAS502	Clinical Pathology and Necropsy	0+1	0+2
0841VAS503 + 0841VAS504	Zoo, Wild, Aquatic and Laboratory Animal Medicine	3+1	3+2
0841VAS505 + 0841VAS506	Poultry Medicine	2+1	2+2
0841VAS507 + 0841VAS508	Pet and Companion Animal Surgery	2+1	2+2
0841VAS509 + 0841VAS510	Reproductive Biotechnology	2+0	2+0
0841VAS511 + 0841 VAS512	Broiler & Specialized Fowl Production	2+1	2+2

0841VAS513+0841VAS514	Livestock Economics and Agribusiness Management	2+0	2+0
	Total	**13+5=18**	**13+10=23**

Fifth Year Second Semester (Internship)

Course No. (T+P)	Course Title (T+P)	Credits (T+P)	Duration
0841VAS515 + 841VAS516	Hospital Practices	0+1	10 Weeks
0841VAS517 + 841VAS518	Farm Practices	0+1	5 Weeks
0841VAS519 + 841VAS520	Disease Diagnostics and Control Practices	0+1	**4** Weeks
0841VAS521 + 841VAS522	Zoo, Wild, Aquatic and Laboratory Animal Practices	0+1	2 Weeks
0841VAS523+0841VAS524	Livestock Development (Private Sector)	0+1	1 Week
0841VAS525+0841VAS526	Report, Project and Presentation	0+1	3 Weeks
0841VAS527 + 841VAS528	Board Exam (Viva Voce)	0+1	-
	Total	**0+7=7**	**25 Weeks**

Distribution of credits:

Health Science Courses: 15+11+19+12+14+10+27+15+11=134 Credits (67%) [Preclinical and Paraclinical: 75 Credits (55.97%), Clinical: 59 Credits (44.03%)]
Animal Science Courses: 10+6+7+9+6=38 Credits (19%)
Social and Other Science Courses:17 Credits (8.5%)
Internship: 6 Credits (3%)
Board Exam (Viva Voce): 5 Credits (2.5%)

Summary of the semester-wise distribution of courses, credits and contact hours

Year (Y)	Semester	Number of courses	Credits (T+P)	Contact Hours (T+P)
First	First	7+6=13	12+6=18	14+12=26
	Second	6+6=12	12+6=18	12+12=24
Second	First	6+7=13	12+7=19	12+14=26
	Second	7+7=14	15+7=22	15+14=29
Third	First	8+7=15	17+7=24	17+14=31
	Second	8+7=15	16+7=23	16+14=30
Fourth	First	8+7=15	17+7=24	17+14=31
	Second	8+8=16	16+7=23	16+14=30
Fifth	First	6+5=11	13+5=18	13+10=23
	Second (Internship)	0+6=6	0+6=6	26 weeks
Board Exam (Y1-Y5)		-	5	-
Grand Total		**64+66=130**	**130+65+5=200**	**133+118=251**

Total Number of Courses : 130 (Theory: 64, Practical: 66)
Total Credits : 200 (Theory: 130, Practical: 59, Internship: 6, Board Exam: 05)
Total Contact Hours : 251 (Theory: 133, Practical: 118)
Internship : 26 weeks
Board Exam (Viva Voce) : 05 (at the end of each year)

Discipline-Wise Distribution of Courses

Discipline	Course No.	Title of the Courses	Credits
Animal Health Courses			
1. Anatomy and Histology	0841VAS101 + 0841VAS102	Systemic Anatomy-I	2+1
	0841VAS11**5** + 0841VAS11**6**	Systemic Anatomy-II	2+1
	0841VAS201 + 0841VAS202	Comparative Anatomy and Neuroanatomy	0+1
	0841VAS21**5** + 0841VAS216	Avian and Aquatic Animal Anatomy	**0+1**
	0841VAS419 + 0841VAS420	Topographic and Surgical Anatomy	0+1
	0841VAS103 + 0841VAS104	General Histology & Embryology	2+1
	0841VAS11**7** + 0841VAS118	Systemic Histology	2+1
		Sub-total:	**8+7=15**
2. Physiology	0841VAS11**9** + 0841VAS1**20**	Basic and Circulatory Physiology	**2+1**
	0841VAS203 + 0841VAS204	Systemic and Nutritional Physiology	**2+1**
	0841VAS21**7** + 0841VAS218	Zoo, Aquatic, Avian and Laboratory Animal Physiology	**2+0**
	0841VAS301 + 0841VAS302	Endocrinology & Reproductive Physiology	**2+1**
		Sub-total:	**8+3=11**
3.Microbiology	0841VAS20**7** + 0841VAS208	General Microbiology and Hygiene	2+1
	0841VAS22**1** + 0841VAS222	Bacteriology and Mycology	3+1
	0841VAS307 + 0841VAS308	Virology	3+1
	0841VAS3**19** + 0841VAS32**0**	Immunology and Serology	2+1
	0841VAS40**1** + 0841VAS402	Veterinary Public Health	2+0
	0841VAS421 + 0841VAS422	Food Microbiology	2+1
		Sub-total:	**14+5=19**
5. Parasitology	0841VAS205 + 0841VAS206	General Parasitology & Platyhelminthes	2+1
	0841VAS219 + 0841VAS22**0**	Nemathelminthes and Malacology	2+1
	0841VAS303 + 0841VAS304	Veterinary Arthropodology	2+1
	0841VAS317 + 0841VAS318	Protozoology	2+1
		Sub-total:	**8+4=12**
6. Pathology	0841VAS209 + 0841VAS210	General Pathology	**2**+1
	0841VAS22**3** + 0841VAS224	Systemic Pathology and Oncology	**2**+1
	0841VAS305 + 0841VAS306	Pathology of Infectious and Non-infectious Diseases	**2**+1
	0841VAS415 + 0841VAS416	Pet and Zoo Animal Pathology	0+1
	0841VAS423 + 0841VAS424	Poultry Pathology	**2**+1
	0841VAS501 + 0841VAS502	Clinical Pathology and Necropsy	0+1
		Sub-total:	**8+6=14**
7. Pharmacology	0841VAS225 + 0841VAS226	General Pharmacology	2+1
	0841VAS309 + 0841VAS310	Systemic Pharmacology	2+0
	0841VAS32**1** + 0841VAS32**2**	Therapeutics and Pharmacy	**2**+1
	0841VAS413 + 0841VAS414	Toxicology	2+0
		Sub-total:	**8+2=10**
8. Medicine	0841VAS311 + 0841VAS112	General Medicine. Animal Behavior and Welfare	2+1
	0841VAS323 + 0841VAS324	Systemic Medicine	2+1
	0841VAS327 + 0841VAS328	Dairy Animal Medicine	**2+0**
	0841VAS403 + 0841VAS404	Farm Animal Medicine	3+**1**
	0841VAS417 + 0841VAS418	Companion and Pet Animal Medicine	2+1
	0841VAS425 + 0841VAS426	Forensic Medicine, Jurisprudence and Veterinary Ethics	**2**+0
	0841VAS**43**3 + 0841VAS434	Epidemiology & Preventive Medicine	2+1
	0841VAS50**3** + 0841VAS50**4**	Zoo, Wild, Aquatic and Laboratory Animal Medicine	3+1
	0841VAS50**5** + 0841VAS50**6**	Poultry Medicine	2+1
		Sub-total:	**20+7=27**
9. Surgery	0841VAS325 + 0841VAS326	Anaesthesiology	2+1
	0841VAS40**5** + 0841VAS40**6**	General Surgery	2+1

	0841VAS407 + 0841VAS408	Diagnostic Imaging and Soundness	2+1
	0841VAS427 + 0841VAS428	Farm Animal and Clinical Surgery	2+1
	0841VAS507 + 0841VAS508	Pet and Companion Animal Surgery	2+1
		Sub-total:	**10+5=15**
10. Theriogenology	0841VAS329 + 0841VAS330	Veterinary Gynaecology	2+1
	0841VAS409 + 0841VAS410	Andrology & Artificial Insemination	2+1
	0841VAS429	Veterinary Obstetrics	2+0
	0841VAS430	Clinics (Theriogenology)	0+1
	0841VAS509 + 0841VAS510	Reproductive Biotechnology	**2+0**
		Sub-total:	**8+3=11**
		Total :	**90+42=132**
Animal Production Courses			
1. Animal Science	0841VAS105 + 0841VAS106	General Animal Science	2+1
	0841VAS123 + 0841VAS124	Farm Animal Production & Management	2+1
	0841VAS333 + 0841VAS334	Livestock and Poultry Products Technology	**2**+1
		Sub-total:	6+**3=9**
2. Animal Genetics	0841VAS227 + 0841VAS28	Animal Genetics	2+1
	0841VAS315 + 0841VAS316	Animal Breeding	2+1
		Sub-total:	**4+2=6**
3. Dairy Science	0841VAS213 + 0841VAS214	Fundamentals of Dairy Science	2+1
	0841VAS411 + 0841VAS412	Dairy Microbiology	**2+0**
	0841VAS431 + 0841VAS432	Dairy Technology	**2**+1
		Sub-total:	6**+2=**8
4. Poultry Science	0841VAS**211** + 0841VAS**212**	General Poultry Science	2+1
	0841VAS**315** + 0841VAS**316**	Poultry Production and Management	2+1
	0841VAS511 + 0841VAS512	Broiler & Specialized Fowl Production	2+1
		Sub-total:	**6+3=9**
5. Animal Nutrition	0841VAS125 + 0841VAS126	Animal Feeds & Feeding	2+1
	0841VAS227 + 0841VAS238	Poultry Feeds & Feeding	2+1
		Sub-total:	**4+2=6**
		Total:	**25+13=38**
Social Sciences and Other Courses			
	0**512**VAS107 + 0**512**VAS108	Basic Biochemistry	2+1
	0841VAS109 + 0841VAS110	Forage and Fodder Production	2+1
	0542VAS111 + 0542VAS112	Biostatistics	2+1
	0231VAS113 + 0231VAS114	Functional English	0+0
	0**512**VAS1**21** + 0**512**VAS12**2**	Metabolism of Biomolecules	2**+0**
	0**611**VAS127 + 0**611**VAS128	Computer Applications	0+1
	0314VAS4**35** + 0314VAS4**36**	Rural Sciology and Livestock Extension Education	2+**1**
	0311VAS51**3** + 0311VAS51**4**	Livestock Economics and Agribusiness Management	2+0
		Total:	**12+5=17**
Internship	0841VAS51**5** + 0841VAS5**16**	Hospital Practices	0+1
	0841VAS5**17** + 0841VAS5**18**	Farm Practices	0+1
	0841VAS5**19** + 0841VAS52**0**	Disease Diagnostics and Control Practices	0+1
	0841VAS52**1** + 0841VAS52**2**	Zoo and Laboratory Animal Practices	0+1
	0841VAS52**3** + 0841VAS52**4**	Livestock Development (Private Sector)	0+1
	0841VAS52**5** + 0841VAS5**26**	Report, Project and Presentation	0+1
		Total:	**0+6=6**
Board Exam	0841VAS130	Board Exam (Viva Voce)	0+1
	0841VAS232	Board Exam (Viva Voce)	0+1
	0841VAS336	Board Exam (Viva Voce)	0+1
	0841VAS438	Board Exam (Viva Voce)	0+1
	0841VAS**5**28	Board Exam (Viva Voce)	0+1
		Toal:	**0+5**
		Grand Total:	1**30+70=200**

Part C

Description of all courses of the program including the following information for each course:

Grading/Evaluation

1) Grading Scale

The grading system shall consist of 10 grades (UGC GS)

Numerical Grade	Letter Grade		Grade Point
80% and above	A+	A Plus	4.00
75% to less than 80%	A	A Regular	3.75
70% to less than 75%	A-	A Minus	3.50
65% to less than 70%	B+	B Plus	3.25
60% to less than 65%	B	B Regular	3.00
55% to less than 60%	B-	B Minus	2.75
50% to less than 55%	C+	C Plus	2.50
45% to less than 50%	C	C Regular	2.25
40% to less than 45%	D	Pass (D Regular)	2.00
Less than 40%	F	Fail	0.00

2) Grades

Letter Grade	Grade Points
A+	4.00
A	3.75
A-	3.50
B+	3.25
B	3.00
B-	2.75
C+	2.50
C	2.25
D	2.00
F	0.00

- A student achieving a GPA of <2.00 in any course shall be placed on probation in subsequent semester and afterwards. Such probation shall not be allowed for more than 2 consecutive similar semesters.

3) Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

GPA is the summation of GP earned in all courses so far completed divided by total credit (TC) hours of those courses

i.e., GPA = (GP ÷ TC)

Total GP in a course = GP achievements in a course multiplied by total cr. hrs. in that course

Example, if a student receives a 'A^+' grade (A^+=4) in a course of 4 cr. hrs., the total GP in that course shall be 4×4=16

4) Course Withdrawal

Other grades are 'E' = final examination not taken

a) 'I' = incomplete accomplishment
b) When a student fails to remove 'E' within specified time Grade 'E' will automatically be converted to 'W
c) Students must remove E or I before starting the next semester
d) Students must remove W before graduation

5) Incomplete (I) courses

Should be complete in the next semester

6) Retake

Academic Deficiency **a**nd Academic Probation

- Any student achieving a GPA of less than 2.0 in any course shall be placed on probation in subsequent semester.
- Such probation shall not be allowed for more than next two consecutive similar semesters.
- *Be Aware of that-*
- *If a student fails to raise his/her GPA to 2.**0** or above within the probation period (next 2 **consecutive** similar semesters**),** his/her admission will stand automatically terminated*.

7) Grade Improvement of the Course (s).

A student achieving GPA of <2.75 in a course will be allowed for grade improvement in the immidiate next similar semester only for one time. Maximum 6 credits will be allowed for improvement in an acadmic year. Marks of class attendance and continuus assesment of regular semester will be added to the improvement exam marks.

8) Dropout

If a student fails to raise his/her GPA to ≥2.00-2.50 [For Semester Promotion, the Semester Grade Point Average (SGPA) for each Semester of First Year is ≥2.00; for each Semster of Second Year is ≥2.25; for each Semester of Third, Fourth and Fifth Year is ≥2.50) within the defined period, his/her admission will stand automatically terminated. The Cumulative Grade Point Average (CGPA) is minimum 2.50 to achieve the Doctor of Veterinary Medicine (DVM) degree.

Other Grades

- **D**' is the minimum passing grade in a course.
- Other grades are **'E'-** final examination not taken**;** and **'I'=** incomplete, all requirements of the courses not fulfilled; **W**= course withdrawn

Removal of 'E', 'F', 'I' and 'W' grades

- A student must remove an 'I' grade before beginning of the next semester.
- A student must remove an 'E' grade before beginning of the next semester.
- To remove 'F' and 'W' grades, the student must repeat the course within two consecutive similar semesters before graduation.

Grade Point Average (GPA)

Grade point average (GPA) is a value obtained by dividing the total grade points earned in all courses by the total credit hours of those courses so far completed.

$$GPA = \frac{\Sigma(Gradepoints \times Credits)}{\Sigma Credits}$$

GPA Calculation

The grades A^+, A, A^-, B^+, B, B^-, C^+, C, D and F are numerically equal to 4.00, 3.75, 3.50, 3.00, 2.75, 2.50, 2.25, 2.00 and 0 (zero)

If a student obtains A^+, B^-, C, D and F grades in 5 courses of 4.5 cr hrs each, total GPA of 5 courses shall be $4.00\times4 + 2.75\times4 + 2.25\times4 + 2.00\times4 + 0\times4 = 49.5$
And total cr. hrs shall be 4+4+4+4+4=20
The calculated GPA shall be 44/20=2.2

Repeating courses

All courses with 'W' and 'F' must be repeated before final semester of graduation and must obtain a minimum passing grade of 'D'.

Conferal of degree

- Student must complete the required credit hours before graduation.
- Student must maintain a minimum GPA of 2.5.
- Student must clear all fees and dues of the University.

Graduation and award of degree

- Qualified students shall have to apply in prescribed form to the Controller of Examination of RU.
- On the recommendation of the Vice Chancellor, Controller shall issue a Provisional Certificate
- The Syndicate, the highest body, shall approve conferral of the degree.

Cancellation of admission

The admission of a student shall be cancelled if he/she fails to:

- complete first three consecutive semesters after admission;
- maintain a minimum cumulative GPA of 2.5 or above for more than two consecutive semesters;
- complete the degree within the time limit (maximum 14 semesters).
- comply with the regulations of the university

Part D

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : Systemic Anatomy-I
2. Course Code : 0841VAS101
3. Course Type : Theory
4**. Course Level** : First Year First Semester
5**. Session** : 2023-2024
6**. Course Credit** : 2
7**. Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8**. Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of medical science which describes components, location, shape, size colors, relation and topography of all organs of skeletal, joint, muscular and circulatory systems of the animal body. Therefore, this course provides students the foundation knowledge of fundamental anatomic principles and concepts for application in all domestic animals. It helps students to disease diagnosis during ante-mortem, post mortem examination and radiographic examination and also helps to perform surgery and various therapeutic approach.

10. Intended Learning Objectives: The objectives of this course are:
a) To understand the Veterinary Anatomy and different terms and scope of Anatomy.
b) To know the forms and structure of different organs and systems of domestic animals specially bones, cartilage, joints, muscles and organs of the circulatory systems.
c) To help understandings related subjects of veterinary science like physiology, pathology, surgery etc.
d) To help disease diagnosis through ante-mortem, post-mortem examinations and radiographic examinations.
e) To perform successful surgery and various therapeutic approach like physiotherapy, acupuncture etc.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand the Veterinary Anatomy, the forms, structure, composition and classification of skeleton, formation and classification of joints, characteristics of joints and its associated structures of animals especially in bovine and caprine.
CLO2: identify the muscles of different regions of the body of domestic animals especially of bovine and caprine, their position, direction, blood supply, nerve supply and relation.
CLO3: explain the organs of circulation of domestic animal especially in bovine and caprine, branching patterns and distribution of blood vessels in whole body.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	3	2	1	2
CLO2	3	2	2	1	2
CLO3	3	1	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	General concepts (Definition and classification of anatomy, Importance and Application of Anatomy, Topographic and descriptive Anatomical Terms)	2
1	Definition and types/ classification of skeletons, bones	1
1	Vertebra, vertebral column, bones of skull, bones of axial and appendicular skeleton	6
1	Definition and Classification of Joints, Formation, Composition and classification of	3

	synovial joint, Movements of synovial joint	
2	Myology (Muscles of different body regions)	6
3	Definition and terminology of cardiovascular system, Pericardium, heart and great vessels, different types of circulation	1
2, 3	Aorta and it branches, circulation of different body parts with venous drainage and major lymphatics	5

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Getty, R., 1986. Sisson and Grossman's The Anatomy of the Domestic Animals. Vol. 1 and 2. W.B. Saunders Co. Philadelphia
2. Dyce, K.M., Sack W.O. and Weneing, C.J. 1999. Textbook of Veterinary Anatomy. W. B. Saunders Co. Philadelphia
3. Konig, H.E and Liebich, H.G. 2009. Veterinary Anatomy of Domestic Mammals Textbook and Colour Atlas, 4th Edition, Schattauer Stuttgart, New York
4. Ashdown, R.R., Done, S.H., Barnett, S.W and Baines E.A. 2010. Color Atlas of Veterinary Anatomy The Ruminants, 2nd Edition, Vol 1. Elsevier, London
5. Philip, G.D. 1988. Guide to the Ruminant Anatomy Based on the Dissection of the Goat. Lowa State University Press. Ames, USA.
6. Budras, K.D. Habel, R.E. 2003. Bovine anatomy an illustrated text. 1st Edition. Schlütersche GmbH & Co. Germany.
7. Primary Veterinary Anatomy by Ronjit Kumar Ghosh 5thed, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : Systemic Anatomy-I
2. Course Code : 0841VAS102
3. Course Type : Practical
4. **Course Level** : First Year First Semester
5. **Session** : 2023-2024
6. **Course Credit** : 1
7. **Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. **Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This course helps to revising the theoretical knowledge and gives practical experience onbones, cartilage, joints, muscles and organs of the circulatory systems. Therefore, this course provides students the foundation knowledge base of fundamental anatomic principles and concepts for application in domestic animals. It helps students to disease diagnosis during ante-mortem, post mortem examination and radiographic examination and also helps to perform surgery and various therapeutic approaches.

10. Intended Learning Objectives:
The objectives of this course are:
a) To provide opportunities for revising the theoretical basis of knowledge of anatomy with practical on laboratory experience.
b) To know the forms and structure of different organs and systems of the ruminants specially bones, cartilage, joints, muscles and organs of the circulatory systems practically.
c) To know the radiographic anatomy of bones and joints thus help disease diagnosis.
d) To increase confidence of doing successful surgery through various dissection.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, you will be able to:

CLO1: describe the scientific killing procedure of animal for anatomical study, collection of bones, preparation of bones and setting of skeletons.

CLO2: identify different Bones, Joints and Muscles with their characteristics grossly and radio graphically.

CLO3: identify and characterize of different parts of the heart, pericardium and great vessels. Dissection of course and distribution of different vessels and origin, insertion, relation of muscles.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	1	2
CLO2	3	2	2	1	2
CLO3	3	1	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Process of scientific killing of animal for anatomical study Collection of bones, preparation of bones and setting of skeletons.	1
1, 2	Study on skeleton, topographic anatomical terms Different types of bones, descriptive osteological terms Bones, foramina and sinuses of skull	2
2	Details study of bones of axial and appendicle skeleton	4
2	Identification, relations, origin and insertion of the muscle of different body regions	3
3	Study on pericardium, different structures of heart and great vessels	1
3	Origin, course and distribution of the branches of thoracic and abdominal aorta and their supplying organs	3

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Getty, R., 1986. Sisson and Grossman's The Anatomy of the Domestic Animals. Vol. 1 and 2. W.B. Saunders Co. Philadelphia
2. Dyce, K.M., Sack W.O. and Weneing, C.J. 1999. Textbook of Veterinary Anatomy. W. B. Saunders Co. Philadelphia
3. Konig, H.E and Liebich, H.G. 2009. Veterinary Anatomy of Domestic Mammals Textbook and Colour Atlas, 4th Edition, Schattauer Stuttgart, New York
4. Ashdown, R.R., Done, S.H., Barnett, S.W and Baines E.A. 2010. Color Atlas of Veterinary Anatomy The Ruminants, 2nd Edition, Vol 1. Elsevier, London
5. Philip, G.D. 1988. Guide to the Ruminant Anatomy Based on the Dissection of the Goat. Lowa State University Press. Ames, USA.
6. Budras, K.D. Habel, R.E. 2003. Bovine anatomy an illustrated text. 1st Edition. Schlütersche GmbH & Co. Germany.
7. Primary Veterinary Anatomy by Ronjit Kumar Ghosh 5thed, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : General Histology and Embryology
2. Course Code : 0841VAS103
3. Course Type : Theory
4**. Course Level** : First Year First Semester
5**. Session** : 2023-2024
6**. Course Credit** : 2
7**. Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8**. Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of medical science which provides an insight into how cellular components are structurally and functionally related. It draws its foundations in Biochemistry, Molecular Biology and Physiology. Histology provides valuable information on why tissues and organs are shaped as they are. On the other hand, Embryology provides an insight into how new individuals are developed, that explain the mode from the development of germ cells to an independent individual existence. It draws its foundations in Reproductive Physiology as well as Theriogenology. Thus, the aim of this course is to provide students with a thorough understanding of the development of a new individual and the microscopic structure and function of normal tissues in the animal body.

10. Intended Learning Objectives:
The objectives of this course are:

a) To describe the normal histological morphology of cells and tissues before they can appreciate pathological conditions of tissues under the virtual microscope.

b) To teach about the basic tissues (epithelial, connective, muscular and nervous tissues) of animal body as well as haemopoietic and lymphatic tissues.

c) To explain how an embryo is developed (embryogenesis), with particular attention to the different phases following gametogenesis (fertilization, Cleavage, gastrulation, organogenesis).

d) To familier about the type, and structure of placenta, and fetal circulation in the different animal species.

e) To disseminate the understanding about the developmental anomalies and their influencing factors (teratogens).

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand the cell, basic tissues and other tissues of animal body (properties, structure and location).
CLO2: cComprehend the whole process of development of embryo and fetus (offspring).
CLO3: describe the formation of placenta and developmental anomalies.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	Cell, tissue, organ and system of animal body Description of animal cell structures (Nucleus, cytoplasmic organells, plasma membrane) and their functions	2
1	Epithelial tissue and its properties Classification and location of surface and glandular epithelium Epithelial cell junctions and Mode of secretion	3
1	Connective tissue and its properties Connective tissue cells and fibers, and their	3

	functions Bone and cartilage, ossification	
1	Muscular tissue and its properties, Muscles types and their location, Mechanism of muscular contraction	2
1	Nervous tissue and its properties, Neuron structure, types and function Neuroglial cells and their functions, Histology of central and peripheral nervous tissue (cerebrum, cerebellum, spinal cord)	4
1	Haemopoietic tissue	1
1	Histology of major lymphatic tissue (lymphnode, spleen, thymus, tonsil, GALT, MALT)	2
2	Embryology, embryo and embryogenesis	4
3	Formation and classification of placenta, fetal membranes, teratology	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Eurell JE and Frappier BL. 2019. Dellmann's Textbook of Veterinary Histology. 6th edition, Blackwell Publishing, USA.
2. McGready TA, Quinn PJ, Fitz Patrick ES, Ryan MT, Kilroy D, Lonergan P. 2017. Veterinary Embryology. 2nd edition, Blackwell Publishing, Ames Iowa, USA.
3. Bacha WJ and Bacha LM. 2012. Color Atlas of Veterinary Histology. 3rd edition, Wiley-Blackwell, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : General Histology and Embryology
2. Course Code : 0841VAS104
3. Course Type : Practical
4**. Course Level** : First Year First Semester
5**. Session** : 2023-2024
6**. Course Credit** : 1
7**. Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8**. Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of medical science which provides an insight into how cellular components are structurally and functionally related. It draws its foundations in Biochemistry, Molecular Biology and Physiology. Histology provides valuable information on why tissues and organs are shaped as they are. On the other hand, Embryology provides an insight into how new individuals are developed, that explain the mode from the development of germ cells to an independent individual existence. It draws its foundations in Reproductive Physiology as well as Theriogenology. Thus, the aim of this course is to teach students the different cells and tissues present in animal body as well as the different developmental stages of embryo using the microscope.

10. Intended Learning Objectives:
The objectives of this course are:

a. To teach about staining principles, and Hematoxylin and Eosin (H & E) staining procedure.
b. To explain the normal morphology of different cells and the basic tissues (epithelial, connective, muscular and nervous tissues) of animal body.
c. To familier the students abput normal architecture of haemopoietic and lymphatic tissues in animal body.
d. To know the different developmental stages of embryo.
e. To describe the structure of placenta in the different animal species.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand staining principles, and Hematoxylin and Eosin (H & E) staining procedure.
CLO2: identify different cells, basic tissues and other tissues of animal body.
CLO3: identify the placenta and different developmental stages of embryo.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Microscopes and its types, glass slide and cover slip How to operate a compound microscope	2
1, 2	Basic description of stain and staining principles Preparation of Hematoxylin and Eosin staining	3
2	Microscopic study of epithelial tissue	3
2	Microscopic study of connective tissue	2
2	Microscopic study of muscular tissue	4
2	Microscopic study of nervous tissue	1
2	Microscopic study of lymphatic tissue	2
3	Microscopic study of embryo and placenta	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Eurell JE and Frappier BL. 2019. Dellmann's Textbook of Veterinary Histology. 6th edition, Blackwell Publishing, USA.
2. McGready TA, Quinn PJ, Fitz Patrick ES, Ryan MT, Kilroy D, Lonergan P. 2017. Veterinary Embryology. 2nd edition, Blackwell Publishing, Ames Iowa, USA.
3. Bacha WJ and Bacha LM. 2012. Color Atlas of Veterinary Histology. 3rd edition, Wiley-Blackwell, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : General Animal Science
2. Course Code : 0841VAS105
3. Course Type : Theory
4. Course Level : Second Year First Semester
5. Session : 2023-2024
6. Course Credit : 2
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Syed Sarwar Jahan
Professor Dr. Md. Akhtarul Islam

9. Rationale of the Course:
This is a fundamental course of animal Science. It describes definition, adaptation, scope, livestock population, importance and constraints of animal farming in Bangladesh. It also discusses various classes and breeds of animals available in Bangladesh and abroad. It also designates different types of housing systems for livestock as well as modern animal farming. Therefore, this course provides students the foundation knowledge on

different managemental practices, disposal of farm wastages, slaughter house by-products and their industrial uses. It helps the students to know about fundamental knowledgethe and nutritive value of milk, meat and egg.

10. Intended Learning Objectives:

The objectives of this course are:

a) To attain the knowledge of different terms related to animal and animal science; Scope, importance, livestock population, adaptability and constraints of livestock farming in Bangladesh.

b) To provide knowledge about various types of livestock housing, breed.

c) To describe the managemental practices of livestock, disposal of animal wastage from farm house and slaughter house by-products and their industrial uses

11. Course Learning Outcome:

After the successful completion of the course, you will be able to:

CLO1 : explain about the fundamental issues of farm animals.

CLO2 : describe the livestock housing, breed and farm design.

CLO3 : explicit the livestock management practices, disposal of farm wastes, uses of animal products and their by-products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	Definition of livestock and animal Science. Introduction, scope and importance of animal husbandry and animal science. Constraints of livestock farming in Bangladesh. Livestock population in Bangladesh.	5
1	Introduction to domesticated animal ecology, psychology and behaviour. Adaptation of exotic animals in socio economic and climatic condition of Bangladesh. Scientific and professional terms related to cattle, buffalo, sheep, goat and horse.	5
2	Common breeds of livestock, their important characters and adaptive ability with special emphasis on cattle, buffalo, sheep, goat and horse.	5
2	Definition and types of housing. Merits and demerits of different housing of livestock. Objectives and principle of housing for livestock. Site selection for livestock farm. Economic housing.	6
3	Different management practices of livestock. Disposal of animal wastage from different farm house.	5
3	Elementary knowledge of slaughter house by products and their industrial uses	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1. Benerjee, G.C. 2011. A Text Book of Animal Husbandry. 8th edition, Oxford and IBH publishing Co. New Delhi, 11001 India.
2. Webster, J. 2011. Management & Welfare of Farm Animals. Wiley-Blackwell.
3. Peel, L. and Tribe, D.E. 1983: Domestication, conservation and use of animal resources. World Animal Science A-1, Basic Information, Elsevier, 100 A.E Amsterdam, Netherlands.
4. Rai, M.K. 2012. Text book of Animal Husbandry. Oxford Book Co.
5. Ensminger, M.E. 1969. Animal Science, Sixth edition, The interstate Printers and publishers Inc.Danville, Illinois, U.S.A.
6. Tomar, S. 2013. Basic operations of Animal Husbandry. Oxford Book Co.
7. Singh, V.K. 2017. Animal Science & Management.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title : General Animal Science
2. Course Code : 0841VAS106
3. **Course Type** : Practical
4. Course Level : Second Year First Semester
5. Session : 2023-2024
6. Course Credit : 1
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Syed Sarwar Jahan
Professor Dr. Md. Akhtarul Islam

9. Rationale of the Course:
This is a basic course of Animal Science which designates how to approach & handle animal, identify and to know the important characters of different breeds of cattle, buffalo, sheep & goat and various body parts of livestock. It also describes housing, floor system and different equipment and appliances used in livestock farming. It helps students to know the method of age determination of animals, various practical knowledge about restraining tools, casting, castration, grooming, and washing bedding, clothing and marking of livestock.

10. Intended Learning Objectives:
The objectives of this course are:

a) Describe the approach and handle animals for different purposes.
b) To identify various body parts of different livestock.
c) Introduce with different breeds of cattle, buffalo, goat, sheep and horse with their specific characters.
d) To provide knowledge about different livestock tools and equipment, various housing of livestock and their specification.
e) To learn practical techniques of age determination, casting, castration, grooming, washing, bedding, clothing and marking of animals.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:

CLO1: explain about approach and handle, identify breeds with their specific characters and various body parts of different livestock species

CLO2: describe the role of different animal restraining tools & equipment and various housing of different livestock species.

CLO3: State the age determination, casting, castration, grooming, washing, bedding, clothing and marking of livestock.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	Handling and approaching of animals.	1
1	Identification of different body parts of livestock species. Identification and demonstration of different breeds of cattle, buffalo, sheep and goat.	3
2	Identification of different restraining tools and equipment used in livestock farm.	1
2	Demonstration of livestock housing.	2
3	Dentition and ageing of animals.	1
3	Casting and castration of livestock.	2
3	Methods of grooming, washing, bedding and clothing of animals.	2
3	Field trip in different livestock farms.	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Rai, M.K. 2012. Textbook of Animal Husbandry. Oxford Book Co.
2. Fowler, M.F. 1989. Restraining and Handling of Wild and Domestic Animals. 3rd edition, WileyBlackwell Publishing, USA.
3. Hossain, M.M. and Akhter, S. 1999. Practical Animal Science. 1st edition. Department of Animal Science, Bangladesh Agricultural University, Mymensingh2202, Bangladesh.
4. Tomar, S. 2013. Basic operations of Animal Husbandry. Oxford Book Co.
5. Singh, V.K. 2017. Animal Science & Management.
6. Miller, W.C and Robertson, E.D.S. 1959. Practical Animal Husbandry. 7th Edition, Oliver andBoyd. Edingburg. Tweeddalecourt.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title **:** Basic Biochemistry
2. Course Code **:** 0512VAS107
3. Course Type **:** Theory
4. Course Level **:** First Year First Semester
5. Session **:** 2023-2024
6. Course Credits **:** 02
7. Total Marks **:** 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. Course Teachers **:** Prof. Dr. K. M. Mozaffor Hossain and Prof. Dr. Shaziea Rahman

9. Rationale of the Course:
This is a fundamental course of Biochemistry. It includes definition, scope, and importance basic Biochemistry. It consist biophysics that is crucial for the understanding of the mechanisms of cell functions and body activities. It describes the chemistry of biomolecules such as carbohydrates, proteins, lipids, and nucleic acids which are important for the survival of living cells. It also includes hormones which are important to regulate growth, sexual development and reproduction, and metabolism. Therefore, this course provides students the basic knowledge of Biochemistry.

10. Intended Learning Objectives:
The objectives of this course are:
a) To know different terms related to basic biochemistry and understand the concept of thermodynamics and bioenergetics in biological systems.
b) To help in understanding various membrane phenomenon including molecular transport within the cell and across the membranes.
c) To introduce with the chemistry of different biomolecules like carbohydrates, lipids, proteins, and nucleic acids.
d) To gain knowledge on the structures and conformations of biological macromolecules, structural and functional relationship and so on.
e) To introduce with the structures and role of hormones living individual.

11. Course Learning Outcomes (CLOs):
After completion of this course, students will be able to:
CLO1: realize that biophysics (physical phenomenon) is valid in biological systems.
CLO2: understand a relationship between structures and functions of different biomolecules at cellular level.
CLO3: explain the physicochemical properties and biological significance of different biomolecules.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	1	2
CLO2	3	3	2	1	2
CLO3	3	1	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	**Introduction to biochemistry:** Introduction, scopes and prospects, historical development, relationship of biochemistry with veterinary medicine and diseases.	3
1	**Biophysiscs:** Definition and importance of biophysics. Solutions and methods of expressing concentration. Law of mass action. Water, acids, bases, and electrolytes. pH and buffers. Surface tension. Viscosity. Adsorption. Colloidal state and membrane phenomenon. Diffusion and osmosis. Spectrophotometry, electrophoresis, isoelectric focusing, and chromatography.	5
2, 3	**Carbohydrates:** Occurrence, classification, and biological importance of carbohydrates and their derivatives. **i) Monosaccharides and disaccharides:** Structure, optical and chemical properties, characteristic tests, amino-sugars and glycosides. **(ii) Polysaccharides:** Occurrence, composition, structures and properties of starch, glycogen, cellulose, other polysaccharides of biological interest, their chemical tests and biological importance, analysis of carbohydrates. Cell wall polysaccharides.	5
2, 3	**(i) Amino acids and peptides:** Definition, source, classification, structural features, physicochemical properties of amino acids and peptides, essential and non-essential amino acids, peptide bonds, oligopeptides and polypeptides, identification of N-terminal and C-terminal residues of peptide, and synthesis of peptides. **(ii) Proteins:** Introduction, physicochemical properties, classification and biological function, primary, secondary, tertiary and quaternary structure of proteins, protein domain and subunit.	5
2, 3	**Lipids:** Classification, biological importance, and functions. Chemistry of fatty acids, fats, phospholipids, sphingolipids, glycolipids, lipoproteins, and sterols. Lipids as membrane constituents. Characterization of fat.	4
2, 3	**Nucleic acids:** Occurrence, classification, composition, structural features, and physicochemical properties.	3
3	**Hormones:** Definition, classifications, chemical nature, and biochemical functions.	3

14. Teaching strategies:

Lecture, Open discussion, Think-pair-share, Audio visual, Question and answer.

15. Assessment Strategies:

In course Examination/ Tutorial/ Quiz/Class Test/Assignment, Class Attendance, Final Examination.

Suggested Reading Lists:

1. Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, and P. Anthony Weil. 2018. Harpers Illustrated Biochemistry. 31st edition. McGraw Hill Publisher, UK.
2. Richard C. Champe, Richard A. Harvey and Danise R. Ferrier. 2017. Lippincott's Illustrated Biochemistry. 7th edition. Lippincott Williams & Wilkins Publisher, USA.
3. David L. Nelson, Albert L. Lehninger, Michael M. Cox. 2008. Lehninger Principles of Biochemistry. 5th edition. W. H. Freeman publishers, USA.
4. Conn, E. E., Stumpf, P. K., Bruening, G. and Doi, R. H. 2003. Outlines of Biochemistry. Replica Press Pvt. Ltd., Kundli, India.
5. A. C. Dev. 2001. Fundamentals of Biochemistry. 7th edition. New Central Book Agency, Kolkata, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. **Course Title** : Basic Biochemistry
2. **Course Code** : 0512VAS108
3. **Course Type** : Practical
4. **Course Level** : First Year First Semester
5. **Session** : 2023-2024
6. **Course Credits** : 01
7. **Total Marks** : 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. **Course Teachers** : Prof. Dr. K. M. Mozaffor Hossain and Prof. Dr. Shazea Rahman

9. Rationale of the Course:
This is a basic course of Biochemistry. It includes preparation of different solutions in the laboratory. Discuss the principle, methods and application of different analytical techniques. This course focuses on the isolation and identification of different biomolecules from the biological samples. It includes qualitative and quantitative determination of carbohydrates, proteins and lipids. Therefore, this course provides students the basic knowledge on practical Biochemistry.

10. Intended Learning Objectives:
The objectives of this course are:
a) To know about the laboratory hazards and precautions to prevent them.
b) To introduce with different laboratory glass wares and equipments with their uses.
c) To isolate and identify different biomolecules from the biological samples.
d) To gain knowledge on estimation and demonstration techniques, calculation and interpretation of results.
e) To explain the role of biochemistry in diagnosing diseases.

11. Course Learning Outcome (CLOs):
After completion of this course, students will be able to:
CLO1: prepare different type of solutions from supplied solute, solvent and standard solution.
CLO2: perform different biochemical tests according to given method and manual.
CLO3: interpret biochemical values to apply in clinical situations.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	1	2
CLO2	3	2	2	1	2
CLO3	3	1	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Preparation of different solutions. Preparation of buffer solutions and determination of pH.	2
2	Colour tests of carbohydrates and proteins. Determination of reducing sugars.	2
2	Separation of albumins and globulins from biological samples. Identification of sugars and amino acids by TLC.	2
2	Solubility tests for fats. Determination of saponification value, iodine value, and acid value of fats.	2
2	Determination of activity of salivary amylase. Assay of SAP, SGPT, and SGOT.	2
2	Estimation of proteins by Kjeldahl and Biuret methods.	2

	Estimation of vitamin C.	
3	Detection of sugars and proteins in blood and urine.	2

14. Teaching strategies:
Lecture, Open discussion, Think-pair-share, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Nelson, D.L., Lehninger, A.L. and Cox, M.M. 2008. Lehninger Principles of Biochemistry. 5th Edition. W. H. Freeman publishers, USA.
2. Plummer, D.T. 1995. An introduction to practical Biochemistry. Tata McGraw-Hill Publishing Company Limited, New Delhi, India.
3. Plummer, M.U. 2006. An Introduction to Practical Biochemistry. 3rd Edition MC GRAW HILL Publisher, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title **:** Forage and Fodder Production
2. Course Code **:** 08**1**1VAS109
3. Course Type **:** Theory
4. Course Level **:** First Year First Semester
5. Session **:** 2023-2024
6. Course Credit **:** 2
7. Total Marks **:** 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers **:** Professor Dr. Md. Shariful Islam and Dr. Ishrat Jerin Moni

9. Rationale of the Course:
This course focuses on major aspects of forage and fodder crop production. It provides the students with theoretical knowledge of different forage and fodder crops and identifies their characteristics. This consists of fodder production status and challenges, factors affecting fodder crop quality and quantity, and grazing and pasture management.

10. Intended Learning Objectives:
The objectives of this course are:

a) To narrate the role of forages and fodder production in sustainable animal food production and the advantages of forage crops as animal feed.
b) To describe the most commonly grown forages and recognize their suitability for climate, soil, and livestock use as well as fodder production status and challenges.
c) To explain the growth cycles of grass and legume species and demonstrate factors influencing productivity and quality forage and fodder
d) To study how forrage management relates to forage production and nutritional value and understand the essential forage and pasture management concepts.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: explain livestock interaction and grass growth, grass growth in mixed stands, and forage utilization.
CLO2: assess the critical period of fodder scarcity, constraints in forage and fodder production, and remedies.
CLO3: understand and communicate basic principles and production methods such as forage establishment, grazing management, and establishment and renovation of pasture.

12.Mapping of CourseLearningOutcomes(CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	1	3	1	3

CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Importance and characteristics of forages and fodders. Forages and their importance to animal food production sustainability. The basics of grass and other forage growth. Livestock Interaction and grass growth; grass growth in mixed stands	6
2	The critical period of fodder scarcity. Constraints in fodder production and remedies.	3
3	Forage utilization; common grasses and other crops used for forage. Factors influencing productivity and quality forage and fodder. Methods of increasing biomass production	4
3	Factors affecting the chemical composition and nutritional value of forages. Toxicity due to chemicals and poisonous plants	4
3	Forage management practices and principles. Establishment of grasses and legumes in rangelands. Seed selection, seedbed preparation, and planting. Establish forages - continue fertility and nutrient management, insect, disease, and weed control. Harvesting and storage of forages	6
3	Types of grazing; the role of grazing in the pasture-livestock system. Grazing management systems.	5

13. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

14. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Annonymous. 1996. Fodder Production in Pakistan. Proc. National Conf. Improvement, Production and Utilization of Fodder Crops in Pakistan, NARC. March 25-27, 1996, Islamabad.
2. Balasubramaniyan, P.O. and S.P. Polanippan. 2001. Principles and Practices of Agronomy. Agrobios, India,
3. Ball D.M., Hoveland C.S., and Lacefield G.D. 2007. Southern Forages. 4th Ed. Barnes R.F., Nelson C.J., Moore K.J., and Collins M. 2007. Forages. Volume II. The Science of Grassland Agriculture, 6th Ed.
4. Barnes R.F., Nelson C.J., Collins M., and Moore K.J. 2003. Forages. Volume I. An Introduction to Grassland Agriculture, 6th Ed.
5. George, C. Thomas. 2008. Forage crop production in the tropics. Kalyani Publishers, India.
6. Khalil, I.A. and A. Jan. 2006. Cropping Technology. National Book Foundation, Islamabad.
7. Reddy, D.V. 2006. Fodder Production and Grassland Management for Veterinarians. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Singh, A.K. 2011. Forage and fodder. Daya Publishing House Delhi, India.
9. Singh, S.S. 2004. Crop Management. Kalyani Publishers, New Delhi.
10. Stuart, P. 2002. The Forage Book. 2nd Ed. Pacific Seeds Pty Ltd., Toowoomba, Australia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title **:** Forage and Fodder Production
2. Course Code **:** 0811VAS110
3. Course Type **:** Practical
4. Course Level **:** First Year First Semester
5. Session **:** 2023-2024
6. Course Credit **:** 1
7. Total Marks **:** 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers **:** Dr. Ishrat Jerin Moni

9. Rationale of the Course:
This course consists of different aspects of forage and fodder production and provides the students with practical knowledge and skills to produce fodder crops and identify their characteristics. This consists of sowing methods, fertilizer application methods, weed management strategies, plant protection measuresharvesting methods of fodder crops, and pasture management. Techniques for the preservation of fodder crops are also discussed in this course.

10. Intended Learning Objectives:
The objectives of this course are:
a) To introduceforage and fodder crops and their characteristics.
b) To demonstrate the preparation of fodder calendar
c) To learn about the cultivation of common fodder crops.
d) To acquaintance with the preservation of fodder crops

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:

CLO1: identify the common fodder crops with their characteristics and prepare a calendar for fodder crop production.
CLO2: understand and communicate basic technical principles and production methods of common fodder crop production.
CLO3: skillful in the conservation of fodder in the form of silage, hay, and haylage making

12.Mapping of CourseLearningOutcomes(CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Identification of forage, fodder crops, and poisonous plants	04
1	Preparation of fodder calendar	02
2	Cultivation of common fodder crops	06
3	Preservation of fodders and forages (silage and hay making)	02

1**4.Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Annonymous. 1996. Fodder Production in Pakistan. Proc. National Conf. Improvement, Production and Utilization of Fodder Crops in Pakistan, NARC. March 25-27, 1996, Islamabad.
2. Balasubramaniyan, P.O. and S.P. Polanippan. 2001. Principles and Practices of Agronomy. Agrobios, India,
3. Ball D.M., Hoveland C.S., and Lacefield G.D. 2007. Southern Forages. 4th Ed. Barnes R.F., Nelson C.J., Moore K.J., and Collins M. 2007. Forages. Volume II. The Science of Grassland Agriculture, 6th Ed.
4. Barnes R.F., Nelson C.J., Collins M., and Moore K.J. 2003. Forages. Volume I. An Introduction to Grassland Agriculture, 6th Ed.
5. George, C. Thomas. 2008. Forage crop production in the tropics. Kalyani Publishers, India.
6. Khalil, I.A. and A. Jan. 2006. Cropping Technology. National Book Foundation, Islamabad.
7. Reddy, D.V. 2006. Fodder Production and Grassland Management for Veterinarians. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Singh, A.K. 2011. Forage and fodder. Daya Publishing House Delhi, India.
9. Singh, S.S. 2004. Crop Management. Kalyani Publishers, New Delhi.
10. Stuart, P. 2002. The Forage Book. 2nd Ed. Pacific Seeds Pty Ltd., Toowoomba, Australia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title **:** Biostatistics
2. Course Code **:** 0542VAS111
3. Course Type **:** Theory
4. Course Level **:** First Year First Semester
5. Session **:** 2023-2024
6. Course Credit **:** 2
7. Total Marks **:** 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers **:** Dr. Md. Shariful Islam & Mr. Soshe Ahmed

9. Rationale of the Course:
This is a basic course of Statistics that describes the definition, scope, importance, and various classes of Statistics. It also defines some important basic terms, population, sample, different types of variables, frequency distribution and its construction, and organizing & graphing quantitative and qualitative data. It describes numerical descriptive measures, probability and its distribution. This course offers estimation of correlation, correlation-coefficient, regression, test of hypothesis. It also narrates basic concepts and principles of experimental design and estimation of analysis of variance using Completely Randomized and Randomized Block Designs (CRD and RBD). Therefore, this course provides students the basic knowledge of fundamental Statistics.

10. Intended Learning Objectives:
The objectives of this course are:
a) To introduce different basic terms related to Statistics; various classes of Statistics and variables, importance, and scope of Statistics in Veterinary Medicine.
b) To recognize details about population and sample, frequency distribution and its construction, data, and data representation, organizing and graphing quantitative and qualitative data.
c) Tofamiliarize with numerical descriptive measures, estimation of mean, median, and mode from grouped and ungrouped data, probability, and distribution.
d) Togain knowledge of how to estimate correlation, correlation-coefficient, regression, andtest of hypotheses from various data sets.
e) Tolearn basic concepts and principles of experimental design and estimation of analysis of variance using Completely Randomized and Randomized Block Designs (CRD and RBD) and techniques of interpretation.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand the basics of Statistics, such as population, and sample.
CLO2: estimate and represent data, estimate numerical descriptive measures, correlation, correlation-coefficient, regression
CLO3: calculate and analyze variance using various experimental designs and interpretation of findings

11. Mapping of CourseLearningOutcomes(CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Definition and types of Statistics, scope, and importance of it.	3
1	Definition of basic terms, population versus sample, Variablesand their classification, sampling technique and its different methods.	5
2	Data and its types, frequency distribution and its construction,	3
2	Data representation, organizing, and graphing quantitative data.	3

	Organizing and graphing qualitative data	
2	Introduction with numerical descriptive measures, and different types of histograms. Estimation of mean, median, and mode from grouped and ungrouped data, Probability and its distribution	4
2	Estimation of correlation, correlation-coefficient, regression, test of hypothesis from various data set	4
3	Basic concepts and principles of experimental design	2
3	Estimation of analysis of variance using Completely Randomized Designs (CRD).	2
3	Estimation of analysis of variance using Randomized Block Designs (RBD) and techniques of interpretation.	2

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Mann, P.S. 2009. Introductory Statistics,7th Edin. John Wiley & Sons, Inc**.** USA.
2. Lyman Ott, R. and Longnecker, M. 2010. An Introduction to Statistical Methods and Data Analysis, Sixth Edition. Brooks/Cole, 10 Davis Drive, Belmont, CA 94002-3098, USA
3. Meed, R. and Currow, R.N. 1983. Statistics Methods in Agriculture and Experimental Biology. Chapman and Hall, London.
4. Shil, R.N. and Debnath, S.C. 1992. An Introduction to the Theory of Statistics. Minati Shil and Amita Debnath, Mymensingh.
5. Steel, R.G.D. and Torrie, J.H. 1960. Principles and Procedures of Statistics. McGraw-Hill Book Co. Inc., New York.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1. Course Title **:** Biostatistics
2. Course Code **:** 0542VAS112
3. Course Type **:** Practical
4. Course Level **:** First Year First Semester
5. Session **:** 2023-2024
6. Course Credit **:** 1
7. Total Marks **:** 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers **:** Professor Dr. Md. Shariful Islam and Soshe Ahmed

9. Rationale of the Course:
This is an elementary practical aspect of Statistics which describes sampling and sorting & plotting data from specific sources. It describes how to construct and calculate frequency distribution tables and frequencies of given data, organizing and graphing quantitative and qualitative data. It also narrates the way of estimation of mean, median, mode, variance, standard deviation, standard error, and coefficient of variation from grouped and ungrouped data. It shows how to calculate and estimate correlation, correlation-coefficient, regression, analysis of variance using Completely Randomized and Randomized Block Designs (CRD and RBD), and interpretation of findings.

10. Intended Learning Objectives:
The objectives of this course are:
a) To know sampling, sorting, and plottingof data from specific sources
b) To construct and calculate frequency distribution table and frequencies of given data, organizing and graphing quantitative and qualitative data.
c) To estimate of mean, median, mode, variance, standard deviation, standard error, and coefficient of variation from grouped and ungrouped data.
d) To determine correlation, correlation coefficient, regression, test of hypothesis, and *t*-test from various data sets.

e) To knowthe analysis of variance using Completely Randomized and Randomized Block Designs (CRD and RBD) and interpretation techniques.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, you will be able to:

CLO1: perform how to sort, plot, and represent data from population and sample.

CLO2: estimate and calculate mean, median, mode, variance, standard deviation, standard error, and coefficient of variation from grouped and ungrouped data.

CLO3: calculate and estimate correlation, correlation-coefficient, regression, analysis of variance using Completely Randomized and Randomized Block Designs (CRD and RBD) and interpretation of findings.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Study on sampling and plotting of data	2
1	Study on organizing and graphing of quantitative and qualitative data	2
1	Study on construction of frequency distribution table and measurement of central location.	2
2	Study onestimation of mean, median, mode, variance, standard deviation, standard error, coefficient of variation from grouped and ungrouped data	2
2	Estimation of Probability.	1
3	Estimation of effect of treatment in Completely Randomized Designs (CRD).	2
3	Estimation of analysis of variance using Randomized Block Designs (RBD).	2
3	Estimation of correlation, correlation coefficient, regression line, and regressioncoefficient.	2
3	Study on χ^2 (Chi-square) and *t*-test from various data set.	1

1**4. Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Prem S. Mann, 2009. Introductory Statistics,7th Edin. John Wiley & Sons, Inc**.** USA.
2. Ott R. L. and Longnecker M. 2010. An Introduction to Statistical Methods and Data Analysis, Sixth Edition. Brooks/Cole, 10 Davis Drive, Belmont, CA 94002-3098, USA
3. Meed, R. and Currow, R. N. 1983. Statistics Methods in Agriculture and Experimental Biology. Chapman and Hall, London.
4. Shil, R. N. and Debnath, S. C. 1992. An Introduction to the Theory of Statistics. Minati Shil and Amita Debnath, Mymensingh.
5. Steel, R. G. D. and Torrie, J. H. 1960. Principles and Procedures of Statistics. McGraw-Hill Book Co. Inc., New York.

Outcome based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1.	**Course Title**	**:**	Functional English
2.	**Course Code**	**:**	0231VAS115
3.	**Course Level**	**:**	First Year First Semester
4.	**Session**	**:**	2023-2024
5.	**Course Credit**	**:**	0
6.	**Total Marks**	**:**	100 Marks (Final Examination 70, Class Test 20, Attendance 10)
7.	**Course Teachers**	**:**	Prof. Dr. Md. Golbar Hossain Prof. Dr. Md. Mahbubur Rahman

9. Rationale of the Course:
Functional English is the usage of English language required to perform a specific function. The aim of Functional English is to develop communicative skills of students in listening, reading, speaking and writing in relation to socio-linguistic rules performed in real life interaction correctly in English.

10. Intended L**earning Objectives:**
a) To familiarize students with socio-linguistic rules performed in real life situation in English.
b) To teach students with grammars for effective write up in English.
c) To familiarize students with formats of English language proficiency tests.

11. Course Learning Outcomes (CLOs**):** *After successful completion of the course, students will be able to*
CLO1. Communicate effectively in different socio-linguistic situations in English.
CLO2. Write up and explain idea adhering to the grammatical rules in English.
CLO3. Acquaint with different modules of English language proficiency tests with their components.

12. Mapping of CourseLearningOutcomes(CLO) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	1	2		2
CLO2	2			1	1
CLO3					

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	**Course content**	**Lectures**
1	**Socio-linguistic rules:** Opening and closing, Introduction and address system	2
1	**Socio-linguistic rules:** Invitation, thanking people and replying to thanks	2
1	Socio-linguistic rules: Apologizing, Agreeing and disagreeing	2
1	**Socio-linguistic rules:** Expressing anger and resolving conflict, Giving compliments and replying to compliments	2
1	**Socio-linguistic rules:** Getting people attention and interruption, Controlling the conversation	2
1	**Socio-linguistic rules:** Getting information, Signaling the structure of presentation	2
1	**Job interview:** Commonly asked 10 questions in job interview and possible answers, negotiating salary.	2
2	**Grammar:** Types and constructional forms of sentences; Sequence of tense, Verbs, Verb patterns and verb modifiers, Syntax including transformation and combination of sentence and framing of WH-questions.	3
2	**Grammar:** Nouns, determiners and adjectives, Adverbials, prepositional Phrases,	3

	Headword, Infinitive phrases, Participle Phrases, Appositives.	
2	**Grammar:** Mechanics-Punctuation, Quotation Marks, Capitalization, Numbers, Abbreviation, Italics, Spelling including most common mistakes.	3
2, 3	**Explaining idea:** logical, factual and argumentative	1
2, 3	**Explaining idea:** Object perspective (picture, graph, etc.)	1
2, 3	**English language proficiency test format:** Textual study and comprehension of a few selective BBC talks, different modules of IELTS	1
2, 3	**English language proficiency test format:** Textual study and comprehension of a few selective CNN talks, different modules of TOEFL	1
2, 3	**English language proficiency test format:** Textual study and comprehension on different modules of TOEIC	1

14. Teaching-learning strategies:

Lecture, presentation, individual/group practice, handout, and home assignment. Students will be expected to talk with peers and take help from online resources (youtube, etc.).

15. Assessment strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam,surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both socio-linguistic rules, explaining idea and grammar components.

Suggested Reading Lists:

1. Hornby AS. 1998. Guide to patterns and Usage in English. 2nd edn. Oxford University Press, New Delhi.
2. Leech G and Svartvik JA. 1995. Communicative Grammar in English. 2nd edn. Longman, London and New York.
3. Hewing M. 2001. Advanced English Grammar. Cambridge University Press, UK.
4. Murphy R. 2002. Intermediate English Grammar. 2nd Edition. Cambridge University Press.
5. Fitikides TJ. 2000. Common Mistakes in English. Longman.
6. Baker A. ship or Sheep? 2006. An intermediate pronunciation course. 3rd Edition. Cambridge University Press.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1.	**Course Title**	:	Systemic Anatomy-II
2.	**Course Code**	:	0841VAS115
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	First Year Second Semester
5.	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Shah Md. Abdur Rauf Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of medical science which describes components, location, shape, size colors, relation and topography of all visceral organs and nervous system special sense organs and endocrine systems of the animal body. Therefore, this course provides students the foundation knowledge base of fundamental anatomic principles and concepts for application in domestic animals. It helps students to disease diagnosis during ante-mortem, post mortem examination and radiographic examination and also helps to perform surgery and various therapeutic approaches.

10.Intended Learning Objectives :
The objectives of this course are:

a) To know the forms and structure of different organs and systems of animals especially digestive, respiratory, urinary, genitals, endocrine and nervous systems and special sense organs.

b) To help understandings related subjects of veterinary science like physiology, pathology, surgery etc and their correlation with anatomy.

c) To help disease diagnosis through ante-mortem, post-mortem examinations and radiographic examinations.

d) To help in performing successful surgery and various therapeutic approaches.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand and explain the anatomy of digestive and respiratory system.
CLO2: understand and explain the anatomy of uro-genital system, endocrine and lymphatic system.
CLO3: understand and explain the anatomy of nervous system, Sense organs and Common Integument.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	3	2	2	1
CLO2	3	3	2	2	1
CLO3	3	3	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	Description and contents of the abdominal cavity, Peritoneum and its modifications, Anatomy of the digestive tracts (mouth to anus) and accessory digestive organs (teeth, tongue, salivary glands, liver and pancreas)	6
1	Description and contents of the thoracic cavity and mediastinum, Anatomy of the respiratory tracts (Nose, larynx, trachea and bronchi)	3

	Anatomy of the lungs and pleura	
2	Anatomy and positions of the organs of urinary system (Kidney, ureter, urinary bladder and urethra)	3
2	Description and contents of the pelvic cavities, Anatomy of the main organs of the male and female genital system	7
2	Anatomy of the endocrine glands and lymphatic organs	1
3	Anatomy of the brain and spinal cord, Meninges and its modifications, cerebrospinal fluid and its circulation.	2
3	Anatomy of the special sense organs (eye, ear and skin)	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Getty, R., 1986. Sisson and Grossman's The Anatomy of the Domestic Animals. Vol. 1 and 2. W.B. Saunders Co. Philadelphia
2. Dyce, K.M., Sack W.O. and Weneing, C.J. 1999. Textbook of Veterinary Anatomy. W. B. Saunders Co. Philadelphia
3. Konig, H.E and Liebich, H.G. 2009. Veterinary Anatomy of Domestic Mammals Textbook and Colour Atlas, 4th Edition, Schattauer Stuttgart, New York
4. Ashdown, R.R., Done, S.H., Barnett, S.W and Baines E.A. 2010. Color Atlas of Veterinary Anatomy The Ruminants, 2nd Edition, Vol 1. Elsevier, London
5. Philip, G.D. 1988. Guide to the Ruminant Anatomy Based on the Dissection of the Goat. Lowa State University Press. Ames, USA.
6. Budras, K.D. Habel, R.E. 2003. Bovine anatomy an illustrated text. 1st Edition. Schlütersche GmbH & Co. Germany.
7. Primary Veterinary Anatomy by Ronjit Kumar Ghosh 5thed, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1.	**Course Title**	:	Systemic Anatomy-II
2.	**Course Code**	:	0841VAS116
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	First Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Shah Md. Abdur Rauf Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This course helps to revising the theoretical knowledge of anatomy and gives practical experience on location, shape, size colors, relation and topography of all visceral organs, nervous system, special sense organs and endocrine systems of the animal body. Therefore, this course provides students the foundation knowledge base of fundamental anatomic principles and concepts for application in domestic animals. It helps students to disease diagnosis during ante-mortem, post mortem examination and radiographic examination and also helps to perform surgery and various therapeutic approaches.

10. Intended Learning Objectives:

The objectives of this course are:

a) To provide opportunities for revising the theoretical basis of knowledge of anatomy with practical on laboratory experience.

b) To know the forms and structure of different visceral organs, special sense organs and endocrine, lymphatic and nervous systems of the ruminants practically.

c) To know the radiographic anatomy of the visceral organs thus help disease diagnosis.

d) To increase confidence of doing successful surgery through various dissection.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, you will be able to:

CLO1: collect the samples of visceral organs and their preservation, various types of preservations

CLO2: identify the different visceral organs, organs of the endocrine, lymphatic and special sense, their characters, relations and in-situ position.

CLO3: dissect the course and distribution of different nerves, identification and characterization of different parts of brain, spinal cord and meanings.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	2	2	1
CLO2	3	3	2	3	1
CLO3	3	3	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Collection of samples of visceral organs their preservation, various types of preservations for anatomical study	1
2	Identification of the organs of the digestive tracts and accessory digestive organs	3
2	Identification of the organs of the respiratory system	2
2	Identification of the organs of the urinary system	1
2	Identification of the organs of the male and female genital system	4
2	Identification of the different endocrine and lymphatic organs	1
3	Identification of different parts of the brain and spinal cord	1
3	Identification of the special sense organs (Eye, ear and skin)	1

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Getty, R., 1986. Sisson and Grossman's The Anatomy of the Domestic Animals. Vol. 1 and 2. W.B. Saunders Co. Philadelphia
2. Dyce, K.M., Sack W.O. and Weneing, C.J. 1999. Textbook of Veterinary Anatomy. W. B. Saunders Co. Philadelphia
3. Konig, H.E and Liebich, H.G. 2009. Veterinary Anatomy of Domestic Mammals Textbook and Colour Atlas, 4th Edition, Schattauer Stuttgart, New York
4. Ashdown, R.R., Done, S.H., Barnett, S.W and Baines E.A. 2010. Color Atlas of Veterinary Anatomy The Ruminants, 2nd Edition, Vol 1. Elsevier, London
5. Philip, G.D. 1988. Guide to the Ruminant Anatomy Based on the Dissection of the Goat. Lowa State University Press. Ames, USA.
6. Budras, K.D. Habel, R.E. 2003. Bovine anatomy an illustrated text. 1st Edition. Schlütersche GmbH & Co. Germany.
7. Primary Veterinary Anatomy by Ronjit Kumar Ghosh 5thed, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1. Course Title : Systemic Histology
2. Course Code : 0841VAS117
3. Course Type : Theory
4. **Course Level** : First Year Second Semester
5. **Session** : 2023-2024
6. **Course Credit** : 2
7. **Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. **Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of biomedical science which provides valuable information on why tissues and organs are shaped as they are. Modern histological techniques allow us to explore and gain an understanding of biochemical and physiological processes and how these are changed when structure is changed, as occurs, for instance, in many disease processes. The courseprovides an insight how these basic tissues combine to form organs, which operate together to maintain homeostasis. By convention, organs, which work together to achieve a particular function are grouped together as systems in animal body. By the end of this course, students should have a thorough understanding of the organs and systems of the body on the basis of normal structure by microscopic examination and to apply their knowledge to functional states examined in Physiology and diseased states examined in Pathology.

10. Intended Learning Objectives:
The objectives of this course are:
a) Students will understand the normal histological structure of organs of digestive system.
b) Students will understand the normal histological structure of organs of respiratory, cardiovascular, urinary, endocrine system.
c) Students will understand the normal histological structure of organs of reproductive system.
d) Students will understand the normal histological structure of skin and appendages.
e) Students will understand the normal histological structure of organs of special sense (eye, ear, taste bud).

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: understand the normal histological structure of organs of digestive, respiratory, cardiovascular, urinary and endocrine system
CLO2: comprehend the normal histological structure of reproductive organs.
CLO3: enumerate the normal histological structure of organs of special sense (skin, eye, ear, taste bud, olfactory zone of nasal cavity).

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	3	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	General histological plan od tubular organs Histological structure of organs of digestive system	6
1	Histological structure of organs of respiratory system	3
1	Histological structure of organs of endocrine system	3
1	Histological structure of organs of cardiovascular system	7
1, 2	Histological structure of organs of urinary system, male and female reproductive system	1

3	Histological structure of skin and appendages, organs of special sense (eye, ear, taste bud)	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Eurell JE and Frappier BL. 2019. Dellmann's Textbook of Veterinary Histology. 6th edition, Blackwell Publishing, USA.
2. Bacha WJ and Bacha LM. 2012. Color Atlas of Veterinary Histology. 3rd edition, Wiley-Blackwell, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1.	**Course Title**	:	Systemic Histology
2.	**Course Code**	:	0841VAS118
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	First Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Shah Md. Abdur Rauf Professor Dr. Md. Royhan Gofur

9. Rationale of the Course:
This is a basic course of biomedical science which provides valuable information on why tissues and organs are shaped as they are. Modern histological techniques allow us to explore and gain an understanding of biochemical and physiological processes and how these are changed when structure is changed, as occurs, for instance, in many disease processes. The courseprovides an insight how these basic tissues combine to form organs, which operate together to maintain homeostasis. By convention, organs, which work together to achieve a particular function are grouped together as systems in animal body. By the end of this course, students should have a thorough understanding of the organs and systems of the body on the basis of normal structure by microscopic examination and to apply their knowledge to functional states examined in Physiology and diseased states examined in Pathology.

10. Intended Learning Objectives:

The objectives of this course are:
a) Students will understand the normal histological structure of organs of digestive system.
b) Students will understand the normal histological structure of organs of respiratory, cardiovascular, urinary, endocrine system.
c) Students will understand the normal histological structure of organs of reproductive system.
d) Students will understand the normal histological structure of skin and appendages.
e) Students will understand the normal histological structure of organs of special sense (eye, ear, taste bud).

14. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: identify the organs of digestive, respiratory, cardiovascular, urinary and endocrine system under microscope.
CLO2: comprehend and identify the normal histological structure of reproductive organs.
CLO3: understand and identify the normal histological structure of organs of special sense (skin, eye, ear, taste bud, olfactory zone of nasal cavity).

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	3	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Microscopic study of organs of digestive system	4
1	Microscopic study of organs of respiratory system	3
1	Microscopic study of organs of endocrine system	1
1	Microscopic study of organs of cardiovascular system	1
1, 2	Microscopic study of organs of urinary system, male and female reproductive system	4
3	Microscopic study of skin and appendages, organs of special sense (eye, ear, taste bud)	1

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Eurell JE and Frappier BL. 2019. Dellmann's Textbook of Veterinary Histology. 6th edition, Blackwell Publishing, USA.
2. Bacha WJ and Bacha LM. 2012. Color Atlas of Veterinary Histology. 3rd edition, Wiley-Blackwell, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1. Course Title : Basic and Circulatory Physiology
2. Course Code : 0841VAS119
3. Course Type : Theory
4. **Course Level** : First Year Second Semester
5. **Session** : 2023-2024
6. **Course Credit** : 2
7. **Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. **Course Teachers**: Professor Dr. S.M. Kamruzzaman
Professor Dr. Rokeya Sultana

9. Rationale of the Course:
This is a Preclinical course of medical science which acquainted with physiology, its history; various physiological phenomenons persist in the body and life system. Therefore, this course provides students the foundation knowledge on cell physiology, membrane physiology, blood, hemostasis and homeostasis, various body fluid, circulatory physiology and electrophysiology of heart. It helps students to know about normal physiology of animal body

10. Intended Learning Objectives:
The objectives of this course are:
a) To disseminate the knowledge about basic concept, different terms and scope of Veterinary Physiology.
b) To know the functions of different organs and systems of animals specially Cells, Blood and circulatory systems.
c) To acquainted the students about basic physiology related to anatomy, pathology, surgery, medicine etc.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, you will be able to:

CLO1. understand the basic plan of the body, concept of cell, tissue, organ and organ system. Know about osmosis and diffusion, its classification, physiological importance and factors affecting the rate of osmosis diffusion.

CLO2. explain the physiological properties, cellular and chemical constituent and functions of blood, plasma and plasma protein.

CLO3. describe the basic features of the cardio-vascular system and blood circulation and types of blood vessels.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	2	2
CLO2	2	2	2	2	2
CLO3	1	3	1	1	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLO	Course Contents	Lectures
1	Definition of physiology, its history, scope etc. Cell, its organelles their functions. Various physiological phenomenons persist in the body and life system. Basic understanding on hemostasis and homeostasis. Various body fluid compartments.	2
1	Basic plan of the body. Concept of cell, tissue, organ and organ system. Basic properties of cell, its structure and function of different organelles. Exocytosis and endocytosis	1
1	Diffusion, its classification and physiological importance and factors affecting the rate of diffusion. Osmosis and osmotic pressure, physiological importance of osmosis and factors affecting osmosis and osmotic pressure. Solution, its classification depends on osmotic pressure and difference between osmosis and diffusion.	2
1	Transport, its classification and basic mechanism of active transport. Surface tension and its importance. Dialysis and its importance. Filtration and its importance. Definitions of adsorption and absorption, hydrotrophy, colloid and crystalloid and, sol and gel. Transport through cell membrane, membrane potential and action potential. Na+ - K+ pump and its importance to maintain cell volume. Donnan's theory of membrane equilibrium.	2
3	Physiological properties, cellular and chemical constituent and functions of blood, plasma and plasma protein. Composition and functions of plasma proteins. Difference between plasma and serum.	2
2	RBC and its composition, characteristic, functions and genesis of RBC. Describe about haemopoiesis, erythropoiesis, regulation, polycythemia and fate of red blood cells. Difference between plasma and serum.	3
2	Hemoglobin, its composition and functions. Synthesis of Hb and its derivatives (Oxyhemoglobin, myoglobin, methomoglobin and carboxyhemoglobin). Packed cell volume (PCV) and erythrocyte sedimentation rate (ESR).	2
2	WBC, its classification, morphology, functions and characters. Genesis and defensive properties of WBC. The macrophage system (the reticuloendothelial system) and platelets.	1

2	Blood coagulation and homeostasis (mechanism and factors), intrinsic and extrinsic mechanism and difference between them. Factors hasten and prevent coagulation. Blood groups, cross matching hemagglutination and transfusion of blood.	2
2	The body fluids (extra-cellular and intracellular fluid, body fluid determination and total body fluid). Body fluids compartments, difference between intracellular fluid and extracellular fluid, and hypovolemia.	2
3	Basic features of the cardio-vascular system and blood circulation and types of blood vessels. Chambers of heart, types of heart valves and their functions. Some terminology (independent rhythm, flutter, tachycardia, bradicardia, fibrillation, ventricular fibrillation, turbulence, laminar flow etc.).	2
3	Stroke volume, cardiac output and physiological factors affecting the cardiac outputs. Heart sounds, its classification and production heart sounds. Special tissue of heart (SA node, AV node, bundle of His and Purkinje fiber). Heart rate and its regulating factors and theories of heart beat.	2
3	Types of circulation (general and regional circulation, special circulation, coronary, pulmonary, cerebral, portal, fetal, renal and cerebral circulation). Cardiac cycle, blood pressure and its types, measurement and factors controlling blood pressure.	2
3	Electro-physiology of the heart and electrocardiography. Regulation of the heart and blood vessels (nervous and chemical regulation of heart). Vasomotor mechanisms and vasomotor centre.	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. **Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. A Text book of Practical Physiology. Ghai C.L., 5th edition. Jaypee Brothers Medical Publishers (P) Ltd., Hyderabad *2003*.
2. Animal Physiology. Arora M.P., 3rd edition. Himalaya Publishing House Pvt. Ltd 1992.
3. Duke's Physiology of Domestic Animals. Dukes H.H., 11th edition. Cornell University Press 1977.
4. Review of Medical Physiology. Ganong W.F., 18th edition. APPLETON and LANGE 1977.
5. Review of Physiology. Langley L.L., 3rd edition. Mac-Graw Hill 1971.
6. Students Laboratory Manual of Veterinary Physiology. Sharma I.J., Sing H.S., 1st edition. Kalyani Publishers 2000.
7. Text book of Medical Physiology. Guyton A.C., Hall J.E., 11th edition. Elsevier Saunders 2006.
8. Text book of Veterinary Physiology. Bhattacharyya B., 1st edition. Kalyani Publishers 2000.
9. Text book of Veterinary Physiology. Cunningham J.G., 2nd edition. W. B. Saunders Company 1997.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1.	**Course Title**	:	Basic and Circulatory Physiology
2.	**Course Code**	:	0841VAS120
3.	**Course Type**	**:**	Theory
4.	**Course Level**	:	First Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor Dr. S.M.Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course:
This is a practical course of general physiology which acquainted with procedure of blood collection blood collection in different species, Suggestive test of blood, Storage procedure of blood. Therefore, this course provides students the foundation knowledge on blood collection, hematological test and blood storage procedure. It helps students to know about hematology of animal.

10. Intended Learning Objectives:
The objectives of this course are:
a) To understand and be able to explain the blood collection from different species
b) To know different hematological test.
c) To help understandings related subjects of veterinary science like pathology, and medicine etc.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1. explain the procedure of plasma, serum and defibrinated blood separation from blood.
CLO2. describe the procedure for enumeration of RBC, WBC, Platelet and Interpretation of the results.
CLO2. enumerate the principle and procedure of hemoglobin, ESR, PCV determination, morphological characteristics of different leucocytes and Interpretation of the results. Understand the Principle and procedure of blood grouping, coagulation time and bleeding time, recording blood pressure

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	2	2	2	1
CLO2	1	2	2	2	1
CLO3	1	3	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	The procedure of blood collection. Site of blood collection in different species. Suggestive test of blood. Storage procedure of blood	2
1	Name of different anticoagulants, its mode of action and required amount. Advantage and disadvantage of use of different anticoagulants.	1
1	The procedure of plasma, serum and defibrinated blood separation from blood. Principle of plasma and serum separation	1
2	Principle of TEC. Procedure for enumeration of RBC. Interpretation of the results	2
2	Principle of TLC. Procedure for enumeration of WBC. Interpretation of the results.	2
2.	Principle and procedure of DLC. Morphological characteristics of different leucocytes. Interpretation of the results.	2
3	Principle and procedure of hemoglobin determination. Interpretation of the result.	1
3	Principle and procedure of ESR determination. Physiological and pathological variation of ESR.	1
3	Principle and procedure of PCV determination. Interpretation of the results.	1
3	Define blood group and its types. Principle and procedure of blood grouping	1
3	Describe coagulation time and bleeding time. Understand principle and procedure of coagulation time and bleeding time.	1
3	Define mean corpuscular volume, mean corpuscular hemoglobin and mean	1

	corpuscular hemoglobin concentration. Understand principle and procedure for calculation of various hematological indices.	
3	Principle and procedure of recording blood pressure. Interpretation of the results.	1
3	Define hemin and its importance. Understand principle and procedure of hemin crystal test.	1
3	How to write a hematological report.	1

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. A Text book of Practical Physiology. Ghai C.L., 5th edition. Jaypee Brothers Medical Publishers (P) Ltd., Hyderabad *2003*.
2. Animal Physiology. Arora M.P., 3rd edition. Himalaya Publishing House Pvt. Ltd 1992.
3. Duke's Physiology of Domestic Animals. Dukes H.H., 11th edition. Cornell University Press 1977.
4. Review of Medical Physiology. Ganong W.F., 18th edition. APPLETON and LANGE 1977.
5. Review of Physiology. Langley L.L., 3rd edition. Mac-Graw Hill 1971.
6. Students Laboratory Manual of Veterinary Physiology. Sharma I.J., Sing H.S., 1st edition. Kalyani Publishers 2000.
7. Text book of Medical Physiology. Guyton A.C., Hall J.E., 11th edition. Elsevier Saunders 2006.
8. Text book of Veterinary Physiology. Bhattacharyya B., 1st edition. Kalyani Publishers 2000.
9. Text book of Veterinary Physiology. Cunningham J.G., 2nd edition. W. B. Saunders Company 1997.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1. Course Title : Metabolism of Biomolecules
2. Course Code : 0512VAS121
3. Course Type : Theory
4. Course Level : First Year Second Semester
5. Session : 2023-2024
6. Course Credits : 02
7. Total Marks : 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. Course Teachers : Prof. Dr. K. M. Mozaffor Hossain and Dr. Afia Khatun

9. Rationale of the Course:
This course is pivotal to Biochemistry that describes the metabolisms of biomolecules. It is concerned with the storage and generation of metabolic energy required for the biosynthesis of low-molecular weight compounds and energy storage compounds. The course outline includes enzymes, metabolism of carbohydrates, proteins, lipids, and nucleic acids. It describes the disorders of carbohydrates, proteins/amino acids, lipids, nucleic acids/nucleotides metabolism. It also includes vitamins and minerals which are important as co-enzymes and co-factors in the regulation of metabolism.

10. Intended Learning Objectives:
The objectives of this course are:
a) To know the properties and functions of enzymes, co-enzymes and co-factors, and the clinical significance of enzymes and isozymes.
b) To help in understanding various reactions involved in breaking down and building up of biomolecules.
c) To introduce with different metabolic pathways including intermediary metabolisms.
d) To gain knowledge on the metabolic disorders and their physiological effect and adaptation.

e) To explain molecular events those occur during normal and abnormal biomolecular activities and correlate the metabolic activity of tissues and organs with their functions.

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:

CLO1: discuss an overview of metabolism, enzyme kinetics and enzyme technology.

CLO2: explain the major pathways of metabolism of biomolecules.

CLO3: evaluate the roles of vitamins and minerals in metabolism.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	1	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	**Introduction:** Definition of free energy, entrophy, and enthalpy. Exergonic and endergonic reactions. ADP-ATP cycle. An overview of metabolism. Stages in the breakdown of biomolecules.	2
1	**Enzymes:** Definition, Classification. Mode of action. Elements of kinetics. Inhibition and prosthetic groups. Clinical importance of enzymes. Coenzymes.	5
2	**Carbohydrate metabolism:** Glycolysis, Kreb's cycle, entry of different substances in glycolytic pathway. Gluconeogenesis. Alcoholic fermentation. Cori cycle. Metabolic regulation of glycolysis and Kreb's cycle. Shuttle systems. Electron transport chain. Oxidative and substrate level phosphorylations. Pentose phosphate pathway. Lactose biosynthesis.	6
2	**Protein metabolism:** Blood amino acid pool. Nitrogen balance. Catabolism of amino acids. Transamination, deamination, decarboxylation, and deamidation. Inborn error of amino acid metabolism. Detoxification of ammonia in liver and brain.	4
2	**Lipid metabolism:** Biological oxidation of fatty acids. Propionate catabolism in animals. Ketone body formation, utilization, and physiological effects of ketosis. Biosynthesis of fatty acids.	4
2	**Nucleic acid metabolism:** Replication, transcription, and translation. Recombinant DNA.	4
3	**Vitamins and Minerals:** Sources and biochemical functions.	3

14. Teaching strategies:

Lecture, Open discussion, Think-pair-share, Audio visual, Question and answer.

15. Assessment Strategies:

In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, and P. Anthony Weil. 2018. Harpers Illustrated Biochemistry. 31st edition. McGraw Hill Publisher, UK.
2. Richard C. Champe, Richard A. Harvey and Danise R. Ferrier. 2017. Lippincott's Illustrated Biochemistry. 7th edition. Lippincott Williams & Wilkins Publisher, USA.
3. Donald Voet and Judith G. Voet. 2010. Biochemistry. 4th edition. Willey Publisher, USA.
4. David L. Nelson, Albert L. Lehninger, Michael M. Cox. 2008. Lehninger Principles of Biochemistry. 5th edition. W. H. Freeman publishers, USA.

5. Dev A. C. 2001. Fundamentals of Biochemistry. 7th edition. New Central Book Agency, Kolkata, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First **Year** Second **Semester**

Course Outline

1. Course Title : Farm Animal Production and Management
2. Course Code : 0841VAS123
3. **Course Type** : Theory
4. Course Level : First Year Second Semester
5. Session : 2023-2024
6. Course Credit : 2
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Syed Sarwar Jahan
Professor Dr. Md. Akhtarul Islam

9. Rationale of the Course:
This course is designed to provide proper knowledge on cattle, buffalo, goat and sheep production, farm management and farming systems. This is a fundamental course of farm animal which deals with geographical distribution and world production systems of farm animals. Importanceof farm animals, their functional roles in poverty alleviation in Bangladesh. Factors affecting the success of livestock farm operation and plan and prospectus of a livestock farm. It also designed to know the management practices of farm animals, supplementation strategies for livestock production in smallholder livestock farming, judging and selection of buffaloes, sheep and goat, feeding of cattle, sheep, goats and buffaloes. Further, problems of farming in Bangladesh and their possible solutions, economic importance of housing and selection of sites for livestock farm, common abnormal behaviours and bio-security measures of livestock farms are covered.

10. Intended Learning Objectives:
The objectives of this course are:
a) To attain knowledge about the history of major livestock breed development,
b) Describe the plan and prospectus of a dairy farm, management practices of farm animals.
c) To facilitate necessary knowledge about the about methods of feeding of livestock.
d) To learn about judging of cattle, buffalo, goat and sheep and also know how to disease diagnosis, treatment and prevention measures.

11. Course Learning Outcome (CLO):
After the successful completion of the course, you will be able to:
CLO1: Explain introductory farm animal production.
CLO2: Discuss breeds of goat and sheep
CLO 3: State the role of farm animals as well as husbandry and management practices in farm animal rearing. Outline, feeding judging, selection and bio-security and disease prevention strategies of farm animals

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1.	**Introduction**: Geographical distribution and world production of farm animals. Scope, Importance of farm animals, their functional roles in poverty alleviation. Different types of farming system for livestock. Effect of environmental changes on performances of farm animals.	3
2.	Classification and description of farm animals. Important traits of a good sheep,	4

	goat, beef cattle and buffalo. Characteristics of good mutton type and wool type sheep. Common vices of farm animals.	
3.	Management systems of cattle, sheep, goat and buffaloe farm. Husbandry and management practices of beef cattle, sheep , goat and buffaloe at different stages of age. Sign of good and ill health.	5
3	**Record keeping**: Definition, types, methods, importance of different livestock farm record.	2
3	Definition, importance, procedure of Judging and selection of farm animal. Qualifications of a good judge, culling..	3
3	Feeding of farm animals for growth, meat, and wool production, supplementation strategies for milk production in smallholder livestock farmers.	4
3	Concept of different types of farm animal housing, Internal arrangement and required space of beef cattle, sheep, goat and buffalo farm. Selection of sites for a livestock farms, planning and lay-out of farm houses.	4
3	Bio-security, prevention and controlling measures of different livestock farm farms.	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1. Roy, B. and Ghosh, S. 2015. Dairy Animal Production. New India Publishing Agency, New Delhi, India.
2. ELRI Board of Consultants & Engineers. 2005. Hand-Book of Dairy Farming, Engineers India Research Institute. New Delhi. India.
3. Banerjee, G.C. 1998. A Textbook of Animal Husbandry. Oxford & IBH Publishing Company Pvt. Limited. India.
4. Padgham, J. 2006. Organic Dairy farming. Orag-Utan Press. India.
5. Leaver, J.D. 1987. Milk Production and Practices. Longman Group. United Kingdom.
6. Prasad, J. 1991. Animal Husbandry and Dairy Science. Kalyani Publishers. New Delhi. India.
7. Prasad, J. 2004. Principles and Practices of Dairy Farm Management. Kalyani Publishers. New Delhi. India.
8. Acharya, R.M. and Umar, P. 2013. Dairy Production and Business Management. Satish Serial Publishing House. New Delhi. India.
9. Etgen, W.M. and Reaves, P.H. 1975. Dairy Cattle Feeding and Management. John Wiley and Sons. New York.
10. Yapp, W.W. and Nevens, W.B. 2011. Dairy Cattle Selection: Feeding and Management. Biotech Books. New Delhi. India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1. Course Title : Farm Animal Production and Management
2. Course Code : 0841VAS124
3. **Course type** : Practical
4. Course Level : First Year Second Semester
5. Session : 2023-2024
6. Course Credit : 1
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Syed Sarwar Jahan
Professor Dr. Md. Akhtarul Islam

9. Rationale of the Course:
This is a practical course on farm animal management which covers routine works in dairy farm, casting and castration, cleaning and washing of dairy cows, utensils and equipment andgrooming, bedding, dipping,

clipping, shearing. It also describes computation of balanced rations for dairy cows, heifers and calf, judging of dairy cows, buffaloes and dairy bulls, culling of Dairy cows, Dairy farm plan, layout and prospectus for successful dairy operation, Silage and hay making for dairy animals. Further, it covers demonstration of external points of livestock. Identification, colour, descriptive markings and measurement of livestock. Therefore, after completion of this course students will know details about dairy farm planning and management with modern tools.

10. Intended Learning Objectives:

The objectives of this course are:

a) To know the management practices in the livestock farm.
b) To provide knowlwdge of ration formulation, judging procedure of dairy cows and plan and prospect of dairy farm.
c) To know silage and hay making procedure.
d) To attain knowledge about different dairy utensils and equipment and how to use of dairy records.

11. Course Learning Outcomes (CLOs) :

After the successful completion of the course, you will be able to:

CLO1: describe the livestock management practices
CLO2: explain about ration formulation, record keeping, judging of dairy cattle and plan of livestock farm.
CLO3: identify the different utensils and equipment of livestock farm.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	Routine works in livestock farms	1
1	Farm animal practices like shearing , clipping, dehorning, cleaning, washing, dipping, hoof triming	3
2	Use of record keeping of livestock farm.	2
2	Dairy farm plan, layout and prospectus for successful dairy operation.	2
2,3	Planning for year-round feeds & fodder supply in a livestock farm. Silage and hay making for animals,	1
3	Identification of utensils and equipment livestock farm.	1
3	Visit to government and private commercials farms.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1 Roy, B. and Ghosh, S. 2015. Dairy Animal Production. New India Publishing Agency, New Delhi, India.
2. ELRI Board of Consultants & Engineers. 2005. Hand-Book of Dairy Farming, Engineers India Research Institute. New Delhi. India.
3. Banerjee, G.C. 1998. A Textbook of Animal Husbandry. Oxford & IBH Publishing Company Pvt. Limited. India.
4. Padgham, J. 2006. Organic Dairy farming. Orag-Utan Press. India.
5. Leaver, J.D. 1987. Milk Production and Practices. Longman Group. United Kingdom.
6. Prasad, J. 1991. Animal Husbandry and Dairy Science. Kalyani Publishers. New Delhi. India.
7. Prasad, J. 2004. Principles and Practices of Dairy Farm Management. Kalyani Publishers. New Delhi. India.

8. Acharya, R.M. and Umar, P. 2013. Dairy Production and Business Management. Satish Serial Publishing House. New Delhi. India.
9. Etgen, W.M. and Reaves, P.H. 1975. Dairy Cattle Feeding and Management. John Wiley and Sons. New York.
10. Yapp, W.W. and Nevens, W.B. 2011. Dairy Cattle Selection: Feeding and Management. Biotech Books. New Delhi. India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First **Year** Second **Semester**

Course Outline

1. **Course Title** : **Animal Feeds & Feeding**
2. **Course code** : **0841VAS125**
3. **Course type** : **Theory**
4. **Credit** : **2**
5. **Course Level** : **First Year Second Semester**
6. **Session** : **2023-2024**
7. **Total Marks** : **100 (Final Examination 70, Class Test 20 and Attendance 10)**
8. **Course Teacher** : **Dr. Md. Akhtarul Islam, Dr. Md. Shariful Islam**

9. Rationale of the Course:
This is a fundamental course of Animal Nutrition which describes about feed nutrients, their classification, metabolic function, digestion & utilization in animal body with their natural sources. It narrates feedstuffs with their classification, rumen environment, principle of rationing and ration formulation, digestibility and nutrient value of different feeds & fodder., practicing of feeding green fodder to animal. This course also describes about the nutrient requirement at various ages/stages of animal, methods of enhancing the quality of roughages specially through urea treatment. It states the advantages and methods of green fodder preservation specially through silage and hay making.

9. **Intended Learning Objectives :**
The objectives of this course are:
a) To know different terms related to animal nutrition, relation of nutrition to other discipline of sciences, history of nutrition. scope and limitation of animal feeds & fodder.
b) To know various group and number of population of bacteria in rumen of ruminant animal and introduce feedstuffs and their classification, principle of rationing and ration formulation.
c) Introduce about the functions of digestive tracts of animals. Discuss about feeding green fodder to animal, digestion and absorption of different feed nutrient in monogastric and polylactic animal.
d) To assess the microbial protein degradation and detect the non-protein nitrogen in feedstuffs.
e) To learn the nutrient requirement at various stages of animal and technique of silage and hay making.

10. **Course Learning Outcomes (CLOs) :**
Upon completion of the course, students will be able to:
CLO1. Understand different feeds & their nutrients.
CLO2. Obtain knowledge about digestion and utilization of nutrients.
CLO3. Gather knowledge about feedstuff, nutrients requirement of animals & rumen microbes.

12.Mapping of CourseLearningOutcomes(CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	Definition and scope of nutrition, its relation to other discipline of sciences. History and its development.	3
1	Classification of food nutrients and their sources, Terms related to animal feeds & feeding.	3
2	Metabolic functions and deficiency symptoms of CHO, protein, fat, vitamin, mineral & water with their sources.	5
2	Rumen environment, digestion and utilization of carbohydrate, protein and fat in monogastric and poly gastric animal.	6
2	Feedstuffs and their classification with examples.	2
2	Principle of rationing and ration formulation.	3
3	Digestibility and nutrient value of different feeds & fodder. Practices of feeding green fodder to animals	4
3	Nutrient requirement in animals at various stages of growth, reproduction and production.	3
3	Factors affecting digestibility of roughages especially green fodder. Methods of enhancing the quality of roughages specially through urea treatment. Silage and hay making.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. D.V. Reddy. 2018. Principles of Animal Nutrition & Feed Technology. 3rd Edn. Oxford & IBH. India
2. G.C. Banerjee. 1988. Feeds and Principles of Animal Nutrition. Oxford & IBH. India.
3. G.C. Banerjee. 2018. Principles of Animal Nutrition and Feeds. Oxford & IBH. India.
4. P. McDonald, J.F.D. Greenhalgh, C.A. Morgan, R. Edwards, L. Sinclair and R. Wilkinson. 2012. Animal Nutrition. Pearson Education, UK.
5. T.M. Prabhu and K. Chandrapal Singh. 2013. Analytical Techniques in Animal Nutrition Research. New India Publishing Agency. India.
6. W. Guoyao. 2017. Principles of Animal Nutrition. Taylor & Francis

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First **Year** Second **Semester**

Course Outline

1. **Course Title** : Animal Feeds and Feeding
2. **Course code** : 0841VAS126
3. **Course type** **:** Practical
4. **Credit** : 1
5. **Course Level** : First Year Second Semester
6. **Session** : 2023-2024
7. **Total Marks** : 100 (Final Examination70, Class Test 20 and Attendance 10)
8. **Course Teacher** : Prof. Dr. Md. Akhtarul Islam, Prof. Md. Shariful Islam

9. Rationale of the Course:

This is a practical course of Animal Nutrition which describes definition & related terms of animal nutrition and feeding, introduction to various types of feed ingredients and fodder crops, their nutrient value used in animal ration. It also entitles preparation and formulation of hand mixed ration & balanced ration for various types of animals. It deals with practices of preparation of feed sample for nutritional analysis. Practicing Proximate analysis of feedstuffs and different fodder crops cultivation. Therefore, this course provides students the fundamental knowledge on animal feeds and fodder processing & preservation technique. It aids students to know how to make economic balanced ration for profitable animal production.

10. Intended Learning Objectives:

The objectives of this course are:

a) To know different terms related to animal nutrition and feeding; various types of feed ingredients and fodder crops used in animal ration in Bangladesh.
b) To know the methods of preparation of feeds and fodder sample for nutritional analysis
c) To introduce with practices of fodder crops cultivation, collection & feeding technique.
d) To gain knowledge on preparing silage and hay for green fodder preservation.
e) To achieve Gain practical experiences & techniques of ration formulation for different ages/stages of animals.

11. **Course Learning Outcomes (CLOs) :**

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

CLO1. describe practically about the various feeds & fodder, sample preparation for nutritional analysis etc.
CLO2. explain fodder crops cultivation practically including collection, feeding and preservation.
CLO3. formulate the ration for different ages/stages of animal.

12.Mapping of CourseLearningOutcomes(CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

12. **Lesson plan**

CLOS	Course Content	Lectures
1	Introduction to various feed ingredients and fodder crops used in animal ration with their nutritive value.	3
1	Demonstration of various feed ingredients and fodder crops for animal. Identification of different animal feed ingredients & fodder crops.	3
1	Preparation of feeds and fodder sample for nutritional analysis	2
2	Introduction of Kjeldahl machine and principle of proximate analysis of feedstuffs	2
2	Fodder crops cultivation technique	2
3	Silage and hay preparation technique	3
3	Ration formulation for different ages/stages of animal.	2

14. **Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. A. Sahoo, S.K. Sankhyan, S.A. Karim. 2015. Techniques in Animal Nutrition Research. Satish Serial Publishing House. India.
2. D.V. Reddy. 2018. Principles of Animal Nutrition & Feed Technology. 3rd Edn. Oxford & IBH. India.

3. G.C. Banerjee. 2018. Principles of Animal Nutrition and Feeds. Oxford & IBH. India.
4. P. McDonald, J.F.D. Greenhalgh, C. A. Morgan, R. Edwards, L. Sinclair and R. Wilkinson.2012. Animal Nutrition. Pearson Education, UK.
5. T.M. Prabhu and K. Chandrapal Singh. 2013. Analytical Techniques in Animal Nutrition Research. New India Publishing Agency. India.
6. W. Guoyao. 2017. Principles of Animal Nutrition. Taylor & Francis

Outcome based Education (OBE)Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year Second Semester

Course Outline

1.	**Course Title**	**:**	Computer Applications
2.	**Course Code**	**:**	0611VAS128
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	First Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 Marks (Final Examination 60, Class Test 30, Attendance 10)
8.	**Course Teachers**	**:**	Prof. Dr. Moizur Rahman Prof. Dr. Md. Golbar Hossain

9. Rationale of the Course:
This course is designed to developessential knowledge and skills to use modern ICT tools in daily life and occupational tasks. The goal is to familiarize and reinforce students understanding of computer applications including uses of operating system, word and image processing, spreadsheets, database,presentation and integrated applications. Students will also apply effective oral and written communication techniques along with proper computer applications strategies.

10. Intended learning Objectives:
The objectives of this course are:
a) To know basics of computer (hardware components: input, processing, output, and storage) with their functions.
b) To describe the major operating system functions and demonstrate usage of operating system services to include: disk management, file management, and memory management.
c) To identify, discuss and use important categories of application software: word processing, spreadsheet, database management, and presentation graphics.

11. Course Learning Outcomes (CLO):
After successful completion of the course, students will be able to
CLO 1. identify different components/devices of hardware and software with their usages.
CLO2. work with standard application softwares to analyze data, process image for presentation/publication artworks, combine text and graphics to create publications such as newsletters, brochures, flyers and special forms.
CLO3. recognize issues associated with ethical use of computer and computer security and troubleshoot system and applications.

12. Mapping of CourseLearningOutcomes(CLO) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	1	3	2		
CLO2	2	3	2		
CLO3					2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

12. Lesson Plan

CLOs	**Course Contents**	**Lectures**

1	Computer fundamentals: hardware (input, processing, output, and storage).	1
2	Operating system: function, disk management, file management, and memory management.	1
2	Application software: word processing, spreadsheet, and database management.	2
2	Application software: presentation graphics/publication art work (PowerPoint, Adobe Illustrator)	3
2	Application software: image editing (Adobe Photoshop, GIMP2)	3
2	Application software: data analysis (Excel, SPSS)	3
3	Computer ethics and security, troubleshooting systems and applications.	1

13. Teaching-learning strategies:

Lecture, presentation, handout, hands on training, individual/group project, and home assignment. Students will be expected to talk with peers and take help from online resources (youtube, etc.).

14. Assessment strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading:

1. France S. Computer Science. 5th Edition.
2. Office XP reference manual.
3. Windows manual.-

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	:	Comparative Anatomy and Neuro Anatomy
2.	**Course Code**	:	0841VAS20**2**
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Second Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 60, Class Test 30, Attendance 10)
8.	**Course Teachers**	:	Prof. Dr. Shah Md. Abdur Rauf Professor Dr. Royhan Gofur

9. Rationale of the Course:
Comparative anatomy helps to study the anatomy of all organs of all domestic animals in a shorter period of times by comparative basis. Therefore, this course provides knowledge to identify species and meat adulteration by observing their bones and visceral organs. It provides clear idea about topography of the organs and their relations which are important for diagnosis, surgery. Neuro anatomy provides knowledge on structures of brain and spinal cords, course and distribution of peripheral nerves thus help students to perform anesthesia and surgery.

10. **Intended learning Objectives (ILOs):**

a. To know the anatomy of the bones and visceral organs of domestic animals with special emphasis to horse, cattle, buffaloes, sheep, goat, dog, cat and birds by comparative basis.
b. To know details structures of brain and spinal cords.
c. To know the origin, course and distribution of cranial and spinal nerves of the domestic animals.

11. **Course** L**earning** O**utcome**s (CLOs)**:**
After the completion of this practical course, students will be able to-
CLO1. identify and characterize the bones and visceral organs of different domestic animals.
CLO2. identify species of animals by observing the bones and visceral organs and meet adulteration.
CLO3. have clear idea about central nervous system, course and distributions cranial and spinal nerves.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	1	3	2	1	×
CLO2	1	3	2	1	×
CLO3	1	3	2	1	×

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. **Course Contents:**

CLOs	**Course Contents**	**Lectures**
1,2	Comparative study of axial skeleton of domestic animals (Horse cattle, buffaloes, sheep, goat, dog, cat and birds) Comparative study of appendicular skeleton of domestic animals	5
1,2	Comparative study of the organs of the digestive systems of the domestic animals. Comparative study of the organs of the respiratory systems of the domestic animals. Comparative study of the organs of the uro-genital, lymphatic and endocrine systems of the domestic animals.	5
3	Details study on the structures of brain and spinal cord grossly and radiographically.	3
3	Origin and distribution of cranial nerves.	3

	Origin course and distribution of and spinal nerves Formation and distribution of brachial plexus and lumbosacral plexus	

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Anatomy of the sheep, By Neil, D.S May, 2nd ed. 1970 Brisbane, University of Queensland.
2. Anatomy of the Dog. By Miller, M.E. 1964. W.B. Saunders co. Philadelphia.
3. Anatomy of ox. ICAR publication 1sted. New Delhi
4. Bovine Anatomy, By W.M. McLeod, 2nded, 1964. Burgers publishing co.
5. Session and Grossman's The Anatomy of the Domestic Animals, vol. 1 and 2 By Robert Getty, 1975, W.B. Saunders co. Philadelphia.
6. Text book of veterinary Anatomy 4thed, Dyce, KM.,Sac,WO and Wensing,C.J.G 2009Saunders co. UK
7. Primary Veterinary Anatomy by Ronjit Kumar Gosh 5th ed, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	:	Systemic and Nutritional Physiology
2.	**Course Code**	:	0841VAS203
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Second Year first Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. S.M.Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course :

This is a Preclinical course of medical science which acquainted with systemic physiology, and various physiological functions. Therefore, this course provides students the foundation knowledge on digestive, respiratory, urinary, nervous, muscular system and temperature regulation in animal body.

10. Intended Learning Objectives (ILOs):

a. To understand and be able to explain the Veterinary systemic Physiology and scope of systemic physiology.
b. To know the functions of different system and especially digestive, respiratory, urinary, nervous, muscular system and temperature regulation
c. To help understandings related subjects of veterinary science like Anatomy, pathology, surgery and medicine etc.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1. Relate the knowledge about the physiological activities of different parts of gastrointestinal tract (GIT) and accessory organ and relate knowledge about the mechanisms of digestion, absorption and mechanism of various food particles in both simple and compound stomached animals.

CLO2. Know the nervous system and regulation nervous system. Relate the knowledge about respiratory, urinary and muscular system mechanism and regulation. Know how animals regulate temperature in hot and cold condition.
CLO3. explain the process of uptake of different nutrients, their functions and deficiency symptoms. .

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	2	2
CLO2	2	2	2	2	2
CLO3	1	3	1	1	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLO	Course Contents	Lectures
1	Definition of digestive system, food, nutrient, nutrition, digestion and its functions, its importance, Structure of digestive tract in ruminants and non-ruminant, factors of digestion (mechanical-prehension, mastication, deglutition, rumination etc., chemical and microbial factors).	3
1	Digestive juices (saliva, gastric juice, pancreatic juice, intestinal juice, bile), Mechanism of secretion of HCl, pepsin and mucous, regulation of gastric juice secretion.	3
1	Pancreatic juice with composition, function and nervous and hormonal regulation of pancreatic juice secretion, Intestinal juice with composition, mechanism of secretion, regulation and function of succus entericus	3
1 1	Bile with composition, function, pathway of bile secretion, bile acids, bile salts, functions of bile salts, mechanism of emptying of gall bladder and regulation of bile, gall stone and effects of cholecystectomy.	2
1	Describe the digestion in ruminants- the ruminant ecosystem, rumen microorganisms and rumen P^{H}., Microbial digestion of carbohydrate, protein and fat.	3
2	Define and classification of nervous system, reflex Arc. Synapse, Chemical control of nervous system, Peripheral chemoreceptor system, Chloride shift and reverse chloride shift.	2
2	Define respiration, steps, types and function of respiration and breathing apparatus, Understand the mechanism of respiration. Describe the diffusion of the respiratory gases (O_2 and CO_2), Factors affecting diffusion, Describe avian respiration and role of air sac	2
2	Describe the structure and functions of urinary system, mechanism of urine formation, Regulation of water excretion and blood volume by kidney, Describe the counter current system	2
3	Define muscle, types, characteristics, functions of muscle, properties of muscle, organization of striated skeletal muscle, and types of contraction.	1
3	Define Homeothermic animal, poikilothermic animal, hibernation, body temperature, gradient of temperature, rectal temperature, core temperature, shell temperature, sites for measuring body temperature, diurnal variations, heat balance and critical temperature.	2
1, 2, 3	Sites, routes and mechanism of absorption and absorption of carbohydrate, protein, fat, vitamin, mineral.	3
3	Metabolism of carbohydrate, Nutrient exchange and utilization by body tissues, Disorder of carbohydrate metabolism, Factors affecting the carbohydrate, protein and fat metabolism.	3
3	Fat and Water-Soluble Vitamins, their sources, functions and deficiency symptoms in animals and birds.	1
3	Major (Calcium, Phosphorus, Magnesium, Sodium, Potassium, Sulphur) and trace (Iron, Copper, Cobalt, Manganese, Zinc) elements-their sources, functions and deficiency symptoms in animals and birds	1

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Dukes H.H. (1977). Duke's Physiology of Domestic Animals. 11th edition. Cornell University Press.
2. Langley L.L (1971). Review of Physiology. 3rd edition. Mac-Graw Hill.
3. Sharma I.J., Sing H.S (2000), Students Laboratory Manual of Veterinary Physiology. 1st edition. Kalyani Publishers.
4. Guyton A.C., Hall J.E (2006). Text book of Medical Physiology. 11th edition. Elsevier Saunders.
5. Bhattacharyya B. (2000). Text book of Veterinary Physiology. 1st edition. Kalyani Publishers.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	:	Systemic and Nutritional Physiology
2.	**Course Code**	:	0841VAS204
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Second Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	**1**
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. S.M. Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course:
This is a practical course of systemic physiology which acquainted with procedure of rumen liquor collection basic clinical test of urine. It helps students to know about urine routine and abnormal urine examination.

10. Intended Learning Objectives (ILOs):
a) To identify the collection site of rumen liquor, collection process of the rumen liquor and its preservation procedure.
b) To know the basic clinical tests of urine.
c) To analyze the urine for abnormal constituents and to help understandings related subjects of veterinary science like pathology, and medicine etc.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: determine the various physical status of rumen liquor.
CLO2: understand the protozoal motility in rumen liquor and identify the digestive condition in ruminants
CLO3: to collect and preserve urine and to perform routine test for urine.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	2	2	2	1
CLO2	1	2	2	2	1
CLO3	1	3	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1, 2	Determine the various physical, chemical, pH status of rumen liquor, Determine the protozoal motility in rumen liquor and identify the digestive condition in ruminants. .	4
1	Determine the total volatile fatty acids in rumen liquor, Understand the carbohydrate and protein digestion condition in ruminants, Estimate the ammonia level in rumen liquor.	4
3	Collect urine as clinical samples in aseptic way, Preserve urine sample for further	7

	analysis, Understand about the basic clinical tests of urine, Determine specific gravity of urine	
3	Estimate the Chloride, sulphate, phosphate, uric acid and creatinine in urine as normal constituents and glucose, albumin, acetone, calcium, blood in urine as abnormal constituents.	7
3	Microscopic examination of urine	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Dukes H.H. (1977). Duke's Physiology of Domestic Animals. 11th edition. Cornell University Press.
2. Langley L.L (1971). Review of Physiology. 3rd edition. Mac-Graw Hill.
3. Sharma I.J., Sing H.S (2000), Students Laboratory Manual of Veterinary Physiology. 1st edition. Kalyani Publishers.
4. Guyton A.C., Hall J.E (2006). Text book of Medical Physiology. 11th edition. Elsevier Saunders.
5. Bhattacharyya B. (2000). Text book of Veterinary Physiology. 1st edition. Kalyani Publishers.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	**:**	General Parasitology and Platyhelminthes
2.	**Course Code**	**:**	0841VAS 205
3.	**Course**	**:**	Theory
4.	**Course Level**	**:**	Second Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	2
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Moizur Rahman Professor Dr. Lovely Nahar

9. Rationale of the Course
General Parasitology and Platyhelminthes, a theoretical paraclinical course, describes the basic concepts of parasitology including the history, nomenclature, terminology, host-parasite relationship, harmful effects of parasites on host, general morphology, basic life cycle, transmission, distribution, epidemiology of parasites etc. This section provides the fundamental understanding on parasitology and parasites. The student will be familiar with basic concepts related to host parasite relationship and others. Platyhelminthes section describes the general morphology, biology, epidemiology, life cycle, pathogenic significance, control etc. of different Platyhelminth (trematode and cestode). The knowledge achieved in this course helps students to understand the platyhelminthic infection in domestic, wild animals and birds. Application of knowledge achieved by learning this course will provide insight for parasitic disease diagnosis and its control which have great impact on livestock development and animal welfare.

10.Intended learning Objectives (ILOs):
The objectives of this course are:

a. To describe the basic understanding of the history, nomenclature, classification of parasites and hosts.
b. To provide knowledge on animal associations, general biology, transmission, general injurious effects and immune mechanisms of parasites.
c. To be familiar with general therapeutic approach and control strategies against parasitic infection.
d. To know the taxonomy, ecology, epidemiology, morphology, transmission cycle, pathogenic significance and control of trematodes of veterinary importance.

e. To know the taxonomy, ecology, epidemiology, morphology, transmission cycle, pathogenic significance and control of cestodes of veterinary importance.

11. Course Learning Outcomes (CLO):

At the end of the course, students will be able to:

CLO 1: describe the history of Parasitology, hosts and parasites, animal associations, source and mode of parasitic infections, injurious effects and immune mechanisms involved in parasitic infections.

CLO 2: enumerate the general morphology, general life cycle, transmission, ecology, distribution and general therapeutic and control strategies of major parasites in Bangladesh.

CLO 3: explain the taxonomy, ecology, morphology, specific life cycle pattern, transmission and harmful effects and control of Platyhelminthes of veterinary importance.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	General concepts (Definition and classification of parasites and hosts, zoological nomenclature, history of Parasitology, evolution of parasites, and animal associations)	4
1,2	Ecology and geographical distribution of parasites	1
1,2	Host and organ specificity of parasites, susceptibility, immunity and resistance of hosts to parasites	2
1,2	Sources of parasitic infections and mode of transmission	1
1,2	General morphology, life cycle, transmission of parasites and their injurious effects on hosts	3
2	General therapeutic approach and control of economically important parasites	1
2, 3	Taxonomy, morphology, life cycle, transmission and effects of trematodes on animals and birds	8
2, 3	Taxonomy, morphology, life cycle, transmission and effects of cestodes on animals and birds.	8

14. Teaching-learning strategy: Lecture, demonstration, Q-Card, Flash Card, audio-visual discussion, presentation, discussion, question answering, feedback etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists:

1. Cheng, T. C. 1986. General Parasitology. 2nd edn. New Delhi, India, Academic Press Inc., USA.
2. E. J. L. Soulsby (2012) Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
3. Urquhart G. M. et. al. (1996) Veterinary Parasitology. 2nd edn. (Blackwell).
4. Taylor et. al. (2016) Veterinary Parasitology. 4th edn. (Wiley Blackwell).
5. Rahman MH et. al. (1996) Introduction to Helminth Parasites of Animals and Birds in Bangladesh. 1st edn. (Sheba printing Press, Dhaka, Bangladesh).
6. Mehlhorn H (1988) Parasitology in Focus: Facts and Trends. 1st edn. (Springer-Verlag, Berlin).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	**:**	General Parasitology and Platyhelminthes
2.	**Course Code**	**:**	0841VAS 206
3.	**Course**	**:**	Practical
4.	**Course Level**	**:**	Second Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Moizur Rahman Professor Dr. Lovely Nahar

9. Rationale of the Course:

General Parasitology and Platyhelminthes, a practical para-clinical course, primarily describes basic principles of biosafety in laboratory work, requirements of a parasitology laboratory and the preparation and usages of common laboratory reagents, solutions etc.. This course also provides knowledge on common techniques applied in identification/ diagnosis of parasites/parasitic infections which includes qualitative and quantitative fecal sample examination, blood examination, skin examination etc. The students will also understand the method of detection of nematode larvae from pasture/faeces by Baermann's Technique and post mortem examination of animals and birds to recovered the parasites. Platyhelminthes section will be helpful for the identification of eggs, larvae and adult trematode and cestode of veterinary importance which are essential for future clinical courses to diagnose the helminthic infections and to take the proper therapeutic and control approach.

10. Intended learning Objectives (ILOs):

a) Basic understanding on biosafety in laboratory work, common laboratory instruments, reagents/solutions used in parasitological examination.
b) To be familiar with common laboratory techniques (Qualitative and Quantitative faecal sample examination, blood examination, skin examination etc.).
c) Understanding the procedures of collection, processing. preservation and shipment of parasitic samples.
d) Identification and preparation of permanent slides of eggs, larvae and adult trematodes of veterinary importance.
e) Identification and preparation of permanent slides of eggs, larvae and adult cestodes of veterinary importance.

11. **Course Learning Outcomes (CLO):** At the end of the course, students will be able to:

CLO1. explain the laboratory biosafety, commonly used instruments/appliances, laboratory reagents/solutions, their preparation and uses.
CLO2. describe the procedures of sample collection, preservation, shipment and apply the techniques for different parasitological examination
CLO3. identify as well as distinguish the eggs, larvae and adult trematode and cestode of animals and birds and able to prepare the permanent slide.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. **Course Contents:**

CLOs	Course Contents	Lectures
1	Introduction with the common equipment's, appliances, chemicals and reagents used in parasitological studies	2
2,3	Sample collection (feces, blood, skin scrapping, larvae, adult worms), preservation, shipment	1
2	Examination techniques (Direct smear, Sedimentation, Floatation and Centrifugation, McMaster and Stoll's ova counting, Mini-FLOTAC, Baermann's Technique, Blood and skin examination techniques and others)	3
3	Identifications of eggs, larve and adults (gross and microscopic) trematode of animals and birds	4
3	Identifications of eggs, larve and adults (gross and microscopic) cestode of animals and birds	3
3	Preparation of permanent slides of trematode and cestode of animal and birds.	2

14. Teaching-learning strategy: Lecture, demonstration, Q-Card, Flash Card, audio-visual discussion, presentation, discussion, question answering, feedback etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists:

1. E. J. L. Soulsby (2012) Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
2. Urquhart G. M. et. al. (1996) Veterinary Parasitology. 2nd edn. (Blackwell).
3. Taylor et. al. (2016) Veterinary Parasitology. 4th edn. (Wiley Blackwell).
4. Rahman MH et. al. (1996) Introduction to Helminth Parasites of Animals and Birds in Bangladesh. 1st edn. (Sheba printing Press, Dhaka, Bangladesh).
5. Mehlhorn H (1988) Parasitology in Focus: Facts and Trends. 1st edn. (Springer-Verlag, Berlin).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1. Course Title **:** General Microbiology and Hygiene
2. Course Code **:** 08412VAS207
3. Course Type **:** Theory
4. Course Level **:** Second Year First Semester
5. Session **:** 202**3**-202**4**
6. Course Credits **:** 02
7. Total Marks **:** 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. Course Teachers **:** Prof. Dr. K. M. Mozaffor Hossain and Prof. Dr. Mst. Ismat Ara Begum

9. Rationale of the Course:
This course is consisted of the basic of medical and veterinary medicine microbiology. The course contains fundamentals of microbiology and hygiene. It contains the definitions, classes, and properties of bacteria, virus, fungus, chlamydia, rickettsia and mycoplasma. More emphasis on bacteria includes virulence factors, host pathogen relationship. Better understanding of the general microbiology will correlate with best hygienic practices in individual and livestock farming industries.

10. Intended Learning Objectives (ILOs):

a. To learn about the definition, types and characteristics of bacteria and viruses.
b. To understand the basic factors and mechanism of disease producing capacity of bacteria and other organisms.
c. To implement the knowledge of microbiology in health and hygienic measure of individual and livestock industry.

d. To help disease diagnosis and prevention strategy through isolation identification and characterization of microorganism.
e. To introduce with the measures to be followed to control infectious and contagious diseases usually affecting livestock.

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:

CLO1: realize that different Microorganisms are present in our environment and are causing diseases as well as some hygienic measurements should be taken for keeping sound health on human and animals.

CLO2: know the physiological, biochemical and pathological characteristics of different microbes.

CLO3: understand a relationship between livestock with their environment.

13. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	1	1	3	1
CLO2	2	1	3	1	1
CLO3	1	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction, importance and scope of microbiology History of microbiology Development and concepts of microbiology with special emphasis on bacteria. Definition and general properties of bacteria. Differentiation of prokaryote from eukaryote.	4
1	History of virology Definition, general properties of virus Differentiation of virus from other microorganisms	2
2	Composition and functions of viral structures. Antigenic determinants or epitopes	3
2, 3	Factors influencing virulence. Mechanisms of infection.	2
2, 3	Pathogenic microorganisms and their relationship to diseases Koch's postulate.	3
2, 3	Exotoxin and endotoxin Mode of action of Exotoxin and endotoxin Exotoxin, endotoxin and their effect on host tissues	3
3	Development of antitoxins Role of antitoxins against toxins.	3
3	Soil, air, water, ventilation, and housing on animal and poultry health	2
1,3	Cleaning and disinfections of poultry houses and equipments, disinfectants and their applications, fumigation and its importance. Bio-security and bio-safety of livestock, poultry, and laboratory animals. Hygienic measures for the prevention and control of infectious and contagious diseases of livestock and poultry.	4

14. Teaching strategies:

Lecture, Open discussion, Group discussion, Audio visual, Question and answer.

15. Assessment Strategies:

In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Kumar, H. D. 2000. Molecular biology. 2nd edn. Vikas Publishing House, Pvt. Ltd.
2. Dale, J. W. 1998. Molecular genetics of bacteria. 3 edn. John Wiley and Sons Inc., New York.

3. Buxton, A and Frazer, G. 1977. Animal Microbiology. Vol.1. Blackwell Scientific Publication.
4. Thapliyal, D. C. 1996. Fundamental of Animal Hygiene and epidemiology. 1st edn. International Book Distributing Co.
5. Carter, G. R and Wise J. Darla. 2004. Essentials of Veterinary Bacteriology and Mycology. 6th edn. Iowa State Press, USA.
6. Songer, J. Glenn and Post, W. Karen. 2005. Veterinary Microbiology: Bacterial and Fungal agents of Animal Disease. 1st edn. Elsever Saunders Publication, China.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1. Course Title **:** General Microbiology and Hygiene
2. Course Code **:** 0841VAS208
3. Course Type **:** Theory
4. Course Level **:** Second Year First Semester
5. Session **:** 202**3**-202**4**
6. Course Credits **: 01**
7. Total Marks **:** 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. Course Teachers **:** Prof. Dr. K. M. Mozaffor Hossain and Prof. Dr. Mst. Ismat Ara Begum

9. Rationale of the Course:
This course is designed for understanding the preparation of media, staining techniques, isolation, and identification of bacteria. Determination of health by external appearance (signs of health) of livestock and poultry. Methods for recording temperature, pulse, and respiration of livestock and poultry. Methods for administration of drugs. Methods of sterilization. Sanitation of animal and poultry farms and hatcheries. Common practices for bio-security and bio-safety measures. Demonstration of carcass disposal methods.

10. Intended Learning Objectives (ILOs):

a. To learn about properly preparation and observing specimens for examination using microscopy.
b. To understand the use of pure culture as and selective techniques and to isolate microorganisms, appropriate methods to identify microorganisms (media-based, molecular and serological).
c. To learn appropriate microbiological and molecular lab equipments and methods
d. To determine the health of by external appearance (signs of health) of livestock and poultry and learn the methods for administration of drugs.
e. To learn the techniques for recording temperature, pulse, and respiration of livestock and poultry and the practices of the sanitation of animal and poultry farms and hatcheries.

11. Course Learning Outcome (CLOs):
After completion of this course, students will be able to:
CLO1: Use appropriate microbiological laboratory equipments and methods, appropriate methods to identify microorganisms, staining of bacteria, pure cultures, selective techniques and isolation of microorganisms.
CLO2: Determine the health by external appearance, temperature, pulse, and respiration of livestock and poultry
CLO3: Apply different drugs, provide proper sanitary, hygienic and biosecurity measures to animal and poultry farms and hatcheries for controlling infectious and contagious diseases.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	1	1	3	1
CLO2	2	1	3	1	1
CLO3	1	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction to different Microbiology laboratory equipments with their uses	1
1	Staining techniques, Microscopic visualization of Bacteria, Preparation of media	5
2	Determination of health by external appearance (signs of health) of livestock and poultry.	2
2	Methods for recording temperature, pulse, and respiration of livestock and poultry.	2
3	Methods for administration of drugs.	2
3	Sanitation of animal and poultry farms and hatcheries. Common practices for bio-security and bio-safety measures.	2
3	Demonstration of carcass disposal methods.	2

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

7. R.P. Singh. Basic Microbiology and Control of Microorganisms
8. Monica Cheesbrough.Medical laboratory manual for tropical countries
9. Buxton, A and Frazer, G. 1977. Animal Microbiology. Vol.1. Blackwell Scientific Publication.
10. Thapliyal, D. C. 1996. Fundamental of Animal Hygiene and epidemiology. 1st edn. International Book Distributing Co.
11. Carter, G. R and Wise J. Darla. 2004. Essentials of Veterinary Bacteriology and Mycology. 6th edn. Iowa State Press, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1	**Course Title**	:	General Pathology
2	**Course Code**	:	0841VAS209
3	Course Type	:	Theory
4	**Course Level**	:	Second Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	2
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	1. Dr. Md. Golbar Hossain 2. Dr. Afia Khatun

9. Rationale of the Course:
General Pathology is a core course of Veterinary Medicine and provides fundamental principles of disease involving basic alteration of cells, tissues, organs or body fluids due to different etiological agents. This includes study of disease mechanisms via an introduction to cell degeneration, necrosis, gangrene, infarct, inflammation, disturbances of circulation and growth.

10. Intended Learning Objectives (ILOs) (Maximum of 5 ILOs):
The objectives of this course are:

a. To acquire knowledge on the terminology related to altered cells, tissues, molecules and body fluids.
b. To gain knowledge on various types of extracellular and intracellular deposition and degeneration.
c. To understand the causes and processes of development of basic alterations of cells, tissues, organs and body fluids.

d. To know the various disturbances of growth and circulations of animals.
e. To gain knowledge on changes/alteration of tissues and body fluid in response to injury and their effects.

11. Course Learning Outcomes (CLOs):

After successful completion of the course, students will be able to-

1. understand the definition, classification, pathogenesis, gross and microscopic lesions using appropriate terminology.
2. describe the causes and mechanisms of cell injury and explain the basic alterations of cells, tissues, organs and body fluids in different organ systems.
3. understand the abnormalities of growths and circulations and explain the host responses to tissue injury with their consequences.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	2	×	1
CLO2	×	3	×	2	1
CLO3	×	3	2	1	×

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Content	Lectures
1,2	**Introduction and general:** Definition, scope and purpose of pathology, branches of Pathology, terminology: biopsy, pathognomonic lesion, morbid lesion, cell injury, cell death, necrosis and necrobiosis	2
1,2	**Introduction and general:** Difference between apoptosis and accidental cell death, causes of cell death and cell injury, mechanism/pathogenesis of hypoxic cell death, changes in the organelles after death of the cell. Description of cell death induced by free radicals, exogenous chemicals and viruses	2
1, 2	**Introduction and general:** Gross and microscopic characteristics / features of necrotic cells and tissues, gross and microscopic difference of necrosis from postmortem autolysis, definition, types, occurrence, causes, gross and microscopic appearance of different types of necrosis, fate of necrotic tissue.	2
1, 2	**Introduction and general:** Definition, types and causes of gangrene, gross and microscopic characters of different types of gangrene, significance and effect of gangrene, definition, types and causes of infarct, gross and microscopic characters of different types of infarcts, description of special type of infarcts	2
1, 2	**Intracellular and Extracellular deposition/degeneration:** Definition, causes, occurrence, gross and microscopic character, and pathogenesis of fatty change, Extracellular fat deposition, fatty infiltration and fatty degeneration in the myelin, Occurrence, causes, gross and microscopic character of glycogen deposition, special stain of glycogen, different types of glycogen storage diseases	2
1, 2	**Intracellular and Extracellular deposition/degeneration:** Intracellular accumulation of protein, description of different types of lysosomal storage diseases, extracellular deposition of protein: amyloidosis, albumins and albuminous fluids and fibrin, definition, classification, gross, microscopic character and pathogenesis of amyloidosis, definition, gross and microscopic character of albumins, definition, occurrence, gross and microscopic character, significance and fate of fibrin	2
1, 2	**Mineral deposits and pigments:** Definition and types of calcifications, definition, classification, causes, occurrence, gross and microscopic character and significance of different types of pathologic calcification, definition, causes, occurrence, microscopic character and significance of pathologic ossification	2
1, 2	**Mineral deposits and pigments:** Definition, classification, causes and significance of gout, definition of pseudogout, description of exogenous pigments (from outside the body), (Carbon, Dust, Metals, Tattoos, Kaolin, Carotenoids), description of endogenous pigments (from inside the body)	1

	(Phenolic pigments, Haematogenous pigments, Lipogenic pigments, miscellaneous pigments), DOPA reaction, Fate of RBC	
1, 2	**Mineral deposits and pigments:** Definition and type of Jaundice, causes, pathogenesis, comparison and diagnosis of different types of Jaundice, definition and types of photosensitizational dermatitis, lipogenic pigment, lipofuscin, ceroid and miscellaneous pigments	2
1, 2, 3	**Disturbances of growth:** Description the following terminologies: aplasia, hypoplasia, atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia, anaplasia, neoplasia, metastasis, tumor immunity	2
1, 2, 3	**Disturbances of growth:** Description of criteria of differentiating benign and malignant neoplasm, nomenclature of neoplasia, in vitro properties of tumor cells	2
1, 2, 3	**Disturbances of circulation:** Description of the thrombosis, embolism, coagulation, failure to clot, hyperemia and congestion, definition, types causes and effect of hemorrhage, definition, causes, gross, microscopic appearance and mechanisms of oedema, definition, classification, causes and lesions of shock	1
1, 2, 3	**Inflammation and repair:** Definition and classification of inflammation, irritants/injurious agents of inflammation, cardinal signs of inflammation	1
1, 2, 3	**Disturbances of growth:** Description of vascular and cellular events of inflammation, description of chemical mediators of inflammation, Name of cell associated chemical mediators and cells of inflammation, description of regeneration, repair and fever	1
1, 2, 3	**Immunopathology:** Definition of immunology, immunity and immunopathology, description of antigen, antibody, anamnestic response and immune effector of mechanism, definition and types hypersensitivity	1
1, 2, 3	**Immunopathology:** Definition and example of autoimmunity, autoimmune disease, definition, classification and example of immunodeficiency, description of clonal selection theory of antibody production	1

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

d. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
e. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
f. **Final exam:** The final exam will cover both theory and practical components and will include written test.

Suggested Reading Lists:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th Williams and Wilkins, Philadelphia, USA.
2. Majno G and Joris I. 1996. Cells, Tissues and Disease: Principles of General Pathology. Blackwell Scientific Publications, London, UK.
3. Curran RC. 1981. Colour Atlas of Histopathology. 2nd edn. Harvey-Miller Publishers, London, UK.
4. Van Dijk JE, Gruys E, Mouwen JMVM. 2007. Colour Atlas of Veterinary Pathology: General Morphological Reactions of Organs and Tissues. 2nd edition. Saunders Elsevier.
5. Bancroft JD And Gamble M. 2007. Theory and practice of histological techniques, 6th edn. Churchill Livingstone, Landon, UK.
6. Maxie G. 2007. Jubb, Kennedy & Palmer's Pathology of Domestic Animals: Volume 1, 2 and 3. 5th edn. Saunders Ltd., Philadelphia, USA.
7. Mills SE. 2012. Histology of Pathologists. 4th edn. Lippincott Williams & Wilkins, Philadelphia, USA.
8. Bacha WJ and Bacha LM. 2012. Colour Atlas of Veterinary Histology. 3rd edition. Wiley-Blackwell.
9. Tizard IR. 2012. Veterinary Immunology. 9th edition, W. B. Saunders Co, London, UK.

Second Year First Semester

Course Outline

1	**Course Title**	:	General Pathology
2	**Course Code**	:	0841VAS210
3	**Course Type**	:	Practical
4	**Course Level**	:	Second Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 60, Class Test 30, Attendance 10)
8	**Course Teachers**	:	1. Dr. Md. Golbar Hossain 2. Dr. Afia Khatun

9. Rationale of the Course:

General Pathology is a core discipline in veterinary medicine. Students will learn general principles about the processes involved in disease. The course will contribute to the students' achievement in understanding fundamental principles of disease and recognizing disease states across the range of species, focusing upon domestic animals.

10. Intended Learning Objectives (ILOs):

a. To the process of collection, fixation and storage of tissues/organs for pathological investigation and preparation of permanent slide.
b. To recognize various basic alterations of molecules, cells, tissues, organs and body fluids.
c. To understand and explain the pathogenesis and pathology of the disease or disease condition.
d. To identify the various disturbances of growth and circulations of animals
e. To recognize various lesions due to host responses against injurious agents with their consequences

10. Course Learning Outcomes (CLO):

After successful completion of the course, students will be able to-

1. process tissues for museum specimens, histopathological preparation and identify basic alterations in cells, tissues, organs and body fluids grossly and microscopically.
2. differentiate antemortem changes from postmortem changes grossly and microscopically.
3. identify and differentiate various types of inflammation and immunological reactions with respect to etiological agents.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	1	3	2	1	×
CLO2	1	3	2	1	×
CLO3	1	3	2	1	×

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Demonstration of collection, shipment, fixation and preservation of pathological tissue samples and storage in the museum.	2
1	Demonstration of routine histopathological techniques for permanent slide preparation	2
1	Identification of necrosis, infarction, gangrene, intra- and extra cellular deposits	2
2	Postmortem changes, factors affecting postmortem changes, identification of different stages of postmortem changes, differentiation of postmortem changes from antemortem changes	2
1, 2	Demonstrations of different types of growth and circulatory disturbances	2
3	Demonstration of different types of inflammation	2
3	Demonstration of different types of alteration due to immunological disorders.	1

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th Williams and Wilkins, Philadelphia, USA.
2. Curran RC. 1981. Colour Atlas of Histopathology. 2nd Edition (reprinted). Harvey Miller Publishers, London, England.
3. Bacha WJ and Bacha LM. 2012. Colour Atlas of Veterinary Histology. 3rd edition. Wiley-Blackwell.
4. van Dijk JE, Gruys E and Mouwen JMVM. 2007. Colour Atlas of Veterinary Pathology: General Morphological Reactions of Organs and Tissues. 2nd edition. Saunders/Elsevier.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	**:**	General Poultry Science
2.	**Course Code**	**:**	0841 VAS 211
3.	**Course Type**	**:**	Theory
4.	**Course Level**	**:**	Second Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	2
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Dr. Md. Shariful Islam & Mr. Soshe Ahmed

9. Rationale of the Course:
This is a fundamental course of Poultry Science. It describes the definition, scope, importance, various classes, and breeds of poultry. It also designates history, development and different body systems of poultry, structure and formation of eggs, selection and care of hatching eggs, incubation, different types of housing systems as well as modern poultry farming. Therefore, this course provides students with the basic knowledge of fundamental poultry science and farming. It helps students to know various poultry-related terms, handling, and managemental approaches towards modern poultry production.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

- **a)** Know different terms related to poultry and poultry science; classes, breeds and varieties of chicken as well as history, development and population of poultry in Bangladesh.
- **b)** understand various body systems of birds and their relationship with meat and egg production.
- **c)** introduce with events of egg formation, unusual shape and size of eggs; vices of poultry and their control measures; sexing, debeaking, lighting and other important management in relation egg production.
- **d)** Acquire knowledge how to select a site for poultry farming and design of house according to the requirements of birds and will be able to suggest rural farmer.
- **e)** Learn techniques of quality hatching eggs production, collection, selection care and handling procedures as well as incubation methods, instrumentations and hatchery waste managements.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

CLO1: understand introductory poultry science.
CLO2: realize the role of body systems as well as husbandry and managemental procedures in meat and egg production.
CLO3: evaluate various housing, husbandry practices in relation to quality eggs and chicks production.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Definition of Poultry and Poultry Science. Scope and importance of poultry farming. Different terminology is used in Poultry Science.	3
1	Classes, Breeds and Varieties of Poultry and their chronological development. Concept of broiler and layer hybrids. Major chicken breeds and their characteristics. History, Development and Population of Poultry in Bangladesh. Origin and Domestication of Poultry Species. Consequence of domestication of Poultry.	3
2	Different body system: Digestive system, skeletal system, Reproductive system and Respiratory system and their relations with meat and egg production.	4

2	Feathers and feathering, and their importance in production performance. Different comb types and their importance in production performance	3
2	Structure and formation of eggs. Abnormalities in eggs. Vices of poultry and their management. Sexing, debeaking, selection and culling of breeding stock. Lighting and other management practices in poultry farming.	4
2	Sexing, debeaking, selection and culling of breeding stock. Lighting and other management practices in poultry farming.	3
3	Site selection for poultry farm. Different types of housing systems for poultry. Space requirements for different species.	2
3	Hatchery management: Production of quality hatching eggs; Collection, selection, handling, and transport of hatching eggs; care and storage of hatching eggs;	3
3	Incubation methods, types of incubators, incubation requirements; hatchery sanitation and waste management; trouble shooting during incubation; incubation records.	3

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Ghosh N. Poultry science and practice - a textbook. 1st edition. CBS Publishers 2015.
2. Winter, A. R and Funk, E. M. 1960. Poultry Science and Practices. 5th edn. J. B. Lippincott Co., USA.
3. Crawford, R. D. 1990. Poultry Breeding and Genetics. Elsever Publishers, Amsterdam, The Netherlands.
4. Funk, E. M. and Irwin, N. R. 1995. Hatchery Operation and Management. Gohn Wiley and Sout Inc, London-Chapman and Hall Ltd., New York,
5. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Chapman & Hall Inc., New York, USA.
6. Etches, R.J. 1996. Reproduction in Poultry. CAB International, UK.
7. Ensminger, M.E. 1992. Poultry Science, the Interstate Printers and Publishers Inc., Danville, Illinois, USA.
8. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.
9. Singh R.A. Poultry production. 3rd edition. Kalyani Publishers, Ludhiana, New Delhi 1990.
10. Worth D.H. British poultry standard. Butterworth Scientific 1988.
11. Banerjee G.C. Poultry. 3rd edition. Oxford & IBH Publishing Co. Pvt. Ltd., 66 Janpath, New Delhi 1992.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	**:**	**General Poultry Science**
2.	**Course Code**	**:**	0841 VAS 212
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Second Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Mr. Soshe Ahmed

9. Rationale of the Course:

This is a practical course of Poultry Science which designates how to hold & handle poultry, identify various classes, breeds, eggs and various body parts & systems of different birds. It also describes housing, floor system and different equipment and appliances used in poultry farming. It helps students to know various practical techniques of brooding and rearing chicks, identification of layer and no-layer, sexing and debeaking chicks, selection, candling, and setting of hatching eggs and incubation.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. Know how to hold and handle poultry species for different purposes.
2. Identify various body parts & systems of different birds.
3. Introduce with different classes, breeds, varieties, and eggs of different poultry species.
4. Recognize different poultry equipment and appliances, housing of poultry and different floor systems.
5. Learn practical techniques of brooding and rearing chicks, identification of layer and no-layer, sexing and debeaking chicks, selection, candling and setting of hatching eggs and incubation.

11.Course Learning Outcome (CLO):

After the successful completion of the course, the students will be able to:

CLO1: understand how to hold and handle, identify classes, breeds, varieties, eggs, and various body parts & systems of different poultry species

CLO2: realize the role of different poultry equipment and appliances, housing and different floor systems in meat and egg production.

CLO3: acquainted of brooding and rearing chicks, identify layer and no-layer, sexing and debeaking chicks, selection, candling and setting of hatching eggs and incubation.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course content	No. of Lectures
1	Holding and Handling of Poultry.	1
1	Demonstration of internal body parts of poultry. Identification of different poultry species. Identification of breeds and varieties. Identification of eggs of different poultry species.	3
2	Identification of different equipment and appliances	1
2	Demonstration of poultry housing.	2
2	Demonstration of different floor systems.	1
3	Practice on brooding and rearing of baby chicks. Sexing and debeaking of chicken. Identification of layer and no-layer.	3
3	Collection, selection, and handling of hatching eggs.	1
3	Setting of hatching eggs and candling. Incubation and Hatching practices of various poultry eggs.	2

1**4. Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings

1. Winter, A. R and Funk, E. M. 1960. Poultry Science and Practices. 5th edn. J. B. Lippincott Co., USA.
2. Crawford, R. D. 1990. Poultry Breeding and Genetics. Elsever Publishers, Amsterdam, The Netherlands.
3. Funk, E. M. and Irwin, N. R. 1995. Hatchery Operation and Management. Gohn Wiley and Sout Inc, London-Chapman and Hall Ltd., New York,
4. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Chapman & Hall Inc., New York, USA.
5. Etches, R.J. 1996. Reproduction in Poultry. CAB International, UK.
6. Ensminger, M.E. 1992. Poultry Science, the Interstate Printers and Publishers Inc., Danville, Illinois, USA.
7. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	:	Fundamentals of Dairy Science
2.	**Course Code**	:	0841VAS21**3**
3.	**Course type**	:	Theory
4.	**Course Level**	:	Second Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Prof. Dr. Syed Sarwar Jahan & Prof. Dr. Md. Akhtarul Islam

9. Rationale of the Course

This is an introductory course of Dairy Science which deals with scope, terminology, early history, milk, colostrum and statistic of Dairy Science. It also focuses on taxonomy, origin, classification and. characteristics of important dairy breeds-local & foreign. Importance and recent development of dairy farming, factors responsible for the development of dairy industries, judging of dairy heifers & cows. Further, it deals with dairy farm management, housing, selection of site for dairy farms, disposal of carcass and farmyard manure and feeding; classification of common feed stuffs, importance of feeds, methods of calf raising and feeding schedule, classification and procedure of milking and hygienic milk production.

10. Intended Learning Objectives:

The objectives of this course are:

a) To know terminology related to dairy science, dairying history, characteristics and utility of important dairy breeds

b) To attain the knowledge of site selection of dairy farm, Judging and management of dairy cows, comparison between loose and stanchion barns, importance of feeds and feeding, procedure of feeding for dairy animals, different type of rations, preservation of fodder crops and cooperative of dairying.

c) To learn distinguish between milk & colostrum, Physical properties of milk, food value of milk, methods of milking, milk let-down mechanism and processing of milk and milk products.

11. Course Learning Outcome (CLO):

After the successful completion of the course, the students will be able to:

CLO1 : Describe terminology related to dairy science, taxonomy, dairy animal over the world milk, important dairy breeds and fodder preservation.

CLO2 : Explain the dairy farm housing, Judging, management and feeding methods of dairy cows

CLO3 : enumerate milk, colostrum, food value of milk, physical properties of milk, methods of milking, cooperative of dairying and processing of milk and milk products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1	Explain dairy science and its scope, branches, terminology related to dairy science, early history of dairying, dairy animal and milk production statistic of Bangladesh and leading dairy countries. Prospects and problems of dairying in Bangladesh and their possible solutions.	5
1	Dairy animals of the world & their breeds**,** Taxonomy, definition and classification of dairy breed; Origin, distribution, general characteristics of breeds of dairy cattle.	3
2.	Definition & objectives of dairy farm, selection of site of a dairy farm, factors responsible for the development of dairy industry, recent development of dairy farming, judging of dairy cows, management and feeding of dairy cow. Fodder preservation.	4
3.	Definition and composition of milk and colostrum, normal appearance, taste and flavor of milk, structure, physical properties, food value of milk, importance of colostrum feeding, grades of milk, Sources of contamination in milk and milk products, clean milk production, hygienic way of milking, methods of milking, rules for good milking, milk let-down mechanism.	8
3.	Importance and basic concepts on different dairy products.	2
3.	Machineries & facilities needed in a dairy processing plant. Concepts on receiving, storage, pasteurization, sterilization, sanitization, homogenization, cooling and packaging of milk.	3
3	Different co-operative models and organizational structure of the cooperative, dairy marketing system, institutional structures, UMB feeding to smallholder dairy farm.	3

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1. Neuman, A I. 1977. Beef cattle. 7th edition John Wiley & Sons. Inc. USA.
2. Mary, C C and Dye, I A. 1978. Commercial beef cattle production. 2nd edition, I.E.A. and Febriger Philadelphia, USA.
3. Benerjee, G C. 2011. A Text Book of Animal Husbandry. 8th edition, Oxford and IBH publishing Co. New Delhi, 11001 India.
4. Drapper, J 2003. The Complete Book of Horses, Horse Breeds & Horse Care: An Encyclopedia of Horses and a Comprehensive Guide to Horse and Pony Care. Anness Publishing.
5. Copland, J W. 1985. Evaluation of large ruminants for the tropics, ACIAR Proceeding series no. 5. 6. M. K. Rai 2012. Livestock Production & Management. Oxford Book Co.
7. Ensminger, M E. 1968. Beef Cattle Science., The interstate printers and publishers. Inc. USA.
8. Singh, 2017. Buffalo Production. Oxford Book Co.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1.	**Course Title**	:	Fundamentals of Dairy Science
2.	**Course Code**	:	0841VAS21**4**
3.	**Course type**	:	Practical
4.	**Course Level**	:	Second Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**:		Professor Dr. Syed Sarwar Jahan

9. Rationale of the Course:
This is a practical course of Dairy Science. It deals with general information about RU (Narikalbaria) Dairy Farm & Ideal Dairy Farm, name of common houses of an Ideal Dairy Farm. Handling of Dairy Cows, calves, heifers and Buffaloes and identification of different dairy breeds of cattle and Buffalo. Further it discuss on judging of Dairy cattle and Buffaloes, Acquaintance with routine work of an ideal Dairy Farm. Identification and use of dairy utensils and equipment and Identification of dairy animals (tagging, tattooing, branding, marking).

10. Intended Learning Objectives:
The objectives of this course are:

- **a.** To learn modern dairy farm, different dairy houses, dairy breeds of cattle, buffalo, goat and sheep.
- **b.** To know routine work of an ideal dairy farm, judging of dairy animals, identification of milk of different species and use of dairy equipment.
- **c.** To attain the knowledge about different test of milk and physical properties of milk

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

CLO1 : explain about basic practical knowledge about dairy farm and dairy breeds.
CLO2 : describe the judging of dairy animals, identify the milk of different species.
CLO3 : state the different test of milk

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1.	Acquaintance about RU dairy farm and an ideal dairy farm. Identifications of common dairy barn/shed, design of a dairy farm	3
1.	Identification of different dairy breeds and their identifying characters.	2
2.	Judging of dairy cow. Routine work at an ideal Dairy Farm. Identification of milk of different species.	2
2.	Identification and use of utensils and equipment of a dairy farm.	2
3.	Physical properties of milk and colostrum, adulteration of milk	3
3.	Common organoleptic/ platform tests of milk.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc

Suggested Reading Lists

1. Roy, B. and Ghhosh, S. 2015. Dairy Animal Production. New India Publishing Agency, New Delhi, India.
2. D.K. Thompkinson, D K. 2012. Quality Assessment of Milk and Milk Products. New India Publishing Agency, New Delhi, India.
3. G.C. Banerjee, G C. 1998. A Textbook of Animal Husbandry. Oxford & IBH Publishing Company Pvt. Limited. India.
5. Schmidt, G H. , Van Vleck, L D. and Hutjens, M F. 1998. Principles of Dairy Science. Kalyani Publishers. New Delhi. India.
6. Prasad, J. 1992. Animal Husbandry and Dairy Science. Kalyani Publishers. New Delhi. India
7. Prasad, J. 2004. Principles and Practices of Dairy Farm Management. Kalyani Publishers. New Delhi. India.
8. Leaver. J D. 1987. Milk Production and Practices. Longman Group. United Kingdom. 9. M. Kango. 2006. Milk & Milk Products. RBSA Publishers. Chaura Rasta. Jaypur. India.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1. Course Title : Avian and Aquatic Animal Anatomy
2. Course Code : 0841VAS216
3. Course Type **:** Practical
4. **Course Level** : Second Year Second Semester
5. **Session** : 2020-2021
6. **Course Credit** : 1
7. **Total Marks** : 100 (Final Examination 60, Class Test 30, Attendance 10)
8. **Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the course:
Avian anatomy is a basic course of poultry science which provides an in-depth introduction to the study of birds that includes both avian anatomy with particular emphasis on systems and functions related flight and egg production. Special emphasis will be placed on the unique characteristics of avian morphology using the chicken as the model animal. Aquatic anatomy deals with the anatomical study of fishes. By the end of this course, students should have a thorough understanding the anatomical differences among mammals, birds and fishes.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. Students will understand the normal anatomical structure of skeletal system, organs of digestive, respiratory, cardiovascular, urinary and endocrine system of birds and fishes.
b. Students will understand the normal anatomical structure of male and female reproductive organs of birds and fishes.
c. Students will understand the mechanism of voice and egg production in birds.
d. Students will understand the skin and its modification, and different types of feathers in birds.
e. Students will understand the mechanism of flight, body defence, and thermoregulation in birds.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: Understand the normal anatomical structure of different body systems of birds and fishes.
CLO2: Understand the unique characteristics of birds and fishes, specially the mechanism of flight and egg production in birds.
CLO3: Understand the anatomical and physiological differences between mammals, birds and fishes.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course contents**	**Lectures**
1	Definition of avian and aquatic anatomy Common anatomical terminology	1
1, 2, 3	Avian osteology and skeletal system Role of avian bone in flight mechanism	2
1, 2, 3	Avian myology Role of pectoral muscles in flight mechanism	2

	Avian digestive system Feces colors and their importance to determine health status	
1, 2, 3	Avian respiratory system Air sacs and their role in flight mechanism Mechanism of production of voice Avian urinary system Renal portal system in birds Avian genital system Avian reproductive system Mechanism of egg production Structure and composition of egg	3
1, 2, 3	Avian cardiovascular system Avian skin and appendages Feathers and their role in sex determination and in flight Organs of special sense of birds (eye, ear) Avian endocrine system Flight adaptation and mechanism of flight Body temperature and thermoregulation in birds	2
1, 2, 3	Anatomy of body system of fish	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Gofur MR. 2020. Textbook of Avian Anatomy. 1st edition, Uttoran Offset Printing Press, Rajshahi, Bangladesh.
2. Reece WO. 2009. Functional Anatomy and Physiology of Domestic Animals. 4th edition, Wiley-Blackwell, USA.
3. Getty R. 1975. The Sisson and Grossman's the Anatomy of the Domestic Animals. Volume 2. 5th edition, WB Saunders Company, Philadelphia, USA.
4. Horst E. Koenig, Ruediger Korbel, Hans-Georg Liebich, Corinna Klupiec. 2016. Avian Anatomy: Textbook and Colour Atlas, 2nd edition. 5M Publishing Ltd, Sheffield, UK
5. John McLelland. 1990. Color Atlas of Avian Anatomy, Wolfe Publishing Ltd. England.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	:	Zoo, Aquatic and Laboratory Animal Physiology
2.	**Course Code**	:	0841VAS217
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Second Year Second Semester
5**.**	**Session**	:	202**3**-202**4**
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. S.M.Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course:
This is a Preclinical course of medical science which acquainted with Zoo, Aquatic and Laboratory Animal physiology, and various physiological functions. Therefore, this course provides students the foundation knowledge on wildlife behaviors knowledge about Lab and aquatic animal physiology. Therefore this course will provide the general and systemic physiology of avian, zoo and laboratory animals.

10. Intended Learning Objectives (ILOs):

a) To facilitate necessary knowledge regarding physiology of different systems of zoo, lab, aquatic animal and wild life physiology and behaviors.

b) To provide the knowledge about physiology of different laboratory animals and their behaviors.

c) To develop skills on different types of experimentations in laboratory animals.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 Demonstrate the physiological concept of respiratory, cardiovascular, digestive and reproductive system of zoo, avian and laboratory animal.

CLO2. Illustrate the physiological notion and behaviors of, aquatic and zoo animals.

CLO2. Design the experimentations in laboratory animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	2	2	2	1
CLO2	1	2	2	2	1
CLO3	1	3	2	2	1

13. **Lesson Plan**

CLOs	Course Contents	Lectures
1, 2, 3	**Avian Physiology:** Physiology of respiratory, cardiovascular, digestive and reproductive system of avian species. Factors affecting the reproduction in birds.	9
2	**Zoo Animals:** Physiological behaviors of zoo animals (mammals, reptiles, primates and birds).	9
2	**Aquatic Animals:** Physiolog and physiological behaviors of aquatic animals	3
3	**Lab Animals:** Physiological behaviors of lab animals (rat, mice, guinea pig etc.).	3
2, 3	Lab animal experimentations. Field trips for observation of zoo animal behavior.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. C. G. Scanes. 2014. Sturkie's Avian Physiology, 6th ed., Kindle Edition.
2. P. D. Sturkie. 1986. Avian Physiology, 4th ed.
3. J. V. Cheeran. 2007. Textbook of Wild and Zoo Animals: Care and Management, 2nd Revised and Enlarged ed.
4. A. K. Santra. 2008. Handbook on Wild and Zoo Animals: A Treatise for Students of Veterinary, Zoology, Forestry and Environmental Science.
5. J. Hau, S. J. Schapiro. 2010. Handbook of Laboratory Animal Science, Volume I (Essential Principles and Practices), 3rd ed.
6. M. E. Fowler and R. E. Miller. 1986. Zoo and Wild Animal Medicine, Current Therapy.
7. J. G. Cunningham. 1997. Text book of Veterinary Physiology, 2nd ed.
8. M. J. Swenson. 1977. Duke's Physiology of Domestic Animals, 9th ed.
9. Eckert & Randall. 1983. Animal Physiology (Mechanism and Adaptation), 2nd ed.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	**:**	**Nemathelminthes and Malacology**
2.	**Course Code**	**:**	**0841VAS 2**19
3.	**Course**	**:**	**Theory**
4.	**Course Level**	**:**	**Second Year Second Semester**
5.	**Session**	**:**	**2023-2024**
6.	**Course Credit**	**:**	**2**
7.	**Total Marks**	**:**	**100 (Final Examination 70, Class Test 20, Attendance 10)**
8.	**Course Teachers**	**:**	**Professor Dr. Moizur Rahman** **Professor Dr. Lovely Nahar**

9. Rationale of the Course:

Nemathelminthes and Malacology, a theoretical para-clinical course of veterinary medical science. This course provides the understanding about nematodes and vector snails. Nemathelminthes section describes the general morphology, general life cycle, transmission and common injurious effects caused by the nematodes. This course provides detail knowledge about taxonomy, morphology, ecology, transmission, distribution, life history, pathogenic significance of nematodes of veterinary importance. Malacology section describes the definition, structures, ecology, habitat and vector importance of snails. This section also discusses the identifying characteristics of different fresh water snails acts as a vector of helminth parasites. It also includes collection, preservation and shipment of snails.

10. Intended learning Objectives (ILOs):

a. Knowledge gathering on nematodes and vector snails.
b. Understanding the taxonomy, morphology, biology and bionomics, transmission cycle of nematodes of veterinary importance and their effects in hosts.
c. Providing knowledge on general control of nematodes of animals and birds.
d. Generation of knowledge on mollusk mainly about fresh water snails.
e. To know about habitat, ecology, shell characteristics and control of snails pf veterinary importance.

11. **Course Learning Outcomes (CLO):**
At the end of the course, students will be able to:
CLO 1. uunderstand the taxonomy morphology and recognize the major nematodes of veterinary and zoonotic importance in Bangladesh.
CLO **2**. describe the specific life cycle pattern, transmission and harmful effects of specific nematodes and control measures against them.
CLO 3. eexplain the morphology, classification, biology and vector importance of mollusks, and the control of vector snails and slugs.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. **Lesson Plan**

CLOs	**Course content**	**No. of Lectures**
1	General concepts on Nemathelminthes	1
1,2	General morphology, life cycle and transmission of nematodes	2
1,2	Taxonomy, morphology, transmission cycle, pathogenic effects etc. of nematodes of veterinary importance	16

2	General and specific control measures against nematodes	2
2	Basic concepts on malacology	1
3	Shell characteristics, ecology, habitat and vector importance of fresh water snails	3
3	General control of snails.	1

14. Teaching-learning strategy: Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists:

1. Soulsby EJL (2012) Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
2. Urquhart G. M. et. al. (1996) Veterinary Parasitology. 2nd edn. (Blackwell).
3. Taylor et. al. (2016) Veterinary Parasitology. 4th edn. (Wiley Blackwell).
4. Rahman MH et. al. (1996) Intorduction to Helminth Parasites of Animals and Birds in Bangladesh. 1st edn. (Sheba printing Press, Dhaka, Bangladesh).
5. Mehlhorn H (1988) Parasitology in Focus: Facts and Trends. 1st edn. (Springer-Verlag, Berlin).
6. Malek and Cheng (1974) Medical and Economic Malacology. 1st edn. (Academic Press, London).
7. Brown DS (1980) Freshwater Snails of Africa and their Medical Importance. 1st edn. (Taylor & Francis Ltd., London).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	**:**	**Nemathelminthes and Malacology**
2.	**Course Code**	**:**	**0841VAS220**
3.	**Course**	**:**	**Practical**
4.	**Course Level**	**:**	**Second Year Second Semester**
5.	**Session**	**:**	**2023-2024**
6.	**Course Credit**	**:**	**1**
7.	**Total Marks**	**:**	**100 (Final Examination 70, Class Test 20, Attendance 10)**
8.	**Course Teachers**	**:**	**Professor Dr. Moizur Rahman** **Professor Dr. Lovely Nahar**

9. Rationale of the Course:

Nemathelminthes and Malacology is a practical para-clinical course of veterinary medical science. This course provides the practical understanding about nematodes and vector snails. Nemathelminthes section describes the identifying characteristics of eggs, larvae and adult of different nematodes. It also includes the collection, preservation and preparation of temporary and permanent slide of nematode. This will be helpful for the identification of harmful nematodes of veterinary importance. Malacology section will describe the shell characteristics of snail with emphasis on differential points regarding identification of different fresh water snails acts as a vector of helminth parasites. It also includes collection, preservation and shipment of snails. The practical experiences achieved after the completion of this course helps students to identify the nematode infection in animals and birds.

10. Intended learning Objectives (ILOs):

a. To provide practical knowledge on nematodes and vector snails.
b. Collection, preservation of samples and identification of eggs, larvae and adult nematode.
c. Preparation of temporary and permanent slide of nematode.
d. Collection, preservation and shipment of fresh water snail and study on shell characteristics.
e. Identification of snails of veterinary importance.

11. **Course Learning Outcomes (CLO):**

At the end of the course, students will be able to:

CLO 1. uunderstand the procedures of collection and preservation of samples for identification of eggs, larvae and adult nematodes

CLO 2. describe the identifying characteristics of eggs, larvae and adult nematodes and preparation of temporary and permanent slide.

CLO 3. explain the procedures of snail collection, examination and preservation and identify the snails of veterinary importance.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. **Lesson Plan**

CLOs	**Course content**	**No. of Lectures**
1	Collection of samples for identification of different stages of nematodes.	1
1,2	Identifications of eggs of nematodes from samples.	2
1,2	Culture and identifications of larvae of nematodes from samples.	1
2	Identifications of adults (gross and microscopic) of nematodes	6
3	Collection, preservation and shipment of snail	1
3	Study on Structural morphology of snails	1
3	Morphological identification of important snails and slugs	2

14. Teaching-learning strategy: Lecture, hands on training, visualization, demostration, presentation, discussion, question answering etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists/Essential Readings:

1. Soulsby EJL (2012) Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
2. Urquhart G. M. et. al. (1996) Veterinary Parasitology. 2nd edn. (Blackwell).
3. Taylor et. al. (2016) Veterinary Parasitology. 4th edn. (Wiley Blackwell).
4. Rahman MH et. al. (1996) Intorduction to Helminth Parasites of Animals and Birds in Bangladesh. 1st edn. (Sheba printing Press, Dhaka, Bangladesh).
5. Mehlhorn H (1988) Parasitology in Focus: Facts and Trends. 1st edn. (Springer-Verlag, Berlin).
6. Malek and Cheng (1974) Medical and Economic Malacology. 1st edn. (Academic Press, London).
7. Brown DS (1980) Freshwater Snails of Africa and their Medical Importance. 1st edn. (Taylor & Francis Ltd., London).
8. Ministry of Agriculture, Fisheries and Food .1979. Manual of Veterinary Parasitological techniques. Her Majesty's Stationary Office.
9. Cable, R. M. 1953. An Illustrated Laboratory Manual of Parasitology. Burgess Publishing Co., Minneapolis

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1. **Course Title** : Bacteriology and Mycology
2. **Course Code** : 0841VAS221
3. **Course Type** : Theory
4. **Course Level** : Second Year Second Semester
5. **Session** : 202**3**-202**4**
6. **Course Credits** : 02
7. **Total Marks** : 100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8. **Course Teachers** : Prof. Dr. K. M. Mozaffor Hossain
   Prof. Dr. Mst. Ismat Ara Begum

9. Rationale of the Course:
This course covers principles of microbiology and the impact of microorganisms on different animal hosts. Topics include the various groups of microorganisms like bacteria, fungi, mycoplasma, rickettsia and chlamydia, their classifications, morphology, biochemical characteristics, microbial pathogenicity, infectious diseases, immunogenicity and selected practical applications for diagnosis, control and prevention of these microbial diseases.

10. Intended Learning Objectives (ILOs):
a. To know the history, development and concepts of Microbiology with special emphasis on Bacteria.
b. To understand the characteristics of different microorganisms such as bacteria, fungi, mycoplasma, rickettsia and chlamydia.
c. To gain knowledge on the interactions of different bacteria, fungi, mycoplasma, rickettsia and chlamydia with different animal hosts.
d. To introduce disease diagnosis strategies through isolation, identification and characterization of different microorganism.
e. To apply knowledge in control and prevention of different microbiological diseases.

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:
CLO1: Demonstrate a large number of common bacteria, fungi, mycoplasma, rickettsia, and chlamydia by their salient characteristics; classify bacteria, fungi, mycoplasma, rickettsia, and chlamydia into different groups.
CLO2: Assimilate knowledge on laboratory diagnosis (morphology, staining, cultural and biochemical properties) with their transmission, pathogenicity, antigenic structure, toxins, resistance and immunity of bacterial, fungal, mycoplasmal, rickettsial, and chlamydial species belonging to animals, birds and human.
CLO3: Perceive knowledge on the collection, processing and preservation of specimens for microbiological analysis.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	1	2
CLO2	3	3	2	1	1
CLO3	3	2	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	Morphology, microscopic, and ultramicroscopic structures including their composition and function of bacteria. Nutrition, cultivation, and growth of bacteria. Physiology and metabolism of bacteria, classification of bacteria.	5
1	Replication of DNA and RNA, plasmid, gene transfer (transformation, conjugation, transduction, F-factor, C-factor, and R-factor) mutation and their effects on bacteria.	3

2, 3	Studies of the morphological, biochemical, cultural characteristics of *Streptococcus, Staphylococcus, Bacillus, Clostridium, Corynebacterium, Listeria, Erysipelothrix, Actinomyces, Actinobacillus, Escherichia, Salmonella, Pasteurella, Shigella, Klebsiella, Proteous, Yersinia, Vibrio, Pseudomonas, Mycobacterium, Leptospira, Campylobacter, Brucella, Borrelia, Bordetella, Spherophorus, Spirillium, Nocardia,* and *Moraxella* with a brief reference to their pathogenicity, diagnosis, prevention and control measures.	10
2, 3	Definition, general properties, classification, and reproduction of fungi. Studies on the morphology, staining, and cultural properties of fungi including their transmission, pathogenicity, antigenic structure, toxins, resistance and immunity of fungal species belonging to the following groups of animals, birds and human: Microsporum, Trychophyton, Epidermophyton, Candida, Cryptococcus, Aspergillus, Histoplasma, Blastomyces, Sporotrichum, Coccidioides and Rhinosporidium. Sample collection, preservation, transportation, and cultivation of the important fungi of animals, poultry, and man. Diagnosis of fungi by culture, staining, biochemical tests, and molecular techniques.	8
2, 3	Definition, general properties and classification of mycoplasma. Studies on the morphology, staining, and cultural properties of mycoplasma including their transmission, pathogenicity, antigenic structure, toxins, resistance and immunity of mycoplasmal species of animals, birds and human. Sample collection, preservation, transportation, and cultivation of the important animal and poultry mycoplasma. Diagnosis of mycoplasma by culture, staining, biochemical and serological tests, and molecular techniques	5
2, 3	Definition, general properties and classification of rickettsia. Studies on the morphology, staining, and cultural properties of rickettsia including their transmission, pathogenicity, antigenic structure, toxins, resistance and immunity of rickettsial species of animals, birds and human. Sample collection, preservation, transportation, and cultivation of the important animal and poultry rickettsia. Diagnosis of rickettsia by culture, staining, biochemical and serological tests, and molecular techniques	5
2, 3	Definition, general properties and classification of chlamydia. Studies on the morphology, staining, and cultural properties of chlamydia including their transmission, pathogenicity, antigenic structure, toxins, resistance and immunity of chlamydial species of animals, birds and human. Sample collection, preservation, transportation, and cultivation of the important animal and poultry chlamydia. Diagnosis of chlamydia by culture, staining, biochemical and serological tests, and molecular techniques	5

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Think pair-share, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Veterinary Microbiology: Bacterial and Fungal Agents of Animal Disease. 1st edition. J. Glenn Songer and Karen W. Post. 2004. Saunders Publisher. USA.
2. Essentials of Veterinary Bacteriology and Mycology. 6th edition. **G. R. Carter** and **Darla J. Wise**. 2003. Wiley-Blackwell Publisher. USA.
3. Molecular Genetics of Bacteria. 5th edition. Jeremy W. Dale and Simon F. Park . 2010. John Wiley and Sons Publisher. New York. USA.
4. Animal Microbiology. Vol. 1. Buxton, A. and Frazer, G. 1977. Blackwell Scientific Publication. USA.
5. Veterinary Bacteriology and Virology. 7th edition. Marchant, I. A. and Packer, R.A. 1967. The Iowa State University Press, Ames. lowa. USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1. **Course Title** : Bacteriology and Mycology
2. **Course Code** : 0841VAS22**2**
3. **Course Type** : Practical
4. **Course Level** : Second Year Second Semester
5. **Session** : **202**3-**202**4
6. **Course Credits** : 01
7. **Total Marks** : 100 (Final Examination 60, Class Test 30 and Class Attendance 10)
8. **Course Teachers** : Prof. Dr. K. M. Mozaffor Hossain
   Prof. Dr. Mst. Ismat Ara Begum

9. Rationale of the Course:
This course is designed to provide fundamental concept on laboratory diagnosis of Bacteria, Fungi, Mycoplasma, Rickettsia, and Chlamydia causing animals, birds and human diseases.

10. Intended Learning Objectives (ILOs):

a. To know the practical concept of isolation, identification, characterization and antibiogram study of bacteria and fungi causing animals, birds and human diseases
b. To introduce and apply different bacteriological and mycological media (agar and broth) used for the diagnosis of bacterial and fungal diseases.
c. To gain practical knowledge on the isolation, identification, and characterization of Mycoplasma, Rickettsia, and Chlamydia causing animals, birds and human diseases.
d. To introduce and apply different media used in the laboratory for the diagnosis of Mycoplasmal, Rickettsial and Chlamydial diseases.
e. To apply different molecular approaches used in molecular characterization of bacteria, fungi, mycoplasma, rickettsia and Chlamydia in the laboratory.

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:

CLO1: Acquire knowledge on appropriate techniques for the selection, collection, preservation and shipment of specimens for bacteriological and mycological investigation.
CLO2: Assimilate knowledge on isolation and identification of bacteria, fungi, mycoplasma, rickettsia, and chlamydia by observing morphological, cultural and biochemical characteristics.
CLO3: Achieve knowledge on identification and molecular characterization of the bacteria, fungi, mycoplasma, rickettsia, and chlamydia by using animal inoculation, serological tests, Antibiogram assay, and molecular techniques like PCR, RT-PCR, Agarose gel electrophoresis, SDS-PAGE, Western blotting etc.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	3	2	1	2
CLO2	3	3	2	1	2
CLO3	3	3	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Content**	**Lectures**
1	Collection, preservation and shipment of microbial (bacteria, fungi, mycoplasma, rickettsia and chlamydia) specimens for laboratory examination and identification.	2

2	Preparation of culture media and study of cultural characteristics of bacteria, fungi, mycoplasma, rickettsia and chlamydia.	2
2	Isolation of pure cultures of bacteria and study of different staining techniques.	2
2	Identification of bacteria by using- animal inoculation techniques, biochemical tests, and seological tests.	2
2	Extraction and purification of genomic and plasmid DNA from selective bacteria. Molecular characterization of bacteria by using molecular techniques like PCR, RT-PCR, Agarose gel electrophoresis, SDS-PAGE, Western blotting etc.	3
2	Competent cell preparation and study of transformation techniques.	1
3	Drug sensitivity assay of different types of bacteria against different antimicrobial agents by using disk diffusion method.	2

14. Teaching strategies:

Lecture, Open discussion, Group discussion, Think pair-share, Audio visual, Question and answer.

15. Assessment Strategies:

In course Examination/ Tutorial/ Quiz/Class Test/Assignment (30), Class Attendance (10), Final Examination (60).

Suggested Reading Lists

1. Veterinary Microbiology: Bacterial and Fungal Agents of Animal Disease. 1st edition. J. Glenn Songer and Karen W. Post. 2004. Saunders Publisher. USA.

2. Essentials of Veterinary Bacteriology and Mycology. 6th edition. G. R. Carter and Darla J. Wise. 2003. Wiley-Blackwell Publisher. USA.

3. Molecular Genetics of Bacteria. 5th edition. Jeremy W. Dale and Simon F. Park . 2010. John Wiley and Sons Publisher. New York. USA.

4. Microbiology: A Laboratory Mannual. 12th edition. James G. Cappuccino and Chad Weish. 2019. Pearson Publisher. USA.

5. Molecular Cloning: A laboratory Manual. 3rd edition. Sambrook J. F. and Russell D. W. 2001. Cold Spring Harbor Laboratory Press. USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1	**Course Title**	:	Systemic Pathology and Oncology
2	**Course Code**	:	0841VAS223
3	**Course Type**	:	Theory
4	**Course Level**	:	Second Year Second Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	2
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	1. Dr. Shaziea Rahman 2. Dr. Rashida Khaton

9. Rationale of the Course:

This course is a continuation of General Pathology and presents the pathologic basis of animal diseases at the molecular, cellular, tissue, organ, and function levels using a system-based approach.

10. Intended learning Objectives (ILOs):

a. To know terminology used in different systems of the body.
b. To know etiology, pathogenesis and pathological features of various disorders in different systems.
c. To diagnose diseases of different systems of body with their consequences.
d. To develop and apply knowledge of pathology in the diagnosis, staging and prognosis of neoplastic diseases.

11. Course Learning Outcomes (CLO): *After successful completion of the course, students will be able to*

CLO 1. recognize and describe gross and microscopic alterations associated with diseases specific to the different body systems in domestic animals.

CLO 2. describe the pathogenesis of disease process, name possible etiologic agents, list differential diagnoses including neoplasms in different body systems, and determine a reasonable prognosis.

CLO 3. use of the appropriate medical terminology for pathology.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	×	3	1	3	×
CLO3	2	2	1	2	×

13. Lesson Plan

CLOs	Course Content	Lectures
1,2,3	**Pathological conditions of digestive system:** Buccal cavity and esophagus: cleft lip, cleft palate, gingivitis, stomatitis, periodontitis, tonsillitis, dental caries, sialoadenitis, sialoliths, esophagitis, choke, megaesophagus, and neoplasms.	2
1,2,3	**Pathological conditions of digestive system:** Stomach: tympanites/bloat, impaction, ruminitis, traumatic reticulitis, gastric dilatation and torsion, and neoplasms.	1
1, 2,3	**Pathological conditions of digestive system:** Intestine: volvulus, intussusception, ulcers, enteritis, intestinal obstruction and impaction, peritonitis, hydroperitoneum and ascites, hepatic necrosis, hepatitis, cirrhosis, cholecystitis, cholelithiasis, pancreatitis, and neoplasms.	1
1,2,3	**Pathological conditions of the cardiovascular system:** Developmental anomalies, cardiac failure, myocarditis, cardiomyopathy.	1
1,2,3	**Pathological conditions of the cardiovascular system:** Pericarditis, endocarditis, arteriosclerosis, arteritis, phlebitis, and neoplasms.	1
1,2,3	**Pathological conditions of respiratory system:** Pathological conditions of the upper respiratory tract: rhinitis, nasal polyps, epistaxis, nasal granuloma, sinusitis, pharyngitis, laryngitis.	1
1,2,3	**Pathological conditions of respiratory system:** Pneumonia, pneumonitis, special types of pneumonia, bronchial asthma, pleuritis, atelectasis, emphysema. aneurysm, and neoplasms.	1
1,2,3	**Pathological conditions of hemic-lymphatic systems:** Pathological conditions of bone marrow (aplasia, hypoplasia, hyperplasia)	1
1,2,3	**Pathological conditions of hemic-lymphatic systems:** Osteomyelitis, agranulocytosis, fibrosis, anemia, chediak-higashi syndrome	1
1,2,3	**Pathological conditions of hemic-lymphatic systems:** Disorders of spleen, lymph node, thymus such as splenic enlargement, splenomegaly, lymphadenitis and hypoplasia, hematopoietic neoplasm such as leukemias and lymphomas.	1
1,2,3	**Pathological conditions of urinary systems:** The congenital and hereditary anomalies: aplasia, hypoplasia, horse shoe kidney, displacement, cysts etc.	1
1,2,3	**Pathological conditions of urinary systems:** Glomerulonephritis, interstitial nephritis, pyelonephritis, nephrosclerosis, cystitis, urolithiasis, and neoplasms.	1
1,2,3	**Pathological conditions of genital systems:** Ambiguous sexual differentiations (intersex, hermaphroditism), developmental abnormalities of ovary, fallopian tube and uterus, oophoritis, salpingitis, endometritis, metritis, perimetritis, parametritis, retained placenta	2
1,2,3	**Pathological conditions of genital systems:** Diseases of the gravid uterus such as abortion and still birth, mummified fetus, maceration and emphysema of fetus, hydramnios, hydroallantois, prolonged gestation, abortifacient infections, vulvitis, vulvo-vaginitis, inflammatory lesions of cervix, diseases of mammary gland like mastitis	1
1,2,3	**Pathological conditions of genital systems:** Developmental anomalies of testes,	1

	epididymis, prostate, penis and prepuce like agenesis, hypoplasia, cryptorchidism, atrophy, hypertrophy, hypoplasia, orchitis, epididymitis, prostatitis, seminal vesiculitis, balanoposthitis, phalloposthitis.	
1,2,3	**Pathological conditions of nervous system:** i) The reactions of nervous tissues to injury such as necrosis, hyperemia, hemorrhage, edema, anoxic encephalopathy, encephalitis, encephalomyelitis, meningitis, meningoencephalitis, encephalopathy and encephalomalacia	1
1,2,3	**Pathological conditions of nervous system:** ii) Infectious, poisonous and deficiency diseases of the nervous system iii) Different congenital abnormalities and neoplasms of the nervous system.	1
1,2,3	**Pathological conditions of musculoskeletal system:** i) The developmental disorders of muscles such as muscular dystrophy, hypoplasia, ossification of muscle, steatosis etc.	2
1,2,3	**Pathological conditions of musculoskeletal system:** ii) Disturbances of growth such as atrophy, hypertrophy, degeneration and necrosis, regeneration and repair of muscular tissues.	1
1,2,3	**Pathological conditions of musculoskeletal system:** iii) The causes, pathogenesis and lesions of: nutritional myopathy, equine rhabdomyolysis, pathologic ossification, fracture and repairing of bones, bone necrosis, skeletal dysplasia, Rickets, osteomalacia, fibrous osteodystrophy, osteoporosis, osteosclerosis, osteitis, gout, arthritis and neoplasms.	1
1,2,3	**Pathological conditions of endocrine system:** Hyperpituitarism, hypopituitarism, hypothyroidism, hyperthyroidism, goiter and neoplasms of the thyroid gland, hypoparathyroidism, hyperparathyroidism, primary hyperplasia and neoplasia of parathyroid gland, hypoadrenocorticism. hyperadrenocorticism, hyperplasia and neoplasia of adrenal gland, diabetes	1
1,2,3	**Pathological conditions of skin:** i) Abnormalities of the epidermis such as hyperkeratosis, parakeratosis, dyskeratosis, ballooning degeneration, acanthosis, icthyosis, dermatosis, dermatophilosis etc. ii) Congenital hypoplasia, impetigo, systemic lupus erythromatosus, necrotizing lesions of the epidermis-burn, micotic folliculitis and demodactic folliculitis.	1
1,2,3	**Pathological conditions of eye and ear:** i) Photosensitization, ectropion, entropion, districhiasis, exophthalmos, keratitis, keratoconjunctivitis, synechia, cataract, luxation of lens. Ii) Degeneration, dysplasia, atrophy of retina and optic nerve. Iii) Glaucoma and the organisms causing systemic infection of eye. iv) Congenital deafness, otitis and otorrhea of the ear, and neoplasm.	1

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written test.

Suggested Reading Lists:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th edition. Williams and Wilkins, Philadelphia, USA.
2. Maxie MG. 2016. Jubb, Kennedy & Palmer's Pathology of Domestic Animals. 6th edition. Saunders.
3. Meuten DJ. 2017. Tumors in Domestic Animals. 5th edition. Wiley-Blackwell, Ames, Iowa, USA.
4. Zachary JF and McGavin MD. 2016. Pathologic Basis of Veterinary Disease. 6th edition. Elsevier.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
First Year First Semester

Course Outline

1	**Course Title**	:	Systemic Pathology and Oncology
2	**Course Code**	:	0841VAS224
3	**Course Type**	:	Practical
4	**Course Level**	:	Second Year Second Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 60, Class Test 30, Attendance 10)
8	**Course Teachers**	:	1. Dr. Shaziea Rahman 2. Dr. Rashida Khaton

9. Rationale of the Course:
This course is designed to recognize and interpret the gross and microscopic changes of tissues in various pathological conditions including neoplasms in different systems of animals.

10. Intended learning Objectives (ILOs):
a. To know gross and microscopic pathology of various disorders in different systems of animals.
b. To know dissection procedure for diseases of different systems of body at post-mortem examination.
c. To know examination procedure for diseases of different systems of body at post slaughter examination.

11. Course Learning Outcomes (CLO):
After successful completion of the course, students will be able to
CLO 1. recognize and identify gross and microscopic changes of different systems of animals in various pathological conditions using histopathology slide (permanent and digital), museum specimens and fresh carcasses.
CLO 2. perform systemic dissection of carcasses and differentiate organs with respect to pathology and normal at postmortem and post-slaughter examination.
CLO **3**. apply knowledge of pathology's role in the diagnosis, staging, and prognosis of neoplastic diseases.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	×	3	1	2	×
CLO3	1	3	1	2	×

13. Lesson Plan

CLOs	**Course content**	**Lectures**
1,2	Demonstration of gross specimens and histopathological slides of various pathological conditions including neoplasms in respiratory, cardiovascular, haemopoietic and integumentary, digestive, musculo-skeletal, and nervous systems of animals	5
1,2,3	Demonstration of systemic dissection of small and large animals for identifying different pathological lesions	3
1,2,3	Visits to abattoirs and examination of pathological conditions of different systems	3
1,2,3	Histopathological slides of different systems	2

14. Teaching-learning strategies:
Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

d. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
e. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
f. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists/Essential Readings:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th edition. Williams and Wilkins, Philadelphia, USA.
2. Maxie MG. 2016. Jubb, Kennedy & Palmer's Pathology of Domestic Animals. 6th edition. Saunders.
3. Meuten DJ. 2017. Tumors in Domestic Animals. 5th edition. Wiley-Blackwell, Ames, Iowa, USA.
4. van Dijk JE, Gruys E, Mouwen JMVM. 2007. Colour Atlas of Veterinary Pathology: General Morphological Reactions of Organs and Tissues. 2nd edition. Saunders. Elsevier.
5. Zachary JF and McGavin MD. 2016. Pathologic Basis of Veterinary Disease. 6th edition. Elsevier.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	:	General Pharmacology
2.	**Course Code**	:	0841VAS22**5**
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Second Year Second Semester
5**.**	**Session**	:	202**3**-202**4**
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Prof. Dr. Mst. Rokeya Sultana and Prof. Dr. S.M. Kamruzzaaman

9. Rationale of the Course:

This is a basic course of medical science which describes properties of drugs in details. This course provides students the knowledge about history, source, physical and chemical properties, compounding, dosage forms, methods of administration, absorption, distribution, biotransformation, excretion, mechanism of action, biological effects, therapeutic uses and adverse effects of different chemotherapeutic agents (antiseptics, disinfectants, antibacterial, antiviral, antifungal, antiparasitic, antineoplastic and immunomodulatory agents or drugs) on the animal body.

10.Intended learning Objectives (ILOs):

a) To understand about the history of Veterinary Pharmacology and its related different terms and scope of Pharmacology.
b) To know about the sources, nomenclature and classification of drugs and its pharmacokinetics, pharmacodynamics, dose and dosages and routes of administration.
c) To help understandings of the related subjects of veterinary science like medicine, toxicology, forensic medicine and jurisprudence, surgery etc.
d) To help prescription writing against diseases.
e) To perform successful treatment using combination of different drugs.

11.Course Learning Outcomes (CLO):

After the successful completion of the course, the students will be able to:

1. describe all about pharmacology and the basics of drugs.
2. understand in details about the sources, mode of action, biological effects, therapeutic spectrum, dose and dosages, side effects and routes of administration of different drugs.
3. know the use of appropriate drugs against microorganisms.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	-	-	-
CLO2	2	3	-	-	-
CLO3	2	2	-	-	-

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1,2	Introduction and evolution of Pharmacology, drug nomenclature and classification, sources and routes of drug administration, Pharmacodynamics and Pharmacokinetics of drugs, drug dose & dosage, Prescription writing, drug incompatibilities & adverse drug effects.	10
2,3	**Antibacterial agents:** General considerations, sulfonamides, trimethoprim, penicillins, cephalosporins, aminoglycosides, tetracyclines, macrolides, fluroquinolones and miscellaneous antibiotics,	10
2,3	Antifungal and antiviral drugs, antiseptics and disinfectants.	4
2,3	**Antiparasitic agents:** Antinematodal, anticestodal, antitrematodal and antiprotozoal drugs and ectoparasiticides	6
2,3	Antineoplastic and immunomodulatory agents.	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Jim E. Riviere, Mark G. Papich, 2018. Veterinary Pharmacology and Therapeutics, 10th edn. Wiley-Blackwell publishing company, USA.
2. Nicholas H. Booth and Leslie E. McDonald, 1988. Veterinary Pharmacology and Therapeutics. 6th edn. Iowa State University Press / Ames, USA.
3. Brander, G. C. and Pugh, D. M. 1991. Veterinary Applied Pharmacology and Therapeutics. 5th edn. R. J. Bywater & W. L. Jenkins, ELBS with Bailliere Tindall, UK.
4. Bertram G. Katzung. 2017. Basic and Clinical Pharmacology. 14th edn. McGraw-Hill Medical Publishing Division, New York.
5. Laurence L. Brunton, Bjorn C. Knollmann, Randa Hilal-Dandan, 2017. Goodman and Gilman's The Pharmacological basis of therapeutics. 13th edn. McGraw-Hill Medical Publishing Division, New York.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	:	General Pharmacology
2.	**Course Code**	:	0841VAS22**6**
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Second Year Second Semester
5**.**	**Session**	:	202**3**-202**4**
6**.**	**Course Credit**	:	**1**
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Prof. Dr. Mst. Rokeya Sultana and Prof. Dr. S.M. Kamruzzaaman

9. Rationale of the Course:
This is a basic course of medical science which will provide student some practical experiences about pharmacological application of drugs. Student will gain practical experience about weight and measures of different chemotherapeutic agents. Students also will know about the common veterinary drugs available in the market with their trade name, generic name, therapeutic uses, doses, route of administration, contraindication and side effects. Furthermore, some pharmacological experiments about the action of drugs on laboratory animals and isolated organs under physiological condition will be performed under this course.

10.Intended learning Objectives (ILOs):

a. To understand about the weight and measures of different pharmacological agents.
b. To know details about the common veterinary drugs available in the market.
c. To learn techniques about the action of drugs on laboratory animals.
d. To learn about the action of drugs on isolated heart of mammals and amphibians.
e. To know the action of drugs on anaesthetized animals.

11.Course Learning Outcomes (CLO):
At the end of the course, students will be able to:

1. understand with the weight and measures of veterinary drugs.
2. familiar with the common veterinary drugs available in the market.
3. know the action of drugs on laboratory animals, isolated heart of mammals and amphibians and anesthetized animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3			
CLO2	2	3			
CLO3	2	2			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Weights and measures.	3
2,3	Identification, preparation and study of the actions and dosages of common veterinary drugs.	5
2,3	Study of the actions of drugs on laboratory animals, isolated heart of mammals and amphibians.	5
2,3	Study of the actions of drugs on anaesthetized animals.	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Jim E. Riviere, Mark G. Papich, 2018. Veterinary Pharmacology and Therapeutics, 10th edn. Wiley-Blackwell publishing company, USA.
2. Nicholas H. Booth and Leslie E. McDonald, 1988. Veterinary Pharmacology and Therapeutics. 6th edn. Iowa State University Press / Ames, USA.
3. Brander, G. C. and Pugh, D. M. 1991. Veterinary Applied Pharmacology and Therapeutics. 5th edn. R. J. Bywater & W. L. Jenkins, ELBS with Bailliere Tindall, UK.
4. Bertram G. Katzung. 2017. Basic and Clinical Pharmacology. 14th edn. McGraw-Hill Medical Publishing Division, New York.
5. Laurence L. Brunton, Bjorn C. Knollmann, Randa Hilal-Dandan, 2017. Goodman and Gilman's The Pharmacological basis of therapeutics. 13th edn. McGraw-Hill Medical Publishing Division, New York.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	:	Poultry Feeds and Feeding
2.	**Course Code**	:	0841VAS22**7**
3.	**Course type**	:	Theory
4.	**Course Level**	:	Second Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Prof. Dr. Syed Sarwar Jahan & Soshe Ahmed

9. Rationale of the Course:
This is a basic course of Poultry Nutrition which describes definition & related terms of poultry nutrition and feeding, introduction to various types of feed ingredients used in poultry ration, classification of poultry feed ingredients and their nutritive values, beneficial effects, limitations and Measures of usefulness. It also entitles details of protein, energy, vitamin-minerals, water and feed additives for poultry ration. It deals with feeding standards, nutrient requirements, feeding systems: differences between broiler and layer nutrition, feed forms and feeding systems, ration formulation, ration and balanced ration and factors affecting selection of feed ingredients for poultry. It describes computer package program in formulating "least cost ration" for poultry & quality tests of feed ingredients and mixed feed. Therefore, this course provides students the fundamental knowledge of poultry feeds and feeding in modern farming.

10. Intended Learning Objectives:
The objectives of this course are:

a) To know different terminology related with poultry nutrition, poultry feed ingredients.
b) To learn classify different types of nutrients, describe the general functions of CHO, protein, fat, vitamin, mineral and water.
c) To introduce with Feeding standards for poultry, feed additives and Interrelationships between nutrients.
d) To learn ration formulation technique, selection of feed ingredients for poultry and feed mill design and sanitation.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

1. Describe the poultry feeds and feeding and justify protein nutrition, energy nutrition, vitamin-minerals nutrition and water for meat and egg production.
2. Explain feeding standards for poultry, additives and Interpret the interrelationships of different nutrients.
3. Discuss ration formulation, feeding systems, feed storage, feed quality and enumerate about feed mill.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course content	Lectures
1.	Terminology related with poultry nutrition, objectives of poultry nutrition, history of poultry nutrition, principles of poultry feeding. Classification, nutritive values and anti-nutritional factors, quality assurance and evaluation of feed ingredients, Beneficial effects and limitations of various poultry feed ingredients. Difference between cattle and chicken digestion.	5

2.	**Proteins:** Protein requirement for growth, meat and egg production. protein quality, Plant protein versus animal protein.	3
2	**Energy (Carbohydrates and fats):** Sources, importance, energy content and utilization of commonly used carbohydrates and fats in poultry ration.	2
2.	**Vitamins and minerals**: Role, requirements, sources and deficiency diseases of vitamins and minerals, and their prevention and control. **Water**: Role, requisites of safe water and control of water quality for poultry.	3
3	**Interrelationships**: Interrelationships between protein and energy, Ca and P, different amino acids, vitamins and minerals	2
3.	**Feeding standard**: Feeding standards for poultry, Feeding systems. Feed storage and quality. **Feed Additives:** Definition, importance, classification, mode of action and residual effects of feed additives.	3
3.	**Ration formulation**: Ration and balanced ration. Comprehensive guide on all poultry feed ingredients. Factors affecting selection of feed ingredients for poultry. Factors to be considered during ration formulation. Factors affecting feed intake, Principles and practices involved in the "least-cost feed" formulation.	5
3.	Definition of feed conversion ratio**,** ways to improve feed efficiency, Factors affecting the FCR.	2
3.	**Related topics:** Inclusion level of different feed ingredients**,** anti- nutritional factors of different feed ingredients, Cholesterol in egg, pigmentation of broiler and egg yolk, Feed mill design, and sanitation of feed storage room.	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc**.**

Suggested Reading Lists
1. Reddy, V R and D. T. Bhosale, D T. 2004. Hand book of Poultry Nutrition. International Book distribution Co., Chabagh, Lucknow, UP, India.
2. Leeson, S. and Summers, J. 2001. Nutrition of the Chicken University Books, P.O. Box 1326, Guelph, Ontario, Canada N1H 6NB.
3. Commercial Poultry Nutrition; Leeson, S. and Summers, J. 2008. Nottingham University Press, Manor Farm, Church Lane, Thrumpton, Nottingham, NG11 0AX, England.
4. Bolton, W. and Blair, R. 1974. Poultry Nutrition Great Britain. Ministry of Agriculture, Fisheries and Food.; Blair, R., Ph.D.; Bolton, W. (William), London: H.M.S.O.
5. Patrick, H. and Schaible, P J. 1980. Poultry feeds and Nutrition. Published by Avi Publishing Company, Inc., Westport, CT. 2nd. Edition.
6. Nutrient Requirements of Poultry, 9th Revised Edition; National Research Council (NRC), Washington D.C, USA; 1994.
7. Comparative avian nutrition; K.C. Klasing, K C. 1998. Comparative avian nutrition. Cab International.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	**:**	Poultry Feeds and Feeding
2.	**Course Code**	**:**	0841VAS228
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Second Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Md. Shariful Islam

9. Rationale of the Course:

This is a practical course of Poultry Science that describes the definition & related terms of poultry nutrition and feeding, introduces various types of feed ingredients used in poultry ration. It also entitles the preparation and formulation of hand-mixed ration & balanced ration for various types of poultry. It deals with practices of grinding, processing, steaming, drying, mixing & sacking of feeds, and calculation of the requirements of feeding & watering space and feed for different types of birds. It describes computer package program for formulating "least cost ration" for poultry & quality tests of feed ingredients and mixed feed. Therefore, this course provides students the fundamental knowledge of poultry feeds and feeding in modern farming. It aids students in knowing how to handling feed ingredients and managemental approaches to produce balanced ration in modern poultry production systems.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

- **a)** Know different terms related to poultry nutrition and feeding; various types of feed ingredients used in poultry ration in Bangladesh.
- **b)** Preparation & formulation of hand mixed ration & balanced ration for various types of poultry.
- **c)** Introduce with practices of grinding, processing, steaming, drying, mixing & sacking of feeds and calculation of the requirements of feeding & watering space and feed for different types of birds.
- **d)** Gain knowledge of computer package programs in formulating "least cost ration" for poultry & quality tests of feed ingredients and mixed feed.
- **e)** Acquire practical experiences & techniques of quality feeds and feeding by field trips to commercial poultry farms and feed mills in Bangladesh.

11. Course Learning Outcome (CLO) (Maximum of 3 CLO):

After the successful completion of the course, the students will be able to:

CLO1: prepare & formulate hand mixed ration & balanced ration for various types of poultry.

CLO2: grinding, processing, steaming, drying, mixing & sacking of feeds, and calculation of the requirements of feeding & watering space and feed for different types of birds by visiting modern feed mills and farms.

CLO3: formulate "least cost ration" for poultry & quality tests of feed ingredients and mixed feed in relation to quality eggs and meat production.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Introduction to various feed ingredients used in poultry with their composition.	3
1	Demonstration of various feed ingredients for poultry. Identification of different poultry feed ingredients. Identification of various Federer and waterer.	3
1	Preparation of hand mixed ration of poultry. Formulation of balanced ration for various types of poultry.	3
2	Identification of different equipment and appliances for feed grinding, mixing and pellet preparation. Visit a modern feed mill and Poultry farm.	2
2	Estimation of the requirements of feeding & watering space and feed for different types of birds.	1
3	Practicing computer package program in formulating "least cost ration" for poultry	1
3	Introduction to quality tests of feed ingredients and mixed feed in relation to quality eggs and meat production.	1

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. Scott, M. L., Nesheim, M. C. and Young, R. J. M. L. 1982. Nutrition of the Chicken. Scott and Associates, Ithaca, New York.
2. Leeson, S. 1991. Commercial Poultry Nutrition. Watt Book Services 122 S. Weslay Ave. Mount Morris, USA.
3. Ewing, W. and Ray, R. W. 1951. Poultry Nutrition. 4th edn. Esing Publishers, South Pasadena, California, USA.
4. Bolton, W. and Blair, R. M. A. F. F. 1979. Poultry Nutrition. Her Majesty's Stationery Office, 49, High Holborn, London WCIV 6HB

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	**:**	Animal Genetics
2.	**Course Code**	**:**	0841 VAS 229
3.	**Course Type**	**:**	Theory
4.	**Course Level**	**:**	Second Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	2
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Md. Shariful Islam Professor Dr. Md. Akhtarul Islam

9. Rationle of the Course:
This is a basic course of Genetics which describes definition, scope, importance, various related terms, early development and modern concept of genetics, branches of genetics, application of genetics in livestock and poultry. It also designates principles of inheritance, the law of segregation and the law of independent assortment, modification of Mendelian ratios, lack of dominance, lethal genes, epistasis, linkage and crossing over. It also deals with Sex determination and sex linkage, Gene expression, Mutation, Chromosomal aberration, Variation in chromosome number, Hereditary defects and genetic resistance to diseases, and Multiple gene effects. Therefore, this course provides students the fundamental knowledge of animal genetics.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

- **a.** Recognize different terms related to Genetics, scope, importance, early development and modern concept of genetics, branches of genetics, application of genetics in livestock and poultry.
- **b.** Introduce various principles of inheritance, the law of segregation and the law of independent assortment, modification of Mendelian ratios, lack of dominance, lethal genes, epistasis, linkage and crossing over.
- **c.** Familiar with Mechanism of sex determination; free-martin, intersexes and super sexes, sex-linked, sex-influenced and sex-limited characters.
- **d.** Acquire knowledge of genes and chromosomes with their classification and importance.
- **e.** Learn mutation, chromosomal aberration, variation in chromosome number and quantitative genetics.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

CLO1: know classical & Mendelian Genetics, its scope and importance in livestock and poultry.
CLO2: understand various principles of inheritance and Mechanism of sex determination, sex-linked, sex-influenced and sex-limited character.

CLO3: recognize genes and chromosomes with their classification and importance, mutation, chromosomal aberration, variation in chromosome number and quantitative genetics.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Definition, scope, importance, early development and modern concept of genetics. Different terminology used in Genetics.	2
1	Classical and Modern Genetics, Branches of Genetics, the law of segregation and the law of independent assortment, modification of Mendelian ratios, lack of dominance, Co-dominance, Mono and dihybrid cross.	4
1	Different gene actions, lethal genes, epistasis, linkage and crossing.	4
2	Details of Feather of Mendelian genetics, and principles of inheritance.	3
2	Mechanism of sex determination; free-martin, intersexes and super sexes, sex-linked, sex-influenced and sex-limited characters.	4
2	Sexing of day-old chicks practiced in poultry farms.	2
3	Different types of Genes with their structure and importance. Chromosomes with their classification and importance.	3
3	Mutation, Chromosomal aberration, Variation in chromosome number	3
3	Details of quantitative genetics.	3

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. Lasley, J. F. 1987. Genetics of livestock improvement. 3rd edn. Prentice Hall, Engle Wood Cliffs, New Jersey.
2. Nicholas, F. W. 1987. Veterinary Genetics. Claridon Press, Oxford.
3. Warwick, E. J. and Legtes, J. E. 1987. Breeding and Improvement of Farm Animal. 7th edn. McGraw-Hill Book Co. Inc., New York.
4. Malcolm B. Willis. 1991. Introduction to Practical Animal Breeding. Dalton's Third edn. Blackwell Scientific Publication, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year Second Semester

Course Outline

1.	**Course Title**	**:**	Animal Genetics
2.	**Course Code**	**:**	0841VAS232
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Second Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	**1**

7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Md. Shariful Islam

9. Rationale of the Course:
This is a practical course of Genetics which describes definition, characteristics of an individual selected to be experimental animal for study, morphology of Drosophila, cell divisions, and gametogenesis. It also designates principles of segregation and estimation of probability. It also explains the details of multiple alleles (ABO blood grouping). Therefore, this course provides students the practical knowledge of cell division, segregation, probability and blood grouping techniques.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

- **a.** Know different characteristics of an individual selected to be experimental animal for study, equipment used in genetical study, and morphology of Drosophila.
- **b.** Recognize various stages of cell divisions, gametogenesis, and preparation of onion root tips for evaluation of cell division under microscope.
- **c.** Introduce with principles and formula of segregation with example.
- **d.** Gain knowledge how to estimate probability of calving and others.
- **e.** Know how to determine blood group from given specimens and principles of multiple alleles.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

CLO1: recognize introductory genetics, equipment used in genetical study, and morphology of Drosophila.

CLO2: understand various stages of cell divisions, gametogenesis, and how to prepare onion root tips, principles and formula of segregation and probability estimation.

CLO3: know how to determine blood group from given specimens and principles of multiple

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	Course content	Lectures
1	Study on introduction of Genetics and different characteristics of an individual selected to be experimental animal for study.	2
1	Acquainted with equipment used in genetical study	2
1	Study on morphology of Drosophila	2
2	Study on various stages of cell divisions	2
2	Study on preparation of onion root tips for evaluation of cell division under microscope.	2
2	Study on principles, formula, and exercise on segregation.	2
2	Study on probability estimation	1
3	Study on determination of blood group from given specimens by ABO blood group system.	1

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. Lasley, J. F. 1987. Genetics of livestock improvement. 3rd edn. Prentice Hall, Engle Wood Cliffs, New Jersey.
2. Nicholas, F. W. 1987. Veterinary Genetics. Claridon Press, Oxford.
3. Warwick, E. J. and Legtes, J. E. 1987. Breeding and Improvement of Farm Animal. 7th edn. McGraw-Hill Book Co. Inc., New York.
4. Malcolm B. Willis. 1991. Introduction to Practical Animal Breeding. Dalton's Third edn. Blackwell Scienyific Publication, London.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	:	Endocrinology and Reproductive Physiology
2.	**Course Code**	:	0841VAS301
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Third Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. S.M. Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course:

This is a fundamental course of reproductive and endocrinology which acquainted with knowledge about physiological activities of different endocrine glands and their secretion upon the body. This course also covered the reproductive physiology of male and female animal. It helps students to know about endocrine and reproductive physiology of animal body.

10. Intended Learning Objectives (ILOs):

a. To understand and be able to explain the Veterinary endocrine and reproductive Physiology and different terms and scope of reproductive physiology.
b. To know the functions of different organs reproductive system and secretion of endocrine gland
c. To help understandings related subjects of veterinary science like Anatomy, pathology, surgery and medicine etc.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1. To get the knowledge about physiological activities of different endocrine glands and their secretion upon the body.
CLO2. To know the synthesis and functional physiology of various hormones.
CLO3. To know the reproductive physiology of male and female animal.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	2	2
CLO2	2	2	2	2	2
CLO3	1	3	1	1	1

13. Lesson Plan:

CLO	Course content	No. of Lectures
1	Define Endocrinology, hormones Characteristics /properties of hormone, interrelation of endocrine and nervous system, Mechanism of action and difference between protein and steroid hormone.	3
1	Learn about important endocrine glands and their hormones, Regulation of hormone secretion, Learn about pituitary gland with its hormone and their role, non pituitary gonadotrophins.	3
1	ADH and oxytocin, Synthesis and role of thyroidal hormones with hypothyroidism and hyperthyroidism. Relationship between thyroid and parathyroid gland.	3
1	Regulation of PTH synthesis, calcitonin and vitamin, Role of pancreas and hormones involved in carbohydrate metabolisms.	3

1	Glucocortiocoid, mineralocorticoid, rennin angiotensin mechanism, Synthesis and function of epinephrine and norepinephrine, Pineal gland –biological clock.	2
3.	Define Reproduction and importance of reproduction. Gonad, functions of gonad, primary sex organ, function of primary sex organ. Male sex organ, the genital system of different species, function of accessory and primary sex organ, secondary sexual characteristics of male.	3
3	Define Spermatogenesis and learn about different stages of spermatogenesis, Regulation of reproduction in the male animal, Semen, composition of semen, Function of testosterone, chryptorchidism, impotency, male climax, male sexual act, stage of male sexual act	3
3	Structure of female genital system, ovary, follicle – primodial, growing follicle, graafian and atretic. Interrelationship among hypothalamus, pituitary gland and ovary.	3
3	Hormonal events in folliculogenesis, ovarian endocrinology, and function of estrogen, progesterone and relaxin, prostaglandin, function of prostaglandin. Estrous cycle, signs of estrous in cow, phases of estrus cycle, hormonal changes during estrus cycle, variation of estrus cycle in different species, changes in reproductive tract during estrous cycle	3
3	Transport and survival of gamete, sperm distribution. Ovulation, fertilization, syngamy, embryo transportation, gestation, parturition, lactation, mammogenesis, estrous synchronization.	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Arora M.P. (1992). Animal Physiology. 3rd edition. Himalaya Publishing House Pvt. Ltd.
2. Dukes H.H. (1977). Duke's Physiology of Domestic Animals. 11th edition. Cornell University Press.
3. Langley L.L (1971). Review of Physiology. 3rd edition. Mac-Graw Hill.
4. Sharma I.J., Sing H.S (2000), Students Laboratory Manual of Veterinary Physiology. 1st edition. Kalyani Publishers.
5. Guyton A.C., Hall J.E (2006). Text book of Medical Physiology. 11th edition. Elsevier Saunders.
6. Bhattacharyya B. (2000). Text book of Veterinary Physiology. 1st edition. Kalyani Publishers.
7. Cunningham J.G (1997). Text book of Veterinary Physiology. 2nd edition. W. B. Saunders Company.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	:	Endocrinology and Reproductive Physiology
2.	**Course Code**	:	0841VAS302
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Third Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	**1**
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. S.M.Kamruzzaman Professor Dr. Rokeya Sultana

9. Rationale of the Course:
This is a practical course of Endocrinology & Reproductive Physiology which acquainted with procedure Determination of Total thyroxin (T4), Thyroid stimulating hormone (TSH), Follicle stimulating hormone (FSH), Luteinizing hormone (LH), by Enzyme Immunoassay (EIA) from serum. It helps students to know about

Collection and examination of semen sample, Pregnancy diagnosis (chemical, hormonal and behavioral approaches) of animal.

10. Intended Learning Objectives (ILOs):

a. Determination of different steroid hormone by Enzyme Immunoassay (EIA) from serum.
b. Understand about the collection and examination of semen of animal.
c. To know Pregnancy diagnosis (chemical, hormonal and behavioral approaches) and stages of estrus of animal body.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:
CLO1 To know diagnose the problems related of thyroid disorder, FSH, pituitary and ovarian disorder.
CLO2. To know process of pregnancy diagnosis and understand the collection and preserve the semen samples
CLO3. To know the Identify different stages of estrous cycle and parturition.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	2	2	2	1
CLO2	1	2	2	2	1
CLO3	1	3	2	2	1

13. **Lesson Plan**

CLOs	Course Contents	Lectures
1	Measure total thyroxine, diagnose the problems related to thyroid disorder.	5
1	Measure TSH, Diagnose the problems related to pituitary and thyroid disorder.	4
1	Measure FSH, Diagnose the problems related pituitary and ovarian disorder.	3
1	Measure LH, Diagnose the problems related pituitary and ovarian disorder.	5
2, 3	Collect and preserve the semen samples, Effects of temperature on scrotal size, Identify different stages of estrous cycle, Diagnose pregnancy by various approaches.	7

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. A Text book of Practical Physiology. Ghai C.L., 5th edition. Jaypee Brothers Medical Publishers (P) Ltd., Hyderabad *2003*.
2. Animal Physiology. Arora M.P., 3rd edition. Himalaya Publishing House Pvt. Ltd 1992.
3. Duke's Physiology of Domestic Animals. Dukes H.H., 11th edition. Cornell University Press 1977.
4. Review of Medical Physiology. Ganong W.F., 18th edition. APPLETON and LANGE 1977.
5. Review of Physiology. Langley L.L., 3rd edition. Mac-Graw Hill 1971.
6. Students Laboratory Manual of Veterinary Physiology. Sharma I.J., Sing H.S., 1st edition. Kalyani Publishers 2000.
7. Text book of Medical Physiology. Guyton A.C., Hall J.E., 11th edition. Elsevier Saunders 2006.
8. Text book of Veterinary Physiology. Bhattacharyya B., 1st edition. Kalyani Publishers 2000.
9. Text book of Veterinary Physiology. Cunningham J.G., 2nd edition. W. B. Saunders Company 1997.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1. **Course Title** : Veterinary Arthropodology
2. **Course Code** : 0841VAS 303
3. **Course** : Theory
4. **Course Level** : Third Year First Semester
5. **Session** : 2023-2024
6. **Course Credit** : 2
7. **Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. **Course Teachers** : Professor Dr. Moizur Rahman
   Professor Dr. Lovely Nahar

9. Rationale of the Course:

Veterinary arthropodology, a theoretical course, provides the fundamental understanding on arthropods of veterinary importance which includes general morphology, biology, life history of insects, arachnids and pentastomids and their effects on animal and birds. The course describes taxonomy, morphology, biology, epidemiology, life cycle, pathogenic significance, control etc. of different arthropods which causes direct and indirect effects on host. The knowledge of this course helps students to understand arthropods of animals and birds as they cause injurious effects and acts as vector of different life threating organism.

10. Intended learning Objectives (ILOs):

a. To give basic understanding of host-pathogen-vector relationship needed for clinical studies and future professional development.
b. To understand the taxonomy, morphology, biology and relevant host parasite relationship and vector importance of arthropod parasites of animals and birds.
c. To provide knowledge on effects of arthropods on vertebrate host
d. To be familiar with arthropod borne infection and their transmission strategies and control measures.
e. To understand detail about control of different types of arthropods of veterinary importance.

11. **Course Learning Outcomes (CLO):**
At the end of the course, students will be able to:
CLO 1. explain the historical development of Entomology, general morphological features and classification of arthropods and arthropod vectors
CLO 2. Identify, recognize and describe the morphology and biology (life cycle and behavior), transmission, vector potentiality of arthropods of veterinary and medical importance in Bangladesh.
CLO 3. Explain the principles of general control strategies against the arthropod's pests and vectors.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. **Lesson Plan**:

CLOs	**Course content**	**No. of Lectures**
1	General concepts, taxonomy and classification of arthropods	3
1,2	Class- Insecta, Subclass Pterygota (Order- Blatelleria (Cockroaches), Hemiptera (Bugs)	2
1,2	Class- Insecta, Subclass Pterygota (Orders- Hymenoptera (bees, ants, wasps), Coleoptera (Beetle), Order- Lepidoptera (Moths and butterfly), Phthiraptera (Lice), Siphonaptera (Fleas)	4

1,2	Order- Diptera (Suborder – Nematocerra (Families- Culicidae, Psychodidae, Ceratopogonidae, Similiidae)	4
1,2	Order- Diptera (Suborder – Brachycera (Families- Tabanidae)	2
1,2	Order- Diptera (Suborder – Cyclorrhapha (Nauisance, Biting, and myiasis and strike causing flies)	3
1,2	Class:- Arachnida, Order: Acari (Ticks)	4
1,2	Class:- Arachnida, Order: Acari (Mites)	3
1,2	Class:- Pentastomida (Tongue worm)	1
3	General control approaches of arthropods of veterinary and medical importance	1

14. Teaching-learning strategy: Lecture, demostration, Q-card, presentation, discussion, question answering, feed back etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists/Essential Readings:

1. 1. E. J. L. Soulsby. Helminths, Arthropods and Protozoa of Domesticated Animals. 2012. 7th edn. (ELBS and Baillire and Tindall).
2. Urquhart G. M. et. al. Veterinary Parasitology. 1996. 2nd edn. (Blackwell).
3. Wall, R. and Shearer, D. Veterinary Entomology. 1997. 1st edn. (Chapman and Hall)
4. Mullen, G.R., Durden, L.A. 2009. Medical and Veterinary Entomology. 2nd Edn. Academic Press.
5. Taylor, M.A., Coop, R.L. and Wall, R.L. 2016. Veterinary Parasitology, 4th Edition. Blackwell Publishing Ltd, Oxford.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1. **Course Title** : Veterinary Arthropodology
2. **Course Code** : 0841VAS 304
3. **Course** : Practical
4. **Course Level** : Third Year First Semester
5. **Session** : 2023-2024
6. **Course Credit** : 1
7. **Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. **Course Teachers** : Professor Dr. Moizur Rahman
   Professor Dr. Lovely Nahar

9. Rationale of the Course:

Veterinary arthropodology, a practical course, provides the fundamental understanding on arthropods which includes general morphology of insects, arachnids and pentastomids and their identification. The course describes the procedure of sample collection, processing, examination and identification of different arthropods which causes direct and indirect effects on host. The knowledge of this course helps students to recognize and identify the arthropods of animals and birds which are life threating organism.

10. Intended learning Objectives (ILOs):

a. To make familiar with the preparation and usages of common laboratory reagents.
b. To demonstrate the collection, preservation and shipment of arthropod samples, preparation of permanent slides.
c. To make competent on morphological identification of maggots and body parts (wings, legs, antennae and mouth parts) of insects
d. To identify of lice, fleas, mosquitoes, flies, ticks, mites and tongue worms (pentastomids).
e. To understand the techniques and detect arthropod infestations in clinically sick or apparently healthy animals.

11. **Course Learning Outcomes (CLO):**

At the end of the course, students will be able to:

CLO 1. mention the commonly used laboratory reagents and prepare the reagents.

CLO 2.. explain the methods of collection of arthropod samples and preparation of permanent/ temporary slides.

CLO 3. recognize the wings, legs, antennae of insects and identify and distinguish lice, fleas, maggots, flies, mosquitoes, ticks, mites and pentastomids of veterinary and public health importance.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. **Lesson Plan**:

CLOs	**Course Contents**	**No. of Lectures**
1	Introduction with the common equipment's, appliances, chemicals and reagents used in Entomological studies.	1
2	Sample collection, preservation, shipment and processing of arthropods and preparation of permanent slides of arthropods.	2
2, 3	Morphology and identification of fly, lice and bugs	4
2, 3	Morphology and identification of flea	2
2, 3	Morphology and identification of important ticks	2
2, 3	Morphology and identification of important mites	2
2, 3	Morphology and identification of tongue worms, maggots and crustaceans	2

14. Teaching-learning Sstrategy: Lecture, demostration, presentation, discussion, question answering etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists:

1. Soulsby E. J. L. Helminths, Arthropods and Protozoa of Domesticated Animals. 1982. 7th edn. (ELBS and Baillire and Tindall).

2. Urquhart G. M. et al. Veterinary Parasitology. 1996. 2nd edn. (Blackwell).

3. Wall, R. and Shearer, D. Veterinary Entomology. 1997. 1st edn. (Chapman and Hall) 4. Mullen, G.R., Durden, L.A. 2009. Medical and Veterinary Entomology. 2nd Edn. Academic Press.

5. Taylor, M.A., Coop, R.L. and Wall, R.L. 2016. Veterinary Parasitology, 4th Edition. Blackwell Publishing Ltd, Oxford.

6. Cable, R. M.(1967): An illustrated Laborator Course Outline

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1	**Course Title**	:	Pathology of Infectious and Non-infectious Diseases
2	**Course Code**	:	0841VAS305
3	**Course Type**	:	Theory
4	**Course Level**	:	Third Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	2
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	1. Dr. Rashida Khaton 2. Dr. Afia Khatun

9. Rationale of the Course:
This course is a continuation of general and systemic pathology and present pathologic basis of animal diseases at the molecular, cellular, tissue, organ, and functional levels. It deals with diseases focusing on pathogenesis and pathology due to various infectious microorganisms and non-infectious agents like extraneous poisons or metabolic disorders.

10. Intended learning Objectives (ILOs):

a. To know pathogenesis and pathology of infectious and non-infectious diseases of animals.
b. To diagnose diseases caused by different infectious and non-infectious agents.
c. To know the diagnosis and staging of disease for aiding in management of disease.

11. Course Learning Outcomes (CLOs):

After successful completion of the course, students will be able to

1. recognize and describe gross and microscopic pathology specific for different infectious and non-infectious diseases
2. describe the pathogenesis of disease and determine a reasonable prognosis of infectious and non-infectious diseases
3. use of the appropriate medical terminology for pathology.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	×	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan

CLOs	Course content	Lectures
1, 2, 3	**Bacterial diseases:** Anthrax, black quarter, pasteurellosis, clostridial infections, strangles, glanders, colibacillosis, brucellosis, campylobacteriosis, tuberculosis, paratuberculosis, actinomycosis, actinobacillosis, shigellosis, listeriosis, leptospirosis, dermatophilosis, leprosy, swine erysipelas.	4
1, 2, 3	**Viral Diseases:** Peste des petits ruminants, foot and mouth diseases, bovine virus diarrhea-mucosal diseases complex, ephemeral fever, infectious bovine rhinotracheitis, rabies, pseudorabies,infectious canine hepatitis, canine distemper, pox, papillomatosis, classical swine fever (hog cholera), prion disease.	4
1, 2, 3	**Parasitic diseases:** Fascioliasis, stomach worm infection, hookworm infection, stephanofilariasis, ascariasis and other nematodiasis, coccidiosis, toxoplasmosis, babesiosis, trypanosomiasis, trichomoniasis, hydatidosis, and other tapewormsinfections, mite infections.	2
1, 2, 3	**Fungal Diseases:** Rhinosporidiosis, coccidioidomycosis, cryptococcosis, ringworm, aspergillosis, candidiasis, histoplasmosis, blastomycosis**.**	2
1, 2, 3	**Diseases caused by Mycoplasma:** Bovine pleuropneumonia, contagious caprine pleuropneumonia**,** infectious bovine keratoconjuctivitis, enzootic pneumonia of calve, bovinemycoplasmal arthritis, swine mycoplasmal arthritis and polyserositis.	2
1, 2, 3	**Diseases caused by Rickettsia:** Q- fever, salmon disease of dogs and foxes, Heartwater of cattle, sheep and goats, anaplasmosis, haemobartonellosis, eperythrozoonosis.	2
1, 2, 3	**Diseases caused by Chlamydia:** Psittacosis, sporadic bovine encephalomyelitis, enzootic abortion of ewes, chlamydial abortion in cattle, chlamydial pneumonia in cattle and sheep.	2
1, 2, 3	**Pathogenesis and pathology of metabolic diseases:** Ketosis, milk fever, grass tetany.	2
1, 2, 3	**Pathogenesis and pathology of metabolic diseases:** Rickets, osteomalacia, fibrous osteodystrophy.	1

1, 2, 3	**Pathogenesis and pathology of diseases caused by extraneous poisons:** Classification of extraneous poisons on the basis of pathologic features. Pathology of snake venoms, arsenic, urea, oleander, copper.	2
1, 2, 3	**Pathogenesis and pathology of diseases caused by extraneous poisons:** Carbon tetrachloride, gossypol, vetch, sulfonamides, selenium, dicoumarin, bracken fern, nitrate, nitrite, kale, rape, mycotoxins, organophosphates, strychnine, lathyrus, coffee senna, coyotillo.	2
1	**Toxicologic Pathology:** Definition, scope, measures of toxicity, toxicity testing in drug development	3

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists/Essential Readings:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th edition. Williams and Wilkins, Philadelphia, USA.
2. Jubb KVF, Kennedy PC and Plamer N. 2007. Pathology of Domestic Animals. Vol. 1, 2 and 3. 5th edn. Academic Press, Inc, New York, USA.
3. Radositis OM, Gay CC, Blood DC and Hincheliff KW. 1998. Veterinary Medicine, A textbook of Diseases of cattle, sheep, Pigs, Goats and horses. 9th edn. W.B. Saunders Co. Ltd, London, UK.
4. Zachary JF and McGavin MD. 2011. Pathologic Basis of Veterinary Disease, 5th edn. Mosby New York, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1	**Course Title**	:	Pathology of Infectious and Non-infectious Diseases
2	**Course Code**	:	0841VAS306
3	**Course Type**	:	Practical
4	**Course Level**	:	Third Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	1. Dr. Rashida Khaton 2. Dr. Afia Khatun

9. Rationale of the Course:

This course focusses on the practical aspects of diagnosis of diseases caused by infectious agents, metabolic disorders and extraneous poisons in animals based on gross and microscopic alteration in cells, tissues and organs. The students will acquire knowledge in differentiating pathology due to different etiological agents.

10. Intended learning Objectives (ILOs):

1. To know the practical aspects of pathology of various infectious and non-infectious diseases of animals.
2. To diagnose infectious and non-infectious diseases and know the diagnostic basis for comparative pathology.
3. To know the pathology's role in the diagnosis,staging and prognosis of animal diseases.

11. Course Learning Outcomes (CLO): After successful completion of the course, students will be able to

1. recognize gross and microscopic alterations associated with different infectious agents, extraneous poisons or metabolic disorders animals for diagnosis of disease.
2. identify and differentiate pathological changes due to differences in etiological agents.
3. predict on the stage and prognosis of the disease by using appropriate medical terminology for pathology.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	×	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan

CLOs	Course content	Lectures
1, 2, 3	Gross and microscopic lesions of bacterial diseases	2
1, 2, 3	Gross and microscopic lesions of viral diseases	3
1, 2, 3	Gross and microscopic lesions of fungal diseases	2
1, 2, 3	Gross and microscopic lesions of mycoplasma, chlamydia and rickettsial diseases	2
1, 2, 3	Gross and microscopic changes of metabolic diseases	2
1, 2, 3	Gross and microscopic lesions of extraneous poisons	2
1, 2, 3	Gross pathology of Infectious and no-infectious diseases	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th edition. Williams and Wilkins, Philadelphia, USA.
2. Jubb KVF, Kennedy PC and Plamer N. 2007. Pathology of Domestic Animals. Vol. 1, 2 and 3. 5th edn. Academic Press, Inc, New York, USA.
3. Radositis OM, Gay CC, Blood DC and Hincheliff KW. 1998. Veterinary Medicine, A textbook of Diseases of cattle, sheep, Pigs, Goats and horses. 9th edn. W.B. Saunders Co. Ltd, London, UK.
4. Zachary JF and McGavin MD. 2011. Pathologic Basis of Veterinary Disease, 5th edn. Mosby New York, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1	**Course Title**	:	Virology
2	**Course Code**	:	0841VAS307
3	**Course Type**	:	Theory
4	**Course Level**	:	Third Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	2
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	Prof. Dr. K. M. Mozaffor Hossain Prof. Dr. Md. Hakimul Haque

9. Rationale of the Course:

Virology is a subfield of microbiology or of medicine which describes the components and properties of viruses, classification, their replication schemes and how the various types of viruses infect and replicate in host cells, and molecular analysis of viral proteins and nucleic acids. This course will provide students the foundational knowledge of various aspects of animal, bird and human viruses, with emphasis on the structure, genetic material, classification and evolution, their ways to infect and exploit host cells for reproduction, their interaction with host organism physiology and immunity, the diseases they cause, the techniques to isolate and culture them, and their use in research and therapy. In addition, viral diagnostics, control, prevention and treatment of viral infection will be presented.

10. Intended learning Objectives (ILOs):

a) To understand the general virus structure, genome, and life cycle.
b) To know and be able to explain the fundamental differences between each virus families by genome composition, capsid structure, genome structure and pathogenesis strategy.
c) To help understandings of the Host-Virus interactions.
d) To help disease diagnosis through methods and techniques used in virus diagnosis and reference
e) To know how to control, prevent, and treatment of viral infectious disease

11. Course Learning Outcomes (CLOs):

After successful completion of the course, students will be able to

4. know the basic principles of virus structure, classification, replication, growth, pathogenesis, recovery and vaccines with the use of veterinary examples.
5. compare possibilities and limits of methods and techniques used in virology diagnosis and reference
6. describe in outline each veterinary family and its important members with regard to viral characteristics, host-range, pathogenesis, clinical signs, immunity, epidemiology, diagnosis, control, prevention, and treatment.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	2	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan

CLOs	**Course content**	**Lectures**
1	Definition of virus by Andre Lwoff, Luria and Darnell International committee of taxonomy of virus Scope of virology Properties of virus: Feature of virus, and its uniqueness Difference of virus with other microorganisms. Explain different term like virion, viroid	2

1	History of virology: Contribution of different scientist in the field of virology, Iwanoski, Louis Pasteur, Loeffler and Frosch, Beijerinck, Walter Reed and Caroll, Remliger and Riffet Bay, Bon Prowzek, Woodruff and Good Pasture, Stanley, Dulbecco Origin of viruses: Regressive hypothesis, Cellular origin hypothesis, Coevolution hypothesis Virus Structure: Nucleic acid, Tegument, Capsid, Envelope, Icosahedral symmetry, Helical symmetry, Complex symmetry, Binal Symmetry	3
1, 2	Virus purification Inactivation of virus and preservation of virus Interferon	3
1	Viral taxonomy and basis for classification Viral replication Virus versus Cell interactions Host virus relationships at multicellular level Antiviral drugs	4
1	Viral genetic map and genome organization Definition and scope of molecular virology PCR, RT-PCR Cloning, sequencing and analysis of viral protein and nucleic acids	4
1, 3	Viral Immunity; Poxviridae	4
3	Herpesviridae; Asfarviridae and Adenoviridae; Papillomaviridae	4
3	Parvoviridae; Circoviridae; Reoviridae; Birnaviridae	4
3	Picornaviridae; Coronaviridae, Togaviridae and Flaviviridae, Orthomyxoviridae	4
3	Paramyxoviridae; Rhabdoviridae and Retroviridae	3
3	Prions	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

d. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

e. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

f. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

- Fenner's Veterinary Virology. N. James Maclachlan and Edward J Dubovi; Academic Press, 4th edition. 2010.
- Fundamental of Molecular Virology. Nicholas H Acheson; John Wiley & Sons Ltd, 2nd edition. 2011.
- Veterinary Virology. Frederick A. Murphy et al. Academic Press, 3rd edition. 1999.
- Veterinary Viruses. P.H. Russel and N. Edington, Edington and Russell. 1988
- Virology: Principles and Applications. John B. Carter and Venetia A. Saunders; John Wiley & Sons Ltd, 1st edition. 2007.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1	**Course Title**	:	Virology
2	**Course Code**	:	0841VAS308
3	**Course Type**	:	Theory
4	**Course Level**	:	Third Year First Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1

7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	Prof. Dr. K. M. Mozaffor Hossain Prof. Dr. Md. Hakimul Haque

9. Rationale of the Course**:**

This is a practical of Virology course which describes the selection, collection, transportation, preservation and preparation of virological specimens along with media, reagents and other necessary biologics for laboratory examination. This course will provide students the foundational knowledge of various techniques for the purification (Filters and filtration techniques) and cultivation (intact host systems, embryonated eggs and tissue culture systems) of viruses as well as analysis of viral proteins using Sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE), Coomassie birilliant blue strain and Western blotting.

10. **Intended learning Objectives (ILOs):**

a) To learn how to prepare media, reagents and other necessary biologics in the laboratory.
b) To understand the procedure of collection and preservation of virological samples..
c) To know how to prepare viral inoculums and understand the precaution that should be taken during preparing the viral inoculums.
d) To Know the procedure of virus cultivation in intact host, embryonated eggs and tissue culture systems
e) To help viral disease diagnosis via various methods

Course Learning Outcomes (CLO):

Upon completion of the course the graduate student will be able to:

1. compare possibilities and limits of methods and techniques used in the diagnosis of viral disease and reference
2. identify the viral morphology and biology which hel to diagnose viral diseases.
3. cultivate virus in various system, purify the virus etc.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	2	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan

CLOs	**Course content**	**Lectures**
1	Preparation of media, reagents and other necessary biologics in the laboratory. Collection and preservation of virological specimens	2
1	Preparation of viral inoculums, Filters and filtration techniques,	3
1	Cultivation of virus (Intact host in Tissue culture or in Avian embryo.	3
1	Purification of Virus, Preparation of 1% chicken RBC, Hemagglutination test (HA Test)	4
1	Titration of biological suspension, SDS-PAGE, Coomassie birilliant blue strain, Western blotting	4
1	Preparation of media, reagents and other necessary biologics in the laboratory, Collection and preservation of virological specimens	4
1	Preparation of viral inoculums, Filters and filtration techniques	4

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

g. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
h. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
i. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

- Fenner's Veterinary Virology. N. James Maclachlan and Edward J Dubovi; Academic Press, 4th edition. 2010.
- Fundamental of Molecular Virology. Nicholas H Acheson; John Wiley & Sons Ltd, 2nd edition. 2011.
- Veterinary Virology. Frederick A. Murphy et al. Academic Press, 3rd edition. 1999.
- Veterinary Viruses. P.H. Russel and N. Edington, Edington and Russell. 1988
- Virology: Principles and Applications. John B. Carter and Venetia A. Saunders; John Wiley & Sons Ltd, 1st edition. 2007.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	:	Systemic Pharmacology
2.	**Course Code**	:	0841VAS309
3.	**Course Type**	**:**	Theory
4.	**Course Level**	:	Third Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Prof. Dr. Mst. Rokeya Sultana, Prof. Dr. S. M. Kamruzzaman

9.Rationale of the Course:

This is an important course of medical science which describes drugs used in the treatment of diseases affecting different systems of the body. This course provides students the knowledge about pharmacological properties (chemical name and trade name, mode of action, indication, contraction, interaction, dose and dosage, adverse effects etc.) of the different drugs against specific diseases of the body system.

10.Intended learning Objectives (ILOs):

a. To understand about the diseases of the different systems of the body.
b. To know about pharmacological properties of drugs in details used in the treatment of diseases of the body system.
c. To help understandings of the related subjects of veterinary science like medicine, toxicology, forensic medicine and jurisprudence, surgery, zoo and laboratory animal management and hygiene etc.
d. To help prescription writing against diseases.
e. To perform successful treatment using combination of different drugs.

11.Course Learning Outcomes (CLOs):

At the end of the course, students will be able to:

1. familiar with the drugs used in the treatment and prevention and in some cases diagnosis of different diseases of the body system.
2. understand the interaction of drugs used in the treatment of diseases affecting different systems of the animal body.
3. know the use of appropriate drugs and combination of drugs against different diseases which will help in writing prescription.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5

CLO1	2	3			
CLO2	2	3			
CLO3	2	2	2	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13.Lesson Plan:

CLOs	Course Contents	Lectures
1,2,3	**Alimentary system:** Introduction, sialogogues, anti-sialogogues, emetics, anti-emetics, demulcents, stomachics, carminatives, antizymotics, intestinal astringents, laxatives, purgatives and anti-diarrhoeal agents.	5
1,2,3	**The heart and circulatory system:** Introduction, drugs affecting myocardial contractility and rhythmicity, drugs affecting heart, vasculature and peripheral circulation	4
1,2,3	**Respiratory system:** Introduction, expectorants, antitussives, bronchodilators, membrane shrinking drugs and respiratory stimulants	4
1,2,3	**Urinary system:** Introduction, anti-diuretics, diuretics, urinary antiseptics and drugs used in kidney studies	4
1,2,3	**Autonomic Nervous System:** Introduction, sympathomimetics, sympatholytics, parasymapthomimetics, parasympatholytics and ganglionic blocking drugs	2
1,2,3	**Central Nervous System:** Introduction, CNS stimulants, depressants, anaesthetics-local, regional and general.	2
1,2,3	**Endocrine and Nutritional Pharmacology:** Introduction, hormones & drugs affecting growth, reproduction and metabolism, fat and water soluble vitamins, minerals and miscellaneous nutrients.	4
1,2,3	**Haematopoietic system:** Introduction, anti-anaemic, haemostatic and anti-coagulant drugs.	1
1,2,3	**Dermatologic and Ophthalmic Pharmacology:** Introduction, drugs affecting skin, mucous membranes, ears and eyes	1
1,2,3	**Prophylactic Pharmacology:** Introduction, vaccine, antisera and diagnostic agents. **Miscellaneous Drugs:** Autacoids and anti-inflammatory drugs with special reference to histamine, peptide, prostaglandin and non- steroidal anti- inflammatory drugs	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists*:*

1. Jim E. Riviere, Mark G. Papich, 2018. Veterinary Pharmacology and Therapeutics, 10th edn. Wiley-Blackwell publishing company, USA.
2. Nicholas H. Booth and Leslie E. McDonald, 1988. Veterinary Pharmacology and Therapeutics. 6th edn. Iowa State University Press / Ames, USA.
3. Brander, G. C. and Pugh, D. M. 1991. Veterinary Applied Pharmacology and Therapeutics. 5th edn. R. J. Bywater & W. L. Jenkins, ELBS with Bailliere Tindall, UK.
4. Bertram G. Katzung. 2017. Basic and Clinical Pharmacology. 14th edn. McGraw-Hill Medical Publishing Division, New York.
5. Laurence L. Brunton, Bjorn C. Knollmann, Randa Hilal-Dandan, 2017. Goodman and Gilman's The Pharmacological basis of therapeutics. 13th edn. McGraw-Hill Medical Publishing Division, New York.
6. Clive P. Page, Michael J. Curtis, Michael J. A. Walker and Brian B. Hoffman, 2006. Integrated Pharmacology, 3rd edn. C.V. Mosby Co., USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	:	General Medicine, Animal Behavior and Welfare
2.	**Course Code**	:	0841VAS311
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Third Year First Semester
5.	**Session**	:	202**3**-202**4**
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course::
This course is meticulously designed to provide students with a thorough foundation in veterinary medicine. It examines the definitions, objectives, scope, and critical significance of general medicine while introducing essential terminology pertinent to the field. The curriculum prioritizes systematic methodologies for investigating anamnesis and restraint techniques, as well as the principles of clinical examination. It encompasses a comprehensive range of diagnostic methods, from basic to advanced clinical presentations and features, alongside contemporary diagnostic practices for identifying diseases across various health conditions. The course also addresses general principles of dysfunction, manifestations, and the diagnosis and treatment of altered systemic states affecting different organs and bodily systems. Students will investigate the physiological variations in clinical parameters, gaining insights into how these variations are influenced by factors such as aging, shifts in health status, microbial and parasitic challenges, environmental pressures, and other stressors, along with their respective clinical management strategies. Ultimately, this course establishes a solid framework for understanding veterinary medicine, preparing students for future expertise and practical application in the field.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To be familiar with the terminologies used in medicine as well as its history and scopes.
b. To acquire a foundational understanding of community and clinical medicine, along with the concepts of health and disease.
c. To offer insights into the techniques employed in animal clinical examinations.
d. To familiarize students with essential concepts and methodologies for diagnosing diseases and managing clinical cases effectively.
e. To develop a comprehensive understanding of various general and altered systemic states, along with their corresponding therapeutic interventions.

11.Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: To outline the history and key concepts, highlight the differences between clinical and community medicine, and impart a foundational understanding of various medical terms through the physical and clinical examination of animals.
CLO2: to describe the process of conducting a patient's general and specialized clinical examination, as well as the fundamental principles and techniques of diagnosis and disease management.
CLO3: To illustrate typical and comprehensive systemic conditions that encompass a wide range of clinical presentations and underlying pathophysiological mechanisms, providing students with a holistic understanding of these conditions and their implications for animal care.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	1	3	2
CLO2	2	3	1	3	2
CLO3	2	2	1	3	2

13.Lesson Plan:

CLOs	Course Contents	Lectures
1	**Introduction:** History, definition, classification, aim, objectives and scope of Veterinary Medicine. Its relationship is with other fields and laboratory disciplines.	2
1,2	**Health and diseases:** Definition, classification and etiology of diseases (direct and indirect, biological and non-biological causes)**,** definition of common clinical and diagnostic terms.	2
1,2	**Diagnosis of diseases:** Type of diagnosis, clinical diagnosis, clinical signs and findings (propaedeutics), principles of clinical examination, methods, steps, limitations of field and laboratory diagnosis.	2
1,2	**Procedure of clinical examination:** History taking – patient data (signalment), examination of environment and patients. General examination- distant inspection viz. assessing the 1) Behavior (Ethology)- Normal, Excitatory and depressive state 2) posture-normal, altered 3) gait- normal, abnormal 4) overall physical condition), close (vital signs) examination-respiration, pulse and temperature, physical examination and special examination of the body regions.	8
1,3	**General systemic states**: Disturbances of appetite, food intake and nutritional status-thirst, polyphagia, anophagia or aphagia, pica or allotriophagia, starvation, inanition; weight loss or failure to gain weight (ill-thrift)-shortfalls in performance, thriftiness in weaner sheep; physical exercise and associated disorders-exercise-associated diseases, poor racing performance and exercise intolerance in horses; septicemia, hypothermia, frostbite, hyperthermia, pyrexia, toxemia, shock, dehydration, sudden or unexpected death, electrolyte and acid-base imbalance diseases & disorders related to different body systems in various animal species.	10
1, 2	**Animal Welfare:** Definitions, mental, physical, and natural well-being, the concept of animal needs, anthropomorphism, welfare assessment, clinico-physiological indicators of welfare (both poor and good), and welfare concerns associated with the slaughter of various species. **Stress Medicine and Welfare**: Causes, magnitude of acute stress, activation of the sympathoadrenal medullary system and the HPA axis, stressors such as Transportation, Climate, Excessive physical efforts, Pain, Crowding, Housing conditions, behavioral contrasts (Quietness versus excitement), Herding/ Flocking instincts; Stress syndromes: Stress-Related Psychosomatic Disease, Stress and Susceptibility to Infection, Stress and Animal Welfare-The Five Freedoms concept (Bram bell, 1965), Stress and Metabolic Disease, Stress and Its Effect on Economic Performance, Management of Stress. **Animal Welfare Legislation**: Historical context, international treaties, conventions, statutes, national legislation, welfare codes, comparative statute law across countries, EU directives, EU regulations, case law, expert opinions, and community law.	2
1,2	**Treatment:** General principles of treatment; definition and scope of different types of treatment; factors of consideration in the treatment of food and non-food animals; principles of selection of drugs and determination of dose, route, frequency and duration of treatment; alternative medicine used in clinical and population veterinary practices.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15.Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
2. Chakrobarti.2007. A Textbook of Clinical Veterinary Medicine. 2nd Edn. Kalyani Publishers, India.
3. E. Bourguignon. 2016. Veterinary Medicine. 1st Edn. Bio-Green. India.

4. G.A. Conboy, A.M. Zajac. 2012. Veterinary Clinical Parasitology. Iowa State University Press, USA.
5. Samad, M. A. 2008. Animal Husbandry and Veterinary Science- Volume 2, , LEP publication No. 11, BAU Campus, Mymensingh.
6. S.E. Aiello & Michael A. Moses. 2016. The Merck Veterinary Manual. 11th Edn., John Wiley & Sons, Inc. USA

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	:	General Medicine, Animal Behavior and Welfare
2.	**Course Code**	:	0841VAS312
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Third Y**ear** First**t** Semester
5.	**Session**	:	202**3**-202**4**
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

This course is designed to equip students with the critical competencies required for clinical examination across diverse animal species with an emphasis on advanced animal handling techniques. Using in-depth case material sourced from established veterinary clinics, including the Teaching Veterinary Hospital and Research Centre RU, the Veterinary Clinic and Artificial Reproductive Centre at Narikelbaria, and the Upazila Livestock Offices & Veterinary Hospitals. Students will engage in complex clinical problem-solving exercises. These real-world case studies foster a deeper understanding of diagnostic techniques, therapeutic approaches and communication strategies crucial for professional practice. Through rigorous analysis and collaborative discussions, students will refine their ability to articulate clinical findings and treatment plans effectively in both written and verbal formats. The course is structured with a blend of expert-led lectures, hands-on lab sessions, and guided independent study, challenging students to apply theoretical knowledge in practical settings. Emphasizing critical thinking, it prepares students for advanced roles in veterinary practice by improving their ability to address multifaceted clinical scenarios, develop their diagnostic expertise, and strengthen their interpersonal skills in patient care and client interaction.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. To provide a hands-on proficiency in taking history using a problem-oriented approach.
b. To familiarize oneself with appropriate behavior and attire.
c. To impart communication skills expertise to animal patients, vet-clinicians, vet-nurses, office workers, and other students.
d. To familiarize students with case diaries of cases seen in Vet-hospitals and presentation techniques.
e. To be aware of the fundamentals of diagnosis and how to apply them to diagnose, treat, and control general and systemic clinical conditions.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1: learn about the fundamental and advanced tools and devices and how to use them in veterinary clinical medicine.

CLO2: conduct physical examinations, diagnostic assessments, prognoses, and diagnoses independently, along with clinical management. Ensure proper documentation by maintaining case summaries, laboratory reports, and case reports.

CLO3: writing prescriptions and provide essential veterinary medical care to animal patients.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	1	3	2
CLO2	2	3	1	3	2
CLO3	2	2	1	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction: Veterinary hospital and ambulatory clinical service, requirements and responsibility of the veterinary clinician.	1
1,2	Animal control: Methods and procedures Clinical examination of animals (healthy and sick): Signalment, history taking, general and special physical examination techniques. Distant inspection including demeanor and physical condition, physical examination of different organ-systems, rectal examination.	4
1,2	Methods of collection and physical examination, preservation and shipment of specimens: Feces, urine, blood, rumen fluid, milk, skin scrapings, CSF, lymph, abomasal fluid, plasma, serum, swabs, smears, etc.	1
1,2	Biopsy: Skin, lymph node, spleen, kidney, bone-marrow, liver.	1
1,2	Transfusion techniques: Diagnosis of electrolyte and acid-base imbalances, clinical practice of fluid and electrolytes and blood transfusion.	2
2, 3	Procedure of treatment (therapeutics): Methods of administration of drugs, principles of selection of drugs and determination of dose, route, frequency and duration of treatment, demonstration and dispensing of drugs and practice of prescription writing, clinical nutrition and care of animal patient.	4
2,3	Field trips to the Upazila Livestock Offices and Veterinary Hospitals offers students a valuable opportunity to gain practical knowledge and hands-on experience in veterinary practices. By exposing them to real-world clinical settings and reproductive technologies, these trips bridge the gap between theoretical learning and practical application. It also enhances their skills in diagnosis, animal handling, and clinical management, preparing them for real-life challenges through boosting their confidence and competence in veterinary medicine as future veterinarians.	1

14.Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15.Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Kelly, W. R. 1984. Veterinary Clinical Diagnosis. Bailliere Tindall, London.
2. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
3. Howard, L. 1993. Current Veterinary Therapy, Food Animal Practice. W. B. Saunders Co., Philadelphia.
4. Clinical examination of cattle. Rosenberger G. Blackwell Science Ltd. USA 1995.
5. Samad, M. A.2008. Animal Husbandry and Veterinary Science- Volume 1 , LEP publication No. 11, BAU Campus, Mymensingh.
6. Online resources.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	Course Title	**:**	Animal Breeding
2.	**Course Code**	:	0841VAS313
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Third Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor Dr. Md. Shariful Islam and Dr. Md. Akhtarul Islam

9. Rationale of the Course:
This course aims to explain genetic principles underlying animal improvement, including elementary population genetics, heritability, and repeatability. The course then covers selection methods, selection response; mating system development; and DNA marker technologies from a production systems perspective. Finally, this course introduces the steps required to design a program for breeding animals and teaches the genetic and statistical concepts needed to build a solid breeding program. In the course, the focus is on all aspects required to run breeding programs, either focusing on genetic improvement or conservation of genetic diversity.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

a. Define the concepts of animal breeding. Able to explain the role of animal breeding on animal genetic development and comprehend the importance of sustainability of animal genetic resources.
b. Explain the basis of variation and correlations among different sources of variation. Describe quantitative characters and their inheritance.
c. Describe the selection criteria, selection types and methods, and various breeding methods and their consequences.
d. Describe molecular genetic application on animals and how DNA markers can be used to increase genetic gain and maintain genetic diversity in breeding programs.
e. Explain emerging breeding technologies, breeding strategies and policies and their constraints, and future breeding plans.

11. Course Learning Outcomes (CLOs):
At the successful completion of the course, students will be able to;

CLO1: narrate the scientific concepts of animal breeding and how to apply the emerging breeding technologies in the animal breeding program.
CLO2: evaluate the selection methods and breeding plans for the further genetic improvement of the animals.
CLO3: design a breeding program for improving the desirable qualities of the animals with the need for genetic diversity and the long-term sustainability of the breeding program.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**

1	Definition of animal breeding its objectives and goals. A resource development - References on animal genetic resource development- The importance of reproduction science on supporting animal genetic resource development	04
2	Genetic basis of variation; Quantitative characters and their inheritance; Concepts of heritability and repeatability, methods of their estimation; Genetic and phenotypic correlations;	05
2	Criteria for selecting goals, Selection - one trait selection - multiple traits selection, the basis of selection, types of selection, selection methods, selection of superior animals, genetic gain and its measurement; traits of economic importance in cattle, buffalo, sheep, goat, and poultry; animal genetic resources, their conservation, and preservation	05
3	Pure Breeding: Inbreeding - close breeding and line-breeding, Genetic effects of inbreeding, Advantages, and disadvantages. Introduction to Cross Breeding: The effects of cross-breeding in farm animals, genetic effects, phenotype effects, heterosis, and genotype effect. Cross Breeding Types: Two breed or single cross, back cross or crisscrossing, Cyclical crossing, Rotational crossing, Advantages of cross-breeding, Reciprocal recurrent selection, Grading up	05
3	Molecular genetic application on animal - male line-trait inheritance - female line-trait inheritance - association of gene marker and economic value of animal	04
3	Emerging breeding technologies; Breeding strategies, national breeding policy; constraints and future breeding plans; Role of breed registry societies/associations in developed countries and its application in Bangladesh	05

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Bourdon, R. M., 2000. Understanding Animal Breeding. Prentice-Hall, Inc. Upper Saddle River, New Jersey
2. Lasley, J. F., 1987. Genetics of Livestock Improvement. Prentice-Hall International Inc. Englewood Cliffs, New Jersey.
3. Legates, J. E. and E. J. Warwick, 1990. Breeding and Improvement of Farm Animals. McGraw-Hill Publishing Co., New York.
4. Malcolm B. Willis. 1991. Introduction to Practical Animal Breeding. Dalton's Third edn. Blackwell Scientific Publications, London.
5. Oldenbroek, J. K., 1999. Gene banks and the conservation of Farm Animal Genetic Resources. DLO Institute for Animal Science and Health, The Netherlands.
6. Warwick, E. J. and Legtes, J. E. 1987. Breeding and Improvement of Farm Animal. 7th edn. McGraw-Hill Book Co. Inc., New York.
7. Willis, M. B.,2001. Dalton's Introduction to Practical Animal Breeding. Blackwell Science, Oxford.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	**:**	Animal Breeding
2.	**Course Code**	**:**	0841 VAS 314
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Third Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10**)**

8. Course Teachers : Professor Dr. Md. Shariful Islam

9. Rationale of the Course:
The scope of this course includes the estimation of genetic parameters and breeding values. The course is oriented to estimate the traits' heritability, repeatability, and correlation. The study also determines the mode of inheritance. The course then covers the estimation of selection differential & selection response. This course will predict the rate of inbreeding for simple situations; calculate family relationships and inbreeding coefficients. The course is also oriented to estimate the breeding value of animals using information from records to determine the superior individuals.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

1. Estimate gene and genotype frequencies in animal production
2. Demonstrate the heritability, repeatability, and statistical essential in Animal Breeding
3. Describe the categories of relationships and evaluate coefficients of relationship and inbreeding.
4. Predict the genetic parameters of the animal breeding program.
5. Evaluate the livestock based on own performance, pedigree, and progeny

11. Course Learning Outcomes (CLOs):
At the successful completion of the course, students will be able to:

CLO1: predict the rate of inbreeding for simple situations, calculate gene and genotype frequencies, family relationships, heritability, repeatability and inbreeding coefficients in pedigrees,
CLO2: rank the animals by estimating the breeding value of animals, using single or multiple sources of information.
CLO3: Evaluate breeding programs in terms of response to selection and genetic diversity.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	Course content	Lectures
1	Calculation of gene & genotype frequencies	02
1	Estimation of statistical essentials, heritability, repeatability, and genetic correlations	04
1	Estimation of selection differential & selection response, construction of selection index	03
1	Measurement of coefficient of inbreeding and relationship	02
2	Calculation of breeding values from single and repeated records; Estimation of genetic gain	02
3	Evaluation of livestock based on own performance, pedigree, and progeny	01

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:
1. Bourdon, R. M., 2000. Understanding Animal Breeding. Prentice-Hall, Inc. Upper Saddle River, New Jersey

2. Lasley, J. F., 1987. Genetics of Livestock Improvement. Prentice-Hall International Inc. Englewood Cliffs, New Jersey.
3. Legates, J. E. and E. J. Warwick, 1990. Breeding and Improvement of Farm Animals. McGraw-Hill Publishing Co., New York.
4. Malcolm B. Willis. 1991. Introduction to Practical Animal Breeding. Dalton's Third edn. Blackwell Scientific Publications, London.
5. Oldenbroek, J. K., 1999. Gene banks and the conservation of Farm Animal Genetic Resources. DLO Institute for Animal Science and Health, The Netherlands.
6. Warwick, E. J. and Legtes, J. E. 1987. Breeding and Improvement of Farm Animal. 7th edn. McGraw-Hill Book Co. Inc., New York.
7. Willis, M. B.,2001. Dalton's Introduction to Practical Animal Breeding. Blackwell Science, Oxford.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	**:**	Poultry Production and Management
2.	**Course Code**	**:**	0841VAS315
3.	**Course Type**	**:**	Theory
4.	**Course Level**	**:**	Third Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	2
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Md. Shariful Islam and Mr. Soshe Ahmed

9. Rationale of the Course:
This course covers feeding, breeding, and various management practices of commercial and breeder flock operations. A major focus is to describe modern management tools in different chicken production systems, including small-scale to large-scale industrial production of commercial layer and breeder flocks.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. Describe common terminologies, modern management tools in different production systems.
b. Demonstrate the brooding, feeding, and watering management of chicken.
c. Describe different types of poultry housing systems, lighting and ventilation systems
d. Perform disease prevention and control through proper implementation of biosecurity and vaccination procedures
e. In addition to commercial chicken, the productions of breeder flocks are explained in detail.

11. Course Learning Outcomes (CLOs):
At the successful completion of the course, students will be able to:

CLO1: achieve comprehensive knowledge of different types of production system and develop skills in poultry management practices.
CLO2: gain comprehensive knowledge on preventing and controlling diseases through biosecurity and other measures.
CLO3: Operate chicken farms ranges from small to large scale production.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	Course content	Lectures
1	Grand Parent Stock, Parent Stock and Commercial strains, strain types and chronological development of strains, list of modern strains.	02
1	Preparation of house before receiving the baby chicks, transportation, care on arrival, feeding, and management of chicks during brooding, temperature, ventilation, light management	02
1	Types of poultry houses, different types of rearing - advantages, and disadvantages. Space requirement for different age groups under different rearing systems	02
1,3	Avian thermoregulation, light and lighting programs, ventilation, temperature control, heat stress, and flock management during hot–humid and cold climates. Summer management modification of housing light reflectors; insulators, sprinklers, loggers, and other methods; dietary change to minimize heat stress; unique management during rainy and winter season; other stress management- vices in poultry and its remedial measures.	03
1,3	Care and management of growing birds of the breeder and commercial chicken, layer and breeder flock management, housing & space requirements, lighting management	04
1,3	Litter materials, management of litter, the potential for poultry litter used as fertilizers; recycling for livestock feeding, disposal of poultry manure, used litter and dead birds	03
1,3	Feeding management of breeder and commercial layer, feed restriction, separate male feeding, mid-night feeding.	04
1,2,3	The standard for drinking water in terms of total solids, pH, minerals levels, sanitizers and water sanitation, diseases spread through water contamination prevention	02
2	Prevention and control measures of diseases, biosecurity, management of vaccination, and in breeder and commercial layer flock, all-in-all out the production system	04
1,3	Flock uniformity, light and feed manipulation to attain sexual maturity, causes and effects of early sexual maturity, cannibalism, and control.	02

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. North, M.O. and D. D. Bell, 2001. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, USA.
2. Reproduction in Poultry. CAB International, Wallingford, Oxon, U.K.3.Hocking, P. M., 2009.
3. Biology of breeding poultry. CAB International, Wallingford, Oxon, U.K.
4. Austic and Nesheim, 1990.Poultry Production.13th edition. Lea and Febiger; Philadelphia, Pennsylvania.
5. Leeson, S. and J.D. Summers, 2000. Broiler Breeder Production. University Book Foundation, University of Guleph, Canada.
6. Leeson, S. and J.D. Summers, 2001. Nutrition of the Chicken. International Book Distributing C., Lucknow, India.
7. Sreenivasaiah, P.V., 2006. Scientific Poultry Production. 3rdedition.International Book Distributing Co., UP India.
8. Ensminger, M.E., 1999. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, U.S.A. 2
9. Vegad, J.L., 2004. Poultry Diseases: A Guide for Farmers and Poultry Professionals. International Book Distributors Co. Lucknow, India.
10. Hurd, L.M., 2003. Modern Poultry Farming. Greenworld Publishers 8/217, Indira Nagar Lucknow-226 016 (UP).
11. Charles, T.B. and H.O. Stuart, 2011.Commercial Poultry Farming. 6thedition, Biotech Books, USA.

12. Haq, A. and M. Akhtar, 2004. Poultry Farming. Higher Education Commission, H-9, Islamabad, Pakistan.
13. Jadhav, N.V. and M.F. Siddiqi, 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year First Semester

Course Outline

1.	**Course Title**	**:**	Poultry Production and Management
2.	**Course Code**	**:**	0841 VAS 316
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Third Year First Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Mr. Soshe Ahmed

9. **Rationale of the Course**:
This course covers poultry houses' preparation, birds' management during pre-brooding and brooding, debeaking practices, preparation of vaccination, and medication schedule for layer and breeder flocks and chicken vaccination. A major focus is also to determine the quality of eggs and the preparation of planning and finance statements of poultry operations.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. Demonstration of the chicken house preparation and describe the pre-brooding and brooding management of chicks
b. Perform debeaking, dubbing, and toe clipping of chickens
c. Care and management of eggs
d. Preparation of vaccination and medication schedule of chicken
e. Determination of quality of eggs

11. Course Learning Outcomes (CLOs):
At the successful completion of the course, students will be able to:
CLO1: perform brooding management, debeaking, preparation of vaccination, and medication schedule.
CLO2: determine the quality of eggs and the grading of eggs by assessing the external and internal quality.
CLO3: prepare a financial statement and calculate the cost-benefit analysis of a poultry farm.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	Course content	Lectures
1	Preparation of poultry houses such as cleaning, washing, disinfection and fumigation	01
1	Use of equipment and materials in brooder, grower, and layer houses	01
1	Pre-brooding and brooding management of chicks	02
1	The practice of debeaking, dubbing, and toe clipping of birds	02
1	Preparation of vaccination and medication schedule for chicken against common	01

	diseases	
1	Care and handling of eggs such as **c**ollection, grading, package, storage, and transportation	01
2	Determination of egg structure and identification of normal eggs. Measurements of egg quality traits, shell quality, and internal quality	02
3	Recordkeeping, planning, and financial statement of a commercial layer farm	02
1,2,3	Visit parent stock and commercial farms	02

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. North, M.O. and D. D. Bell, 2001. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, USA.
2. Reproduction in Poultry. CAB International, Wallingford, Oxon, U.K.3.Hocking, P. M., 2009.
3. Biology of breeding poultry. CAB International, Wallingford, Oxon, U.K.
4. Austic and Nesheim, 1990. Poultry Production. 13th edition. Lea and Febiger; Philadelphia, Pennsylvania.
5. Leeson, S. and J.D. Summers, 2000. Broiler Breeder Production. University Book Foundation, University of Guleph, Canada.
6. Leeson, S. and J.D. Summers, 2001. Nutrition of the Chicken. International Book Distributing C., Lucknow, India.
7. Sreenivasaiah, P.V., 2006. Scientific Poultry Production. 3rdedition. International Book Distributing Co., UP India.
8. Ensminger, M.E., 1999. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, U.S.A. 2
9. Vegad, J.L., 2004. Poultry Diseases: A Guide for Farmers and Poultry Professionals. International Book Distributors Co. Lucknow, India.
10. Hurd, L.M., 2003. Modern Poultry Farming. Greenworld Publishers 8/217, Indira Nagar Lucknow-226 016 (UP).
11. Charles, T.B. and H.O. Stuart, 2011.Commercial Poultry Farming. 6thedition, Biotech Books, USA.
12. Haq, A. and M. Akhtar, 2004. Poultry Farming. Higher Education Commission, H-9, Islamabad, Pakistan.
13. Jadhav, N.V. and M.F. Siddiqi, 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RJSHAHI
Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	**:**	Protozoology
2.	**Course Code**	**:**	0841VAS 317
3.	**Course**	**:**	Theory
4.	**Course Level**	**:**	Third Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	2
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Moizur Rahman Professor Dr. Lovely Nahar

9. Rationale of the Course:

Protozoology, a theoretical para-clinical course of veterinary medical science. This course provides the fundamental understanding on protozoa which includes history, definition, biological process (locomotion, nutrition, reproduction) etc.. The course describes morphology, biology, epidemiology, life cycle, pathogenic significance, control etc. of different protozoan parasite. The lesson delivered on protozoa will be helpful for the students regarding detail knowledge on different harmful protozoa economically important in veterinary field. The knowledge and experiences achieved after the completion of this course helps students to understand the protozoal infection in animals and birds. Application of knowledge of this course will have great impact on livestock development and animal welfare.

10. Intended learning Objectives (ILOs):

The objectives of this course are:

a. To give the basic understanding of the history and general concepts (structure, locomotion, nutrition, reproduction etc.) of protozoa of veterinary importance.
b. To provide knowledge on taxonomy, classification, morphology, biology, transmission dynamics of important enteric protozoa of animal and birds.
c. To provide knowledge on taxonomy, classification, morphology, biology, transmission dynamics of important protozoa of blood and other organs of animal and birds.
d. To disseminate knowledge on immunological phenomenon of protozoan infection.
e. To develop knowledge on the impact and general control strategies of protozoan parasites in animals.

11. **Course Learning Outcomes (CLO):**

At the end of the course, students will be able to:

CLO 1. describe the history, classification, morphology, nutrition reproduction, life cycle and transmission of protozoa.
CLO 2. enumerate the harmful effects of protozoa on their hosts with emphasis on public health significance.
CLO 3. explain the immunological phenomena of different protozoan parasites.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. **Lesson Plan**:

CLOs	Course Contents	No. of Lectures
1	Definition, history, classification, structure, locomotion, nutrition, reproduction of protozoa.	3
1,2	Mode of transmission of important protozoa in hosts.	1
1,2	Morphology, transmission, life cycle, harmful effects of flagelleted protozoa	5
1,2	Morphology, transmission, biology, harmful effects of Amoeboid protozoa.	1
1,2	Morphology, transmission, biology, harmful effects of coccidian protozoa of Apicomplexa phylum	7
1,2	Morphology, transmission, biology, economic significance of haemoprotozoan parasites of apicomplexa	5
1,2	Morphology, transmission, biology, harmful effects of ciliated protozoa	1
1,2	Host-protozoa interaction and establishment of infection on the hosts	1
3	Study on the immunological phenomena of different protozoan parasites	2
2	Public health impacts and general control of protozoan parasites.	2

14. Teaching-learning strategy: Lecture, demostration, presentation, Q-Card, Flash card, discussion, question answering, Feedback,etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Lists/Essential Readings:

1. Soulsby E. J. L. Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
2. Taylor M. A. et. al., Veterinary Parasitology. 3rd edn.
3. Urquhart G. M. et. al. Veterinary Parasitology. 2nd edn.
4. Levine N D Veterinary Protozoology.
5. Adam K. M. G. , Medical and Veterinary Protozoology
6. Morgan B. B. and Hawkins P. A., Veterinary Protozoology.
7. Bowman D. D. Georgis's Parasitology for Veterinarians. 9th edn

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	**:**	Protozoology
2.	**Course Code**	**:**	0841VAS 318
3.	**Course**	**:**	Practical
4.	**Course Level**	**:**	Third Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credit**	**:**	1
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	**:**	Professor Dr. Moizur Rahman Professor Dr. Lovely Nahar

9. Rationale of the Course:

Protozoology, a theoretical para-clinical course of veterinary medical science. This course provides the fundamental understanding on protozoa which includes history, definition, biological process (locomotion, nutrition, reproduction) etc.. The course describes morphology, biology, epidemiology, life cycle, pathogenic significance, control etc. of different protozoan parasite. The lesson delivered on protozoa will be helpful for the students regarding detail knowledge on different harmful protozoa economically important in veterinary field. The knowledge and experiences achieved after the completion of this course helps students to understand the protozoal infection in animals and birds. Application of knowledge of this course will have great impact on livestock development and animal welfare.

10. Intended learning Objectives (ILOs):

a. To give the basic understanding of the history and general concepts (structure, locomotion, nutrition, reproduction etc.) of protozoa of veterinary importance.
b. To provide knowledge on taxonomy, classification, morphology, biology, transmission dynamics of important enteric protozoa of animal and birds.
c. To provide knowledge on taxonomy, classification, morphology, biology, transmission dynamics of important protozoa of blood and other organs of animal and birds.
d. To disseminate knowledge on immunological phenomenon of protozoan infection.
e. To develop knowledge on the impact and general control strategies of protozoan parasites in animals.

11. **Course Learning Outcomes (CLO):**
At the end of the course, students will be able to:

CLO 1. describe the history, classification, morphology, nutrition reproduction, life cycle and transmission of protozoa.
CLO 2. enumerate the harmful effects of protozoa on their hosts with emphasis on public health significance.
CLO 3. explain the immunological phenomena of different protozoan parasites.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	1	3	1
CLO2	2	3	1	3	1
CLO3	2	3	1	3	1

13. Lesson Plan**:**

CLOs	**Course Contents**	**No. of Lectures**
1	Definition, history, classification, structure, locomotion, nutrition, reproduction of protozoa.	3
1,2	Mode of transmission of important protozoa in hosts.	1
1,2	Morphology, transmission, life cycle, harmful effects of flagelleted protozoa	5
1,2	Morphology, transmission, biology, harmful effects of Amoeboid protozoa.	1
1,2	Morphology, transmission, biology, harmful effects of coccidian protozoa of Apicomplexa phylum	7
1,2	Morphology, transmission, biology, economic significance of haemoprotozoan parasites of apicomplexa	5
1,2	Morphology, transmission, biology, harmful effects of ciliated protozoa	1
1,2	Host-protozoa interaction and establishment of infection on the hosts	1
3	Study on the immunological phenomena of different protozoan parasites	2
2	Public health impacts and general control of protozoan parasites.	2

14. Teaching-learning strategy: Lecture, demostration, presentation, discussion, laboratory examination, question answering etc.

15. Assesment Stratagy: Tutorial/ Quiz / Class test/ Assignment (20), Attendance (10), Final Examination (70)

Suggested Reading Listss:

1. E. J. L. Soulsby. Helminths, Arthropods and Protozoa of Domesticated Animals. 7th edn. (ELBS and Baillire and Tindall).
2. Taylor M. A. et. al., Veterinary Parasitology. 3rd edn.
3. Urquhart G. M. et. al. Veterinary Parasitology. 2nd edn.
4. Levine N D Veterinary Protozoology.
5. Adam K. M. G. , Medical and Veterinary Protozoology
6. Morgan B. B. and Hawkins P. A., Veterinary Protozoology. 7. Bowman D. D. Georgis's Parasitology for Veterinarians. 9th edn.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

.

1	**Course Title**	:	Immunology and Serology
2	**Course Code**	:	0841VAS319
3	**Course Type**	:	Theory
4	**Course Level**	:	Third Year Second Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	Prof. Dr. K. M. Mozaffor Hossain Prof. Dr. Md. Thoufiq Anam Azad

9. Rationale of the Course:

Immunology is a branch of science dealing with body's resistance to infection. This course deals with the organs and cells involved in the development of immunity. Types of antigen, their nature and the factors that determine antigenicity. The antibody, their types and role in protecting a living body against infection. Response of different immune-competent cells following an infection to eliminate the infection from the body. Role of innate immunity and adaptive immunity. Antigen –antibody reaction, assessment of antibody levels or detection of antigen using different types of serological reaction. Theories of antibody production, monoclonal antibody production and their use. Types of hypersensitivity reaction and their role in elimination of foreign bodies from the system. Different types of vaccines used in immunoprophylaxis and their advantages. Role of adjuvants in immunoprophylaxis

10. **Intended learning Objectives (ILOs):**

a) To understand the immune system in animals and role of immune system to fight against pathogens.
b) To know how to detect antigen or pathogen when an animal is infected
c) To help understandings how to immunize in an effective way to develop better immunity.
d) To learn what kind of vaccines to be given to immunize animals against common diseases
e) To measure immunity to know the protection status against common diseases and what to be done in case of hypersensitivity.

11. **Course Learning Outcomes (CLO):**

Upon completion of the course the graduate student will be able to:

CLO 1. acquire knowledge on the contribution of different eminent scientist in the field of immunology and serology.

CLO 1. Understand basic knowledge on immune response, innate immnunity and adaptive immune response structure of antigen, immunoglobulin, monoclonal antibody production, MHC molecule, activities of cytokine

CLO 1. Perceive the mechanism of vaccine production, types of vaccine, role of adjuvant in case of killed vaccine, reaction of the host due to vaccination, failure of vaccination..

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	1
CLO2	2	3	1	3	1
CLO3	2	3	1	2	1

13. Lesson Plan

CLOs	Course content	Lectures
1	Historical landmarks in immunity: Contribution of different scientist in the field of immunology: Edward Jenner, Louis Pasteur, Elie Metchnikoff, Salmon and Theobold Smith, Karl Landsteiner, Emil von Behring, Von Pirquet and Shick, Nicolas Maurice Arthus, Albert Calmette, Michael Heidelberger, Arne W. Tiselius, Henry Hallett Dale, Max Theiler, Robin Coombs, Frank James Dixon, Niels Kaj Jerne, Jules Bordet, Bruce Glick, Frank McFarlane Burnet, Henry George Kunkel, Rodney R Porter, Rosalyn Yalow, George Snell, Baruj Benacerraf and Jean Dausscт, Cesar Milstein, Walter Plowright, Robert Alan Good	2
1	Cells, Tissues and Organs of the Immune System:Cells of the innate immune system: Cells of the adaptive immune system, lymphoid tissues, Primary and secondary lymphoid organs, Lymphocyte traffic, Response of lymph nodes and spleen to antigen Innate Immunity (part I): Feature of innate immune response, reason of emigration of neutrophil from the blood vessel during phagocytosis, mechanism of phagocytosis, role of respiratory burst molecule in phagocytosis, evasion techniques of microbes against phagocytosis.	3
1	Innate Immunity (part II): Role of pathogen associated molecular pattern (PAMPs) molecule and pattern recognition receptors (PRRs) in relation to innate immunity, role of Toll like receptors in innate immunity, role of complement, and different pathway of complement activation Antigen Capture and Presentation to Lymphocytes: Major histocompatibility complex (MHC) molecules: Structure and function; Antigen presenting cells; Processing of exogenous and endogenous	3
1	Antibodies and Immunoglobulin: Natural distribution and production of antibodies, Molecular structure of antibodies: General features of antibody structure, structural features of variable regions and their relationship to antigen binding, Differentiation among different classes of immunoglobulin, Theory of production of antibody, paratope, production of monoclonal antibody	4
2.	Cytokine: General properties of cytokines, Functional categories of cytokines, Cytokine receptors and signalling, Cytokines that mediate and regulate innate immunity: Tumor necrosis factor, IL-1, IL-12, Type I interferon, IL-10, Cytokines that mediate and regulate adaptive immunity: IL-2, IL-4, IL-5, Interferon-γ, Transforming growth factor-β, Cytokines that stimulates haematopoiesis: Stem cell factor, IL-7, IL-3	4
2	Type I, .II, III Hypersensitibity	4
2	Immunological Tolerence	4
3	Autoimmune diseas	

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Cellular and Molecular Immunology by Abul K Abbas, Andrew H Lichtman and Shiv Pillai, 2012, 7th Edition, Saunders publication.
2. Immunology and Immunopathology of Domestic Animals by Laurel J. Gershwin, Steven Krakowka and Richard G. Olsen, Mosby; 2nd edition, 1995
3. Janeway's Immunobiology (Immunobiology: The Immune System), Kenneth Murphy, Garland Science; 8th edition, 2011.
4. Kuby Immunology - By Owen, Punt, & Stranford, 2013, 7th Edition, W. H. Freeman Publishers

5. Roitt's Essential Immunology, Wiley-Blackwell; 12th edition, 2011
6. The Immune System, Peter Parham, Garland Science; 3rd edition, January 19, 2009.
Veterinary Immunology, An Introduction by Ian R. Tizard, Saunders; 9th editions, 2012

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1	**Course Title**	:	Immunology and Serology
2	**Course Code**	:	0841VAS320
3	**Course Type**	:	Practical
4	**Course Level**	:	Third Year Second Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	:	Prof. Dr. K. M. Mozaffor Hossain Prof. Dr. Md. Thoufiq Anam Azad

9. Rationale of the Course:
Serology is a medical science dealing with blood serum especially in regard to its immunological reactions and properties. This course deals with the testing of blood serum using various techniques to detect the presence of antibodies against a specific antigen.

10. **Intended learning Objectives (ILOs):**

a) To learn the role of serology in diagnosis of animal diseases.
b) Collection of blood from different animals and birds like cattle, sheep, goat, dog, cat, chicken, pigeon, duck, quail, goose.
c) To know how to prepare, purify and preserve antigen and serum
d) To understand the principle, procedure and uses of different serological tests to diagnosis of various veterinary diseases,

11. **Course Learning Outcomes (CLO):**
Upon completion of the course the graduate student will be able to:
CLO 1. learn the principle and importance of common serological test in veterinary disease diagnosis and disease monitoring.
CLO 2. conduct the serological test of veterinary and human importance with interpretation.
CLO 3. compare possibilities and limits of methods and techniques used in the diagnosis of viral disease and reference

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	1
CLO2	2	3	1	3	1
CLO3	2	3	1	2	1

13. Lesson Plan:

CLO	Course content	No. of Lectures
1, 2	• Collection and preservation of blood serum: Concepts of serology; Classification of serological tests; Importance of serological test in veterinary diagnostics and disease monitoring; Principle of common serological tests;Agglutination test	3
1, 2	• Precipitation test, Hemagglutination inhibition test	4
1, 2	• ELISA test. FAT test	2

1,2	• Complement Fixation Test (CFT) • Neutralization and Protection Test	3
1, 2	• Immuno peroxidase and Radio Immuno Assay Test	3

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Cellular and Molecular Immunology by Abul K Abbas, Andrew H Lichtman and Shiv Pillai, 2012, 7th Edition, Saunders publication.
2. Immunology and Immunopathology of Domestic Animals by Laurel J. Gershwin, Steven Krakowka and Richard G. Olsen, Mosby; 2nd edition, 1995
3. Janeway's Immunobiology (Immunobiology: The Immune System), Kenneth Murphy, Garland Science; 8th edition, 2011.
4. Kuby Immunology - By Owen, Punt, & Stranford, 2013, 7th Edition, W. H. Freeman Publishers
5. Roitt's Essential Immunology, Wiley-Blackwell; 12th edition, 2011
6. The Immune System, Peter Parham, Garland Science; 3rd edition, January 19, 2009.
7. Veterinary Immunology, An Introduction by Ian R. Tizard, Saunders; 9th

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Therapeutics and Pharmacy
2.	**Course Code**	:	0841VAS3**2**1
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Third Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teacher s**	:	**Pof.** Dr. Mst. Rokeya Sultana, Prof. Dr. S. M. Kamruzzaman

9. Rationale of the Course:

This is an important course of medical science which describes general aspects of therapeutics and pharmacy. This course provides students the knowledge about introduction and classification of therapeutics and the process of drug development, evaluation and its regulation and other important aspects related to the therapeutic uses of drugs. Furthermore, this course also provides students the knowledge about the procedures related to the preparation of drugs in pharmaceutics.

10.Intended learning Objectives (ILOs):

a. To understand about the general aspects of therapeutics and pharmacy.
b. To know about the process of drug development, evaluation and its regulation.
c. To have knowledge about interaction of drugs and other factors that affect therapeutic effectiveness.
d. To know about the gene therapy and herbal medicine.
e. To understand about the aspects of pharmaceutical preparation of drugs.

11.Course Learning Outcomes (CLO):

At the end of the course, students will be able to:

1. familiar with the general aspects of therapeutics and pharmacy.
2. understand the aspects of drug development, evaluation and its regulation and also interaction of drugs and other facts related to the effectiveness of drugs with a short outline about gene therapy and herbal medicine.
3. know the processes related to the preparation of drugs in pharmaceutics.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3	2	2			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13.Lesson Plan:

CLOs	Course Contents	Lectures
1,2,3	**Therapeutics:** Introduction, classification, qualitative and quantitative aspect of drug therapy, clinical trials, pharmacodynamics. Variability, individualization of drug therapy, factors that affect therapeutic outcome, drug interactions, drug regulations and development, drug overdose, therapeutic and clinical evaluation of durgs, therapeutic & toxic potential of the counter agents. An introduction to gene therapy. Therapeutic studies of herbal medicines.	8
1,2,3	**Pharmacy :** Introduction, Pharmaceuticals dosages, forms and new drug delivery systems, pharmacopeias & formularies, packaging of pharmaceuticals size reduction and separation, mixing & homogenization, filtration & clarification, heating and drying process of drugs, sterilization, studies on immunity & immunological preparations, product processing, evaluation & regulations, a brief description on physical pharmaceutics, pharmaceutical technology and biological pharmacy	8

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists*:*

1. Brander, G. C., Pugh, D. M., Bywater, J. J. and Jenkins, W. L. 1991. Veterinary Applied Pharmacology and Therapeutics. 5th edn. ELBS with Bailliere Tindall, UK.
2. Laurence L. Brunton, Bjorn C. Knollmann, Randa Hilal-Dandan, 2017. Goodman and Gilman's The Pharmacological basis of therapeutics. 13th edn. McGraw-Hill Medical Publishing Division, New York.
3. Bertram G. Katzung. 2017. Basic and Clinical Pharmacology. 14th edn. McGraw-Hill Medical Publishing Division, New York.
4. Carter, S. J. 2008. Cooper and Gunn's Tutorial Pharmacy. 12th edn. CBS Publishers & Distributors Pvt. Ltd., New Delhi, India.
5. Ashok K. Gupta. 2007. Introduction to Pharmaceutics-I. 3rd edn. CBS Publishers & Distributors Pvt. Ltd., New Delhi, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Therapeutics and Pharmacy
2.	**Course Code**	:	0841VAS3**2**2
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Third Year Second Semester
5**.**	**Session**	:	202**3**-202**4**
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Mst. Rokeya Sultana,

9. Rationale of the course:

This is an important course of medical science which describes about the preparation and dispensing of pharmaceuticals dosage forms. This course also provides students the knowledge about the therapeutic uses of common indigenous medicinal plants. Furthermore, this course also provides students the knowledge about few techniques used for the assessment of common drugs.

10.Intended learning Objectives (ILOs):

1. To understand about the collection and preparation of pharmaceutical dosage forms of drugs.
2. To help understanding about the packaging and preservation of prepared drugs.
3. To know about the compounding and dispensing of drugs available in the market.
4. To have knowledge about herbal medicine extracted from indigenous plants.
5. To know about the techniques used for the assessment of common veterinary drugs.

11.Course Learning Outcomes (CLOs):

At the end of the course, students will be able to:

1. familiar with the collection, preparation, packaging and preservation of pharmaceutical dosage forms of drugs.
2. understand about the compounding and dispensing of drugs and indigenous medicinal plants with their therapeutic uses.
3. know the techniques for the assessment of different types of veterinary drugs.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3			
CLO2	2	3			
CLO3	2	2			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13.Lesson Plan:

CLOs	Course Contents	Lectures
1	Collection, preparation, packaging, and preservation of solution, suspension, capsules, tablet, paste, emulsion, ointment, etc.	7
2	Compounding and dispensing of various preparations	2
2	Collection, identification and uses of common indigenous medicinal plants	3
3	Techniques used for the assessment of antibiotics, anthelmintic, anti-inflammatory drugs, antiseptics and other common drugs	4

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings*:*

1. Brander, G. C., Pugh, D. M., Bywater, J. J. and Jenkins, W. L. 1991. Veterinary Applied Pharmacology and Therapeutics. 5th edn. ELBS with Bailliere Tindall, UK.
2. Laurence L. Brunton, Bjorn C. Knollmann, Randa Hilal-Dandan, 2017. Goodman and Gilman's The Pharmacological basis of therapeutics. 13th edn. McGraw-Hill Medical Publishing Division, New York.
3. Bertram G. Katzung. 2017. Basic and Clinical Pharmacology. 14th edn. McGraw-Hill Medical Publishing Division, New York.
4. Carter, S. J. 2008. Cooper and Gunn's Tutorial Pharmacy. 12th edn. CBS Publishers & Distributors Pvt. Ltd., New Delhi, India.
5. Ashok K. Gupta. 2007. Introduction to Pharmaceutics-I. 3rd edn. CBS Publishers & Distributors Pvt. Ltd., New Delhi, India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Systemic Medicine
2.	**Course Code**	:	0841VAS323
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Third Year Second Semester
5.	**Session**	:	202**3**-202**4**
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

This course delivers up-to-date knowledge to veterinary students and practitioners on antimicrobial therapeutics and the comprehensive management of diseases across multiple organ systems in ruminants and non-ruminants. Topics include advanced diagnostics and treatment of alimentary, hepatic, cardiovascular, hemolymphatic, immune, respiratory, urinary, nervous, musculoskeletal, dermatological, ocular, conjunctival, and external ear conditions. Additionally, the course covers metabolic and endocrine disorders, reproductive system diseases, perinatal diseases, mammary gland conditions, as well as complex systemic and multi-organ diseases, preparing students to effectively manage the full spectrum of farm animal health challenges.

10. Intended Learning Objectives (ILOs):

1. To get introduced with in-depth studies of veterinary medicine with particular focus on diseases and disorders of every body system of farm animals;
2. To approach and examine the sick animal, attaining history, identification of the clinical manifestation of that disease, and or disorder, study of environment, ascertaining causative agent(s), and thus making of a diagnosis, the crux of all medical problems;
3. To develop consolidated knowledge on the appropriate therapeutic intervention, clinical risk management, overall follow up and fate of the diseased animals;
4. To gain adequate knowledge on the provision of infection prevention, disease containment, safety of animal and human health.
5. To develop professional competence in assessing the health of individual animals as well as determine nutritional adequacy within groups of animals.

11. Course Learning Outcomes (CLOs):

Upon successful accomplishment of this course, the students will have sufficient competence on:

1. Diseases and disorders of every body system of farm animals;

2. Examining sick animal, successful history taking, identification of the clinical manifestation of said disease or disorders, the study of environment, ascertaining causative agent(s), and making of a diagnosis, the crux of all medical problems;
3. Updated knowledge on the appropriate therapeutic intervention, clinical risk management, overall follow up and fate of the diseased animals;
4. The provision of infection prevention, disease containment, safety of animal and human health.
5. Professional development in assessing the health of individual animals as well as determine nutritional adequacy within groups of animals.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2
CLO4	3	2	3	2	3
CLO5	3	2	3	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis.

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction of systemic animal medicine; monotropic diseases and disorders	1
2,3	Systemic diseases of ruminants and non-ruminants: Alimentary tract diseases: Stomatitis, gingivitis, glossitis, pharyngitis, pharyngeal obstruction and pharyngeal paralysis, esophagitis, esophageal obstruction, simple indigestion, acid indigestion, vagus indigestion, tympani, bloat, traumatic reticulo-peritonitis, left-side and right side displacement of abomasum (LDA & RDA), abomasal impaction, intestinal obstruction, equine and bovine colic	8
2,3	Diseases of the liver and pancreas: Hepatitis, cirrohosis, hepatic abscess, tumors of the liver, diabetes mellitus, pancreatic adenoma, Jaundice etc.	2
2,3	Cardiovascular diseases: Myocardial disease and cardiomyopathy, Cor pulmonale, valvular diseases and murmurs, endocarditis, pericarditis, congenital cardiac defects, cardiac neoplasia, arterial thrombosis and embolism, venous thrombosis, hemangioma, hemangiosarcoma and anaemia, Heart failure.	4
2,3	Diseases of the respiratory system: Pulmonary congestion and edema, pulmonary hypertension, atelectasis, pulmonary hemorrhage, pneumonia, pneumonitis, aspiration pneumonia, shipping fever pneumonia, pulmonary emphysema, pulmonary abscess, hydrothorax, pneumothorax, pleurisy, rhinitis, epistaxis and hemoptysis, laryngitis, tracheitis, bronchitis, obstruction of the nasal cavities etc.	6
2,3	Diseases of the urinary system: Nephrosis, renal ischemia, toxic nephritis, glomerulonephritis, interstitial nephritis, embolic nephritis, pyelonephritis, renal neoplasm, cystitis, paralysis of the bladder, rupture of the bladder, urolithiasis, urinary bladder neoplasms.	4
2,3	Diseases of the nervous system: Brain abscess, otitis media, tumors of the central nervous system, cerebral hypoxia, cerebral edema and brain swelling, hydrocephalus, enchaphalitis, encephlomalacia, traumatic injury of the brain, coenurosis, meningitis, toxic and metabolic encephalomyelopathies, psychoses, epilepsy, traumatic injury of the spinal cords, myelitis, myelomalacia, Prion diseases.	2
2,3	Diseases of the musculoskeletal system: Myasthenia, myopathy, myositis, osteodystrophy, muscular dystrophy, osteomyelitis, Exertional Rhabdomyolysis, white muscle disease, arthropathy, arthritis and synovitis, congenital defects of muscles, bones and joints	2
2,3	Diseases of the skin, conjunctiva and external ear: Pityriasis, hyperkeratosis, parakeratosis, pachyderma, impetigo, urticaria, dermatitis	4

	and dermatosis, photosensitization, alopecia and hyotrichosis, vitiligo, seborrhea, folliculitis, diseases of hooves and horns, anasarca, angioedema, subcutaneous emphysema, lymphangitis, panniculus, hemorrhage, necrosis and gangrene, subcutaneous abscess, cutaneous cysts, papilloma and sarcoid, melanoma, lymphomatosis, mast cell tumors, lipoma, congenital defects of skin and conjunctiva, dermoid cyst, otitis externa etc.	

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
2. Clinical examination of cattle. Rosenberger G. Blackwell Science Ltd. USA 1995.
3. Current therapy in equine medicine. Robinson N.E., Kim A. Volume 6. Sprayberry 2009.
4. Current veterinary therapy. Anderson D.E., Rings D.M. Volume 5. Saunders Elsevier 2009.
5. Large animal internal medicine. Smith B.P. 4th edition. Mosby Harcourt 2009.
6. The Merck veterinary manual. Kahn C.M., Line S. 10th edition. Merck and CO. inc. and Merial Ltd. USA 2010.
7. Veterinary clinical diagnosis. Kelly W.R. Harcourt Publishers. USA 1984.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Systemic Medicine
2.	**Course Code**	:	0841VAS324
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Third Year Second Semester
5.	**Session**	:	202**3**-202**4**
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

This course aims to provide students with the practical expertise required to effectively diagnose, treat, prevent, and manage systemic diseases in a range of animal species, whether dealing with individual cases or herd-level outbreaks. It focuses on equipping students with the essential skills needed for comprehensive disease control and animal health management.

10. Intended Learning Objectives (ILOs):

a. To gain a thorough understanding and foundational knowledge of systemic medicine.
b. To comprehend the etio-pathogenesis, epidemiology, and clinical manifestations of diseases affecting various animals, including both ruminants and non-ruminants.
c. This subject will also enable students to diagnose, treat, prevent, and control diseases affecting different organ systems in animals.

11. Course Learning Outcomes (CLOs):

By the end of this practical session, students will be able to:

CLO 1. Become familiar with the characteristics of both healthy and sick animals, and develop the skill of taking thorough patient histories.
CLO 2. Develop proficiency in administering drugs to in-patients and enhance communication skills with clients and staff for effective teamwork.
CLO 3. Acquire the skills necessary to handle sick animals for thorough clinical assessments of all organ systems, and develop expertise in using diagnostic tools and medical equipment for prompt evaluations of diseased animals, enhancing confirmatory diagnoses, effective therapeutic interventions, and strategies for prevention and control.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1,2,3	Hands-on training will be provided in diverse mobile veterinary clinics and veterinary teaching hospitals, allowing students to master fundamental skills in clinical medicine, prescription writing, and the diagnosis and treatment of systemic diseases in livestock. Students will systematically document clinical cases in a dedicated clinical notebook, facilitating thorough post-treatment evaluations and critical interpretation of outcomes to enhance their practical understanding and clinical expertise.	14
1,2,3	Field trips will be conducted to a selection of Upazila Livestock Offices and Veterinary Hospitals (ULOVH), as well as Field Disease Investigation Laboratories (FDIL). These educational trips will provide students with hands-on veterinary practices and livestock management techniques while enhancing their understanding of disease investigation. Through direct interaction with local veterinary services, they will acquire critical insights into effective clinical and prophylactic management and control of diseases within the livestock industry.	4

14.Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15.Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested reading lists:

1. Clinical examination of cattle. Rosenberger G. Blackwell Science Ltd. USA 1995.
2. Current therapy in equine medicine. Robinson N.E., Kim A. Volume 6. Sprayberry 2009.
3. Current veterinary therapy. Anderson D.E., Rings D.M. Volume 5. Saunders Elsevier 2009.
4. Large animal internal medicine. Smith B.P. 4th edition. Mosby Harcourt 2009.
5. The Merck veterinary manual. Kahn C.M., Line S. 10th edition. Merck and CO. inc. and Merial Ltd. USA 2010.
6. Veterinary clinical diagnosis. Kelly W.R. Harcourt Publishers. USA 1984.
7. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Anaesthesiology
2.	**Course Code**	:	0841VAS325
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Third Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Anaesthesia is a condition produced by certain agents where there is a loss of consciousness, pain and movement. Anesthesia is the prerequisite in most surgical case management. Surgical affections are a common scenario in veterinary practice. Anesthesia may be needed before, after, or during the handling of those surgical cases. To handle surgical cases in animals, proper knowledge of anesthesia is essential. Considering the background, this course is arranged in a manner that discusses in detail of anaesthesia, analgesia, anaesthetics along with mode of action, anaesthetic doses, routes of administration, and management of adverse effects in different species. It is expected that after completion of the course, students will get sufficient knowledge to perform effective anaesthesia on different species of animals in order to handle surgical affections of animals along with the highest comfort of animals.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
1. To describe about the importance of anaesthesia in animals.
2. To provide sufficient knowledge on different anaesthetics, analgesics, and sedatives along with their mode of action, doses, routes of administration, and management of adverse effects in different species of animals.
3. To facilitate necessary knowledge about the procedure of anesthesia in different species of animals such as dog, cat, laboratory and zoo animals or case-specific.
4. To attain knowledge about the role of muscle relaxants in anaesthesia, Mode of action of muscle relaxants, indication of muscle relaxants and their specific doses on different animals.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : describe all about anaesthesia, anaesthetics, analgesia, analgesic, premedication, muscle relaxants, and sedatives.
CLO2 : perform anesthesia in different species of animals such as dog, cat, laboratory and zoo animals or case-specific.
CLO3 : manage adverse effects of anaesthetics on different animals if happen and perform euthanasia of animals if needed.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3	2	3			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction: Common terms related to anesthesia. Classification of anesthesia and anesthetics. General consideration of anesthesia and anesthetics. Spinal nerve, Neurotransmitter, Action potential, Receptors, Impulse, synaptic transmission of the impulse.	3

1,3	Mode of action of anaesthetics: Mode of action of local and general anesthetics. Stages and hazards of anesthesia. Hazards of their management.	3
1,3	Sedatives and Tranquillizers: Indications, agents used, their doses, mode of actions, adverse effects, and their management in different species of animals.	3
1,2,3	Premedication: Indications, agents used, and their doses in different species of animals.	3
1,2,3	Local anesthesia: Agents used, methods of infiltration (Topical analgesia, ring block, field block, inverted L block, inverted V block)	2
1,2,3	Regional Analgesia: paravertebral, epidural, corneal, auriculopalpebral, supra-orbital, mandibular, infra-orbital, planter, perineal, pudic nerve block, intravenous regional analgesia.	3
1,2, 3	Muscle relaxants: Drugs used and their doses in various species.	2
1,2, 3	General anesthesia and anesthetics: Injectable agents: chloral hydrate, barbiturates, dissociatives, steroids, and other agents.	3
1,2,3	Gaseous anesthesia and anesthetics: Apparatus used for gaseous anesthesia. Inhalation agents: Chloroform, diethylether, halothane, methoxyflurane, enflurane, isoflurane, Sevoflurane, desflurane, nitrous oxide, and cychloprone	2
1,2,3	Anesthesia of zoo, aquatic, and laboratory animals and birds.	2
3	Euthanasia: Indications, various methods, and agents used for euthanasia	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Kumar, P. 2009. Textbook of Veterinary Anaesthesia. 1st Edition. CBS Publishers and Distributors, India).
2. Hall, L.W. and Clark, K.W. 1991. Veterinary Anaesthesia. 9th Edition. Bailliere Tindall, London.
3. Vickers, M.D., Wood-Smith, F.G. and Stewart H.C. 1978. Drugs in Anaesthetic Practice. 5th Edition. Butterworths, London.
4. Nunn, J.F., Utting, J.E. and Brown, B.R. 1989. General Anaesthesia. 5th Edition. Butterworths, London.
5. Paddleford, R.R. 1988. Manual of Small Animal Anesthesia. 1st edn. Churchill Livingston, New York.
6. Soma, L.R. 1971. Textbook of Veterinary Anaesthesia. The Williams & Wilkins Company, Baltimore. USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Anaesthesiology
2.	**Course Code**	:	0841VAS326
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Third Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
To handle surgical cases in livestock, pet and companion animals, zoo or other animals, proper expertise in anaesthesia is mandatory. Anaesthesia is a condition produced by certain agents where there is loss of consciousness, pain and movement. Anaesthesia may be needed before, after or during handling of the surgical cases in animals and birds. The preparation of an animal is essential for the successful induction of anaesthesia. Therefore, this course deals with the preparation of animals, administration of anaesthetics, induction of various anaesthesia, and management of adverse effects in different species practically. It is expected after completion

of the course student will be able to prepare the animal, administer the anaesthetics to induce anaesthesia with proper management of toxic effect of anaesthetics.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. To provide sufficient knowledge on the procedure of preparing animals and to administer anaesthetic, analgesic, muscle relaxants or sedatives to animals.
b. To facilitate necessary knowledge on factors related to anaesthesia in different animals, types of anaesthesia needed in case specific.
c. To attain knowledge for the management of adverse effects of anaesthetia practically.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : prepare the animal to administer the anaesthetics.

CLO2 : perform local anaesthesia, regional anaesthesia (like paravertebral, epidural, corneal nerve block), and general anaesthesia in different farm, zoo or lab animals

CLO3 : handle the adverse effects of anaesthtics in animals and perform euthanasia.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	x	x	x
CLO2	2	3	x	x	x
CLO3	2	3	x	x	x

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	**Introduction:** Familiarization with various anesthetic devices and uses. General consideration of patients for anesthesia.	2
1,2	Familiarization with various sedatives, tranquilizers, muscle relaxants, local and general anesthetic (injectable and gaseous) agents with their doses, and administration in different animals.	2
1,2,3	**Infiltration of local anesthesia**: Topical analgesia, field block, ring block, inverted L block, inverted V block.	2
1,2,3	**Regional analgesia:** paravertebral, epidural, corneal, auriculopalpebral, supra-orbital, mandibular, infra-orbital, planter, perineal, pudic nerve block, intravenous regional analgesia	2
1,2,3	Anesthesia of small animals, Stages of anesthesia. Hazards of anaesthesia and their managements.	2
1,2,3	Anesthesia of zoo, aquatic, laboratory, and wild animals.	2
1,2,3	**Euthanasia:** Indications, various methods and agents used	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Kumar, P. 2009. Textbook of Veterinary Anaesthesia. 1st Edition. **CBS Publishers and Distributors, India).**
2. Hall, L.W. and Clark, K.W. 1991. Veterinary Anaesthesia. 9th Edition. Bailliere Tindall, London.
3. Vickers, M.D., Wood-Smith, F.G. and Stewart H.C. 1978. Drugs in Anaesthetic Practice. 5th Edition. Butterworths, London.
4. Nunn, J.F., Utting, J.E. and Brown, B.R. 1989. General Anaesthesia. 5th Edition. Butterworths, London.

5. Paddleford, R.R. 1988. Manual of Small Animal Anesthesia. 1st edn. Churchill Livingston, New York.
6. Soma, L.R. 1971. Textbook of Veterinary Anaesthesia. The Williams & Wilkins Company, Baltimore. USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1. Course Title : Dairy Animal Medicine
2. Course Code : 0841VAS3**2**7
3. Course Type : Theory
4. Credit : 02
5. Course Level : Third Year Second Semester
6. Session : 202**3**-202**4**
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers:

Professor M. Mahbubur Rahman, PhD
Professor Aurangazeb Kabir, PhD
Associate Professor Emtiaj Alam, PhD
Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

This course offers a comprehensive introduction to dairy animals and outlines the crucial roles of veterinarians within the dairy industry. It thoroughly examines a wide range of diseases and disorders that affect dairy and neonatal animals, covering pathogenic, metabolic, and non-infectious diseases, as well as congenital deformities. Key aspects such as etiology, pathogenesis, epidemiology, clinical signs, diagnosis, treatment, prevention, and control form the core of the curriculum. Students gain a solid understanding of both fundamental and advanced diagnostic and therapeutic techniques, with a strong emphasis on case-based learning and practical problem-solving strategies. This approach equips students with the tools needed to effectively manage and prevent diseases in dairy and neonatal animals.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. To equip students with the skills to analyze the etiology and nature of diseases in dairy animals, focusing on advanced epidemiological principles for accurate disease diagnosis in field settings.
b. To deepen students' understanding of the diverse diagnostic methodologies employed in detecting specific diseases in dairy animals, including those caused by bacteria, viruses, parasites, fungi, protozoa, and other pathogenic agents.
c. To provide comprehensive education on the therapeutic management of diseased animals, integrating modern approaches to the prevention and control of both infectious and non-infectious diseases, ensuring holistic care and health maintenance in dairy herds.

11. Course Learning Outcome (CLO):

Upon completion of the course, students will be able to:
CLO1: Comprehend and enhance the skills necessary to articulate the principles of dairy animal medicine and the breadth of this field.
CLO2: Ready to apply the theoretical knowledge in a logical and professional manner to the etiology, epidemiology, pathogenesis, clinical features, diagnosis, treatment and prevention of dairy animals' suffering from various infectious and non-infectious diseases and disorders
.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson plan:

CLOs	Course Contents	Lectures
1,2	• Introduction of dairy animals (Cattle/ Buffalo/Camel/Goat etc.) • Role of veterinarians in dairy farms and associated dairy industries • Principle of diagnosis and prevention of infectious diseases • Source of infection in relation to housing equipment's and feeds used • Management factors in relation to disease control • Implementing a comprehensive care regimen for pregnant animals at each stage of gestation • Neonatal pediatric care and management, early vaccination schedule	3
2	• Causes of abortion in dairy animals/ Health and diseases of pregnant and parturient animals: A. Brucellosis B. Campylobacteriosis C. Mycoplasmosis D. Tritrichomoniasis E. Tuberculosis F. Milk fever G. Pregnancy toxaemia H. Puerperal Metritis in Cow I. Downer's cow syndrome J. Post-parturient haemoglobinuria K. Grass tetany & lactation tetany	9
2	• Health and diseases of milch animals: i) Mastitis ii) Ketosis iii) Agalactia in Cow iv) Contagious Agalactia in Sheep and goat	4
2	• Diseases of teat and skin lesions: i) Pseudo-cowpox ii) Bovine ulcerative mammilitis • Udder disorders: i) Oedema ii) Impetigo iii) Teat papiollomatosis iv) Udder neoplasms	4
2	• Health and diseases of neonatal animals: i) Classification of neonatal diseases, neonatal hypothermia, neonatal icterus, dummy calf syndrome, neonatal tympany and acidosis, congenital defects and relationships between disease incidence and colostrum feeding in newborns. ii) Bacterial diseases: Colibacillosis, Enterotoxaemia, Tetanus, Salmonellosis, Navel-ill. iii) Viral diseases: Enzootic pneumonia of calves, rotavirus infection. iv) Parasitic diseases: Fascioliasis, Paramphistomiasis, Schistosomiasis, Ascariasis, PGE (Parasitic gastroenteritis), Coccidiosis, Cryptosporidiosis etc. v) Diseases caused by protozoa: Babesiosis, Theileriosis vi) Nutritional deficiency diseases: Vitamin and mineral deficiency diseases.	12

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W., 2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
2. Samad, M. A.2008. Animal Husbandry and Veterinary Science- Volume 2, LEP publication No. 11, BAU Campus, Mymensingh.
3. Andrews, A.H., Blowey, R.W., Boyd, H. and Eddy, R.G. (2004). Bovine Medicine: Disease and Husbandry of Cattle. 2ndedn. Blackwell Science Ltd.
4. Kahn C. M., Line. S., Aiello. S. E. and Mays. A. (2010). The Merk Veterinary Manual. Merck & Co. Inc, Winter House Station, NJ, USA
5. mvgv`, Gg. G. 2010. cï wPwKrmv we`¨v . 3q cªKvkbv †jc cªKvkbx bs 12. evK…we, gqgbwmsn|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	:	Veterinary Gynaecology
2.	**Course Code**	:	0841VAS329
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Third Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**:		Professor Dr. Md. Jalal Uddin Sarder Dr. Jashim Uddin

9. Rationale of the Course:

General Gynaecology, a theoretical clinical course, describes the basic concepts of gynaecology including the terminology, history, importance of gynaecology in veterinary field as well as this is a basic course of veterinary gynecology which describes the structure and function of female reproductive organs in different animals. The student will be familiar with basic concepts of gynecology. Veterinary gynaecology describes the reproduction, hypothalamo-pituitary-ovarian-uterine interaction, breeding soundness, reproductive cycle with behaviors of different animals, heat detection, gynaecological diseases of adult female animals and herd health management of different animals. The knowledge achieved in this course helps students to understand the reproductive health and diseases in domestic, wild animals and birds. Application of knowledge achieved by learning this course will provide insight for reproductive disease diagnosis and its control which have great impact on livestock development and animal welfare.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. To understand the definition, terminology, history, scope and importance of veterinary gynecology.
2. To know the structure and functions of reproductive organs of different animals.

3. To learn the reproductive cycle, estrus signs of different female animals and their endocrinology.
4. To explore the breeding soundness evaluation of female animals, induction of estrus cycle and methods of estrus detection and gestation length.
5 To helps the diagnosis of several reproductive diseases and the management of herd health fertility.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:
CLO1 : explain the structures and functions of female reproductive organs of different animals.
CLO2 : describe the age of puberty, sexual maturity, breeding soundness, estrus cycle, estrus signs, and methods of heat detection and gestation length of different animals.
CLO3 : Perform diagnosis and treatment of reproductive diseases of different animals as well as achieve the best practices of reproductive herd health fertility.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Ccontents	Lectures
1	Definition and common terminology of veterinary gynecology. Scope and importance of veterinary gynecology. History of gynecology and introduction to reproduction. The organization and function of the female reproductive tract of different animals. Comparative anatomy of female genital system. Ovarian structure: Folliculogenesis, oogenesis and ovulation and formation of corpus luteum and associated endocrine pattern.	7
2	Puberty and sexual maturity of different animals. Factors influencing the onset of puberty. Hypothalamic-pituitary-gonadal and uterine interaction. Endocrine regulation of estrous cycle. Breeding soundness of female animals.	3
2	The estrous cycle- and basic concepts. Stages of estrous cycle. Follicular phase, luteal phase, behavioral and physical characteristics of estrus in different animals. Factors affecting the estrous cycle.	4
2	Clinical application of hormones, synchronization of estrus and ovulation and induction of ovarian activity of domestic and companion animals. Methods of estrus detection.	3
3	Etiology, diagnosis, treatment, management of reproductive diseases and economic importance of infertility, sub-fertility and sterility.	6
3	Female reproduction and reproductive health management of farm, companion animals. Health control of farm animals. Mastitis and udder health management	5

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Atrhur, GH., Noakes, DE and Pearson, H (1998). Veterinary Reproduction and Obstetrics (Theriogenology). 3rdedn. Bailliere Tindall, London, Sydney, Tokyo.
2. Cupps, PT (1991). Reproduction in Domestic Animals. Academic Press.
3. Hafez, FSE (2000). Reproduction in Farm Animals. Lea and Febizer, USA.
4. Hunter, RHF (1985). Reproduction of Farm Animals.Longman group ltd Longman house, Burnt Mill, Harlow, Esses, CM20 2JE, England.
5. Laing, JA., Morgan, W B and Wagner, WC (1988). Fertility and Infertility in Veterinary Practice. 4thedn. Bailliere Tindall.
6. Roberts, SJ (1986). Veterinary Obstetrics and Genital Diseases (Theriogenogy). 3rdedn. W. B. Saunders Company, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1. Course Title : Veterinary Gynaecology
2. Course Code : 0841**VAS330**
3. Course Type **:** Practical
4**. Course Level** : **Third Year Second Semester**
5**. Session** : 202**3**-202**4**
6**. Course Credit** :1
7**. Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8**. Course Teachers**: Professor Dr. Md. Jalal Uddin Sarder
Dr. Jashim Uddin

9. Rationale of the Course:
This course deals with the Veterinary Gynaecology of Farm animals and others animals. It also deals breeding soundness evaluation of animals as well as heat signs of different animals. Students will be trained to handle the common gynaecological cases practically with proper anaesthesia or analgesia when needed.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To understand the theoretical knowledge practically to observation of female genital systems at slaughter houses.
b. To know the instruments and appliances for the purpose of gynecological study.

c. To learn the gynaecological diseases in different animals at clinics.
d. To explore the breeding soundness evaluation of female animals, induction of estrus cycle and methods of estrus detection and gestation length.
e. To helps the diagnosis of several reproductive diseases and the management of herd health fertility.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : explain the theoretical knowledge practically to handle the gynaecological cases of the farm animals
CLO2 : describe the surgery related to the genital system of farm animals.
CLO3 : ensure the rectal palpation, heat detection, pregnancy diagnosis, surgery of reproductive diseases in farm animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Ccontents**	**Lectures**
1	Demonstration of the female genital organs. Phantom palpation of bovine	3
1	Clinical gynaecological examination of female animals. Estrus detection.	3
2	Clinical practice on various genital diseases. Practice of intrauterine catheter passage, uterine biopsy, intrauterine infusion and flushing,	4
3	On farm practice of reproductive health management.	2
3	Immuno diagnostic techniques.	1
3	Field trips to Rajshahi Cattle improvement and Dairy Farm, Rajabarihat, Rajshahi and other Private farms for practical classes.	1

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Atrhur, GH.,Noakes, DE and Pearson, H (1998). Veterinary Reproduction and Obstetrics (Theriogenology). 3rdedn. Bailliere Tindall, London, Sydney, Tokyo.
2. Cupps, PT (1991). Reproduction in Domestic Animals. Academic Press.
3. Hafez, FSE (2000). Reproduction in Farm Animals. Lea and Febizer, USA.
4. Hunter, RHF (1985). Reproduction of Farm Animals. Longman group ltd Longman house, Burnt Mill, Harlow, Esses, CM20 2JE, England.
5. Laing, JA., Morgan, W B and Wagner, WC (1988). Fertility and Infertility in Veterinary Practice. 4thedn. Bailliere Tindall.
6. Roberts, SJ (1986). Veterinary Obstetrics and Genital Diseases (Theriogenogy). 3rdedn. W. B. Saunders Company, USA.
7. Rvjvj, Gg.wR.BD (2023), M„ncvwjZ cï-cvwLi †ivM-e¨vwa I AvaywbK wPwKrmv c×vwZ, Z…Zxq ms¯‹iY, b~i cvewj‡Kkb, 37, evsjvevRvi, XvKv|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	**:**	**Livestock and Poultry Products Technology**
2.	**Course Code**	**:**	**0841 VAS 331**
3.	**Course Type**	**:**	**Theory**
4.	**Course Level**	**:**	**Third Year Second Semester**
5.	**Session**	**:**	**2023-2024**
6.	**Course Credit**	**:**	**2**
7.	**Total Marks**	**:**	**100 (Final Examination 70, Class Test 20, Attendance 10)**
8.	**Course Teachers**	**:**	**Dr. Syed Sarwar Jahan and Dr. Md. Shariful Islam**

9. Rationale of the course:
This is an applied course of Livestock & Poultry Science which describes livestock and poultry & related terms, its scope, importance, and contribution to our national economy. It also designates prospects, potentials and constraints of meat industry in Bangladesh; factors influencing the growth and development of meat animals, nutritional value of meat, factors affecting the quantity and quality & grading of meat; slaughterhouse by-products and their utilization; processing, preservation and spoilage of meat; marketing of meat and meat products and meat borne diseases and their prevention. This course also deals with hides, skins and wool technology. It describes egg science and technology with animal protein enriched products processing techniques. Therefore, this course provides students the applied knowledge of Livestock & Poultry Products Technology. It helps students to know various livestock & poultry related products, their processing, handling and managemental approaches.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

1. Know different terms related to livestock and poultry; history and development & its scope, importance, and contribution to our national economy in Bangladesh.
2. Gain vast knowledge of meat science & technology and processing of meat & meat products with their quality and value-added products.
3. Introduce wool technology and woollen fibbers & products.
4. Learn techniques of production of hides and skins & curing of hides and skins with proper management with leather preparation procedure.
5. Expert on Egg science & Technology, preparation, preservation and marketing of egg & egg enriched products.

11. Course Learning Outcome (CLO):
At the successful completion of the course, students will be able to:

CLO1: recognize contribution of livestock and poultry to our national economy & meat science & technology and processing of meat & meat products with their quality.
CLO2: apprehend the role of wool technology and woolen fibers & products, and hides and skins Technology, Production of hides and skins & curing of hides and skins with proper management until leather preparation.
CLO3: understand Egg science & Technology, preparation, preservation, and marketing of egg & egg enriched products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	Course content	Lectures
1	Definition of Livestock, Poultry & Poultry Science. Livestock and poultry-related terms, its scope, importance. Contribution of livestock and poultry to our national economy.	3
1	History and Development meat industry in Bangladesh. Prospects potentials and constraints of the meat industry in Bangladesh compared with the world. Factors influencing the growth and development of meat animals.	4
1	Meat is a food in human nutrition. Factors affecting the quantity and quality of meat. Grading of meat. Slaughterhouse by-products and their utilization. Processing, preservation, and spoilage of meat. Marketing of meat and meat products. Meat-borne diseases and their prevention Meat processing steps, Chicken (broiler), Beef, Mutton etc.	4
2	Wool glossary, virtues & uses of wool. Biology of wool and hair growth. Factors affecting fiber growth and quality. Physical and chemical properties of wool. The manufacturing process of wool. Specialty hair fiber, Wool, mohair, and cashmere. Factors influencing the price of wool.	4
2	Hides, skins and leather industry in Bangladesh: Importance, prospect and potentials. Composition and general microscopic structures of hides and skins. Production of hides and skins: pre-slaughter care, killing(slaughter), bleeding, flaying, washing, eating, fatting, trimming, and other considerations. Grading of hides and skins by Quality Most Common Species of Animals whose Hides/Skins are tanned Slaughtering of Animals, Different methods of slaughtering of animal	4
2	Curing of hides and skins: General principles. Different methods of curing and materials are needed for each method. Damage and defect of hides and skins: antemortem, post-mortem, and industrial defects, and during storage and transport. Tanning: The leather making process, Principles of tanning. Disposal of tannery wastages: Types of pollution and their treatments for environment control.	4
3	Definition of Egg Chemical composition of egg contents Physio-chemical properties of Egg Functional Properties of Eggs, Nutritive Value of Eggs	2
3	Egg Grading and Sizing; Factors Affecting Egg Size of Chicken Common Misconceptions About Eggs and The Truth Methods of egg preservation Antinutritional factors in eggs white	2

3	Handling, packing, storing, and transportation of eggs, marketing channels, factors affecting the price of egg and egg-related products. Food products: Types and uses Egg-enriched fast foods and their recipes	1

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.
1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. Thomas, Z. P. 1968. The meat we eat. The Interstate Printers and Publishers Inc., Danville, Illinois.
2. Lawrie, R. A. 1991. Meat Science. 5th edn. Pergamon Press.
3. Gracy. J. F. 1986. Meat Hygiene. 8th edn. English Language Book Society, Bailliere Tindall.
4. FAO. 1990. Manual on Simple Methods of Meat Preservation. Animal Production and Health Paper

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Third Year Second Semester

Course Outline

1.	**Course Title**	**:**	**Livestock and Poultry Products Technology**
2.	**Course Code**	**:**	**0841VAS332**
3.	**Course Type**	**:**	**Practical**
4.	**Course Level**	**:**	**Third Year Second Semester**
5.	**Session**	**:**	**2023-2024**
6.	**Course Credit**	**:**	**1**
7.	**Total Marks**	**:**	**100 (Final Examination 70, Class Test 20, Attendance 10)**
8.	**Course Teachers**	**:**	**Professor Dr. Md. Shariful Islam**

9. Rationale of the course:
This is a practical course of Livestock and Poultry Science that describes the chemical composition, structures, and conditions of hides & skins in Bangladesh. It also designates the identification of different types hides and skins, and wool fibers. This course also deals with the preparation of animals for slaughter, identification of meat of different species & estimation of quality of meat, estimation of carcass quality, dressing percentage & grading of meat and preparation of various value-added meat and egg products. Therefore, this course provides students the practical knowledge of the preparation and processing of Livestock and poultry-related Products with their quality.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. Know different chemical compositions, structures, and conditions of hides & skins in Bangladesh.
b. Gain vast knowledge of cattle hides and calf skins with their properties, antemortem, and post-mortem defects of hides & skins in Bangladesh and different types of wool fibers
c. Learn techniques of slaughtering methods and prepare animals for slaughter
d. Identify meat of different species & estimation of quality of meat, estimation of carcass quality, dressing percentage & grading of meat.
e. Know how to prepare various value-added meat and egg products.

11. Course Learning Outcome (CLO):

At the successful completion of the course, students will be able to:

CLO1: recognize different chemical compositions, structures, and conditions of hides & skins, antemortem, and post-mortem defects of hides & skins in Bangladesh and various wool fibers

CLO2: prepare animals for slaughter and identify meat of different species & estimation of quality of meat, estimation of carcass quality, dressing percentage & grading of meat.

CLO3: make various value-added meat and egg products

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Study on chemical composition and structures of hides & skins	1
1	Study on cattle hides and calf skins in Bangladesh	1
1	Study on identification of different types of wool fibers under Microscope	2
2	Study on different methods of slaughtering animals. Study on preparation of animals for slaughtering Filed trip to a modern slaughter house	2
2	Study on dressing percentage of various carcass and grading of meat	1
2	Identification of meat from different species and quality estimation	1
3	Study on preparation of chicken meat ball	1
3	Study on preparation of chicken chips	1
3	Study on preparation of chicken sausages and nuggets	2
3	Study on preparation of mayonnaise	1

1**4. Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings:

1. Thomas, Z. P. 1968. The meat we eat. The Interstate Printers and Publishers Inc., Danville, Illinois.
2. Lawrie, R. A. 1991. Meat Science. 5th edn. Pergamon Press.
3. Gracy. J. F. 1986. Meat Hygiene. 8th edn. English Language Book Society, Bailliere Tindall.
4. FAO. 1990. Manual on Simple Methods of Meat Preservation. Animal Production and Health Paper

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1. Course Title : Veterinary Public Health
2. Course Code : 0841VAS401
3. Course Type : Theory
4. Course Level : FourthYear First Semester
5. Session : 2023-2024
6. Course Credit : 2
7. Total Marks : 100(Final Examination70, Class Test 20 and Attendance 10)
8. Course Teacher : Prof. Dr. K. M. Mozaffor Hossain, Prof. Dr. Mst. Ismat Ara Begum, Prof. Dr. Md. Hakimul Haque**,** Associate Prof. Dr**.** Md Thoufic Anam Azad

9. Rationale of the Course:

This course is designed to study about basic concepts of Veterinary Public Health (VPH) that focuses on the application of veterinary science to protect and improve the physical, mental and social well-being of humans. Veterinary Public Health includes those areas of public health in clinical veterinary medicine shares an interest concern is veterinary skills can be directed to the solution of community problem of health and disease in man.

10. Intended learning Objectives (ILOs):

a. To understand and be able to explain the Veterinary Public Health and different terms and scope of Veterinary Public Health.
b. Learn about planning, organization and administration of veterinary public health activities and understand the status of Veterinary Public Health activities in Bangladesh and its future plans
c. To understand and participate in contagious disease management, including disease prevention and control programs
d. To explain conditions and measures to ensure the safety and suitability of food of animal origin
e. **To describe zoonotic and non-zoonotic diseases of veterinary public health significance**

11. Course Learning Outcomes (CLO):
Upon completion of the course the graduate student will be able to:

1. Learn the definition and detailed scopes of Veterinary Public Health (VPH), the core domains of VPH and the steps taken to ensure VPH
2. Know about the important duties and responsibilities of VPH and learn about planning, organization and administration of veterinary public health activities
3. Understand **zoonotic diseases and ecological theories of veterinary public health significance t**o enhance infectious disease control and public health policy
4. Understand the correlation of individual and its environment

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	3	2
CLO2	3	2	2	2	3
CLO3	2	2	2	3	1
CLO4	2	2	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course content	Lectures
1 and 2	Definition, scopes, and objectives of veterinary public health.	2
1 and 2	The common basis for veterinary and public health practices. Human-animal interaction and animal production systems and veterinary public health.	2
1 and 2	Public health team: Organization, administration, and function. The role of veterinarians and other related professional in the protection of human health through the safe production of foods of animal origin.	3
3	Zoonoses: Concepts and classification. Factors affecting the spread of zoonotic diseases. Impact of zoonosis on health. Role of reservoir host and vectors in transmitting zoonotic diseases. Emergent zoonotic diseases. Prevention, control, and eradication of zoonotic disease.	3
3	Prevention, control, and eradication of zoonotic disease.	3
3	Epidemiology: Concepts, scope, objective, and type of epidemiology. General methods of epidemiological investigation of zoonotic diseases.	2
4	Ecology and ecological imbalance	1
3 and 4	Disease surveillance and risk analysis. Disseminating information on veterinary public health; quality and safety assurance in food production (meat, milk, and eggs).	2
	Causes of multifactorial diseases: Agents, host, and environmental factors.	2
4	Environmental hygiene: Water and air pollution and their remediation. Water related infections. Indicator bacteria and their characteristics. Effect of acid rain and green house on health of man and animal.	3

Suggested Reading List:

1. Schwabe, C. W. 1965. Veterinary Medicine and Human Health. Baltimore, William, and Wilkins Company.
2. Johan, C. Bell, Stephen, R., Palmer, and Jack, M. Payne. 1988. The zoonoses. 1st edn. Edward Arnold
3. Thapaliyal, D. C. 1999. Diseases of animals transmissible to man. Internationals Book Distributing Company. Lowa State University Press, Ames.
4. Martin, S. W., Meek, A. H., and Willeberg, P. 1987. Veterinary Epidemiology. 2nd edn. Principles and methods.
5. Thrushfeld, M. 1986. Veterinary Epidemiology. 2nd edn. Blackwell Science.
6. Thapaliyal, D. C. 1999. Fundamentals of Animals Hygiene and Epidemiology.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1. Course Title : Farm Animal Medicine
2. Course Code **:** 0841VAS40**3**
3. Course Type : Theory
4. Course Level : Fourth Year First Semester
5. Session : 2023-2024
6. Course Credit : 03
7. Total Marks **:** 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers:

Professor M. Mahbubur Rahman, PhD
Professor Aurangazeb Kabir, PhD
Associate Professor Emtiaj Alam, PhD
Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

This course offers a comprehensive exploration of farm animal medicine, emphasizing the critical role of veterinarians in livestock settings. It encompasses a broad spectrum of species, including livestock, equines, and swine etc., while systematically addressing the multifaceted diseases affecting these animals. Students will investigate diseases caused by various pathogens, including bacteria, viruses, mycoplasma, rickettsia, chlamydia, fungi, parasites, toxins, and physical agents. In-depth analysis of the fundamental components of diseases—such as etiology, epidemiology, pathogenesis, clinical manifestations, diagnosis, treatment, prevention, and control—will be a cornerstone of the curriculum. The course adopts a case-based learning approach, fostering analytical and problem-solving skills essential for effective clinical decision-making. By integrating advanced diagnostic tools and contemporary medical management strategies, students will be equipped to address the complexities of disease medication, prevention and control in farm animal populations.

10. Intended Learning Objectives (ILOs):

a. To identify the causes and nature of diseases as well as emphases on epidemiology to diagnose diseases at field level.
b. To teach the students about various techniques used in diagnosis of the particular diseases e.g. bacterial, viral, parasitic, fungal, protozoal etc.
c. To guide the students regarding treatment of the diseased animals and, how to control and prevent the infectious, non-infectious and other diseases of farm animals.

11. Course Learning Outcome (CLOs):

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

CLO1. understand and develop required capability to explain farm animal medicine and scope of this subject.

CLO2. apply the theoretical knowledge in a logical and professional manner to the etiology, epidemiology, pathogenesis, clinical features, diagnosis, treatment and prevention of farm animals suffering from various infectious, non-infectious and other diseases and disorders.

CLO3. handle the diseased farm animals with high competencies with aim to save the rural farmers from great economic loss.

14. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	1	3	1	3	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

15. Lesson Plan:

CLOs	Course content	Lectures
1,2	• Introduction of farm animals (Cattle/ Buffalo/Camel/Goat/Sheep/horse/pig etc.) • Role of veterinarians in the farms and related industries • Principle of diagnosis and prevention of infectious diseases • Source of infection in relation to housing equipment's and feeds used • Management factors in diseases' control	2
2	• Specific diseases of farm animals, **Bacterial diseases**: Contagious bovine pyelonephritis, Caseous lymphadenitis, Bovine lymphadenitis, Listeriosis, Anthrax, Botulism, Blackleg, Malignant oedema, Bacillary haemoglobinuria, Infectious necrotic hepatitis, Hemorrhagic septicemia, Infectious bovine keratoconjunctivitis, Tuberculosis, Paratuberculosis, Actinobacillosis, Actinomycosis, Leptospirosis, Dermatophilosis, Foot rot, Glanders, Strangles, Melioidosis, Pasteurellosis, Rhodococcosis, Streptococcosis, Salmonellosis, Colibacillosis, Tetanus, Erysipelas, Contagious equine metritis	12
2	**Diseases caused by Mycoplasma, Rickettsia and Chlamydia**: Contagious bovine and caprine pleuropneumonia, Contagious agalactia, Mycoplasmal arthritis, Heartwater disease, Anaplasmosis, Tick born fever, Q fever, Potomac Horse Fever, Enzootic pneumonia	2
2	• **Fungal diseases:** Dermatophytosis, Blastomycosis, Histoplasmosis, Coccidioidomycosis, Moniliasis,	4

	Cryptococcosis, Aspergillosis, Candidiasis, Sporotrichosis, Phaeohyphomycosis, Hyalohyphomycosis and Oomycosis	
2	•**Viral diseases:** • Papillomatosis, Infectious bovine rhinotracheitis, Bovine ephemeral fever, Foot and mouth disease, Lumpy skin disease, Rinderpest, Bovine viral diarrhea, Bovine malignant catarrh, Rabies, Pseudo-rabies, Peste des petits ruminants (PPR), Blue tongue, Scrapie, Maedi-visna, Pox. Hendra Virus infection, EHV-1, EHV-4, Equine Influenza, Equine Rhinovirus 1, Equine Rhinovirus 2, Equine Viral Arteritis (EVA), Vesicular stomatitis, Adenovirus infection, Corona virus infection, African Horse Sickness, West Nile Virus infection, Vesicular stomatitis, Vesicular exanthema, Rota virus infection, Equine coital exanthema.	12
2	• **Parasitic diseases:** Diseases caused by trematodes/flukes: Fascioliasis, Paramphistomiasis, Schistosomiasis Diseases caused by nematodes and cestodes: Stomach worm diseases, Gastro-intestinal nematodiasis, Strongyloidosis, Lungworm disease, Hookworm disease, Eyeworm disease, Trichinellosis, Skin-worm disease, Ascariasis, Tapeworm disease, Diseases caused by protozoa: Babesiosis, Theileriosis, Trypanosomiasis, Coccidiosis, Bovine tritrichomoniasis, Toxoplasmosis, Cryptosporidiasis, Sarcocystosis, Balantidiasis, Giardiasis, Surra, Dourine, Leishmaniasis, Amoebiasis, Cryptosporidiosis, Ectoparasitic skin diseases like Myiasis, Mite infestations (Mange), Tick and lice infestations etc.	10
2	• Diseases caused by poisons: Hydrocyanic acid, Nitrate and nitrite, Chlorinated hydrocarbons, Organophosphorus and carbonates, Urea, Arsenic, Snake venom etc.	4
2	• Diseases caused by physical agents: Physical dermatitis, Lightning stroke and electrocution, Burns and scalds, Yoke gall, Brisket disease etc.	2
2	• Protein- energy deficiency diseases, vitamin-mineral deficiency diseases (vit A, D, E, B complex, CA, P, Mg, Co, Cu, I, Fe, Mn, Zn, Se etc.)	2

14.Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15.Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested reading materials:

1. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
2. Samad, M. A.2008. Animal Husbandry and Veterinary Science- Volume 2, , LEP publication No. 11, BAU Campus, Mymensingh.
3. Andrews, A.H., Blowey, R.W., Boyd, H. and Eddy, R.G. (2004). Bovine Medicine: Disease and Husbandry of Cattle. 2ndedn. Blackwell Science Ltd.
4. KahnC. M., Line. S., Aiello. S. E. and Mays.A. (2010). The Merk Veterinary Manual. Merck & Co. Inc, Winter House Station, NJ, USA
5. mvgv`, Gg. G. 2010. cï wPwKrmv we`¨v . 3q c^{a}Kvkbv †jc c^{a}Kvkbx bs 12. evK…we, gqgbwmsn|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1. **Course Title**: Farm Animal Medicine
2. **Course Code**: 0841VAS 40**4**
3. **Course type**: Practical
4. **Course Credit**: 01
5. **Course Level**: 4th Year 1st Semester
6. **Session**: 2023-2024
7. **Total Marks**:100 (Final Examination 70, Class Test 20, Attendance 10)

8. Course Teachers:

Professor M. Mahbubur Rahman, PhD
Professor Aurangazeb Kabir, PhD
Associate Professor Emtiaj Alam, PhD
Associate Professor Mst. Ishrat Zerin Moni MPhil

9. Rationale of the Course:

Veterinarians must employ a diverse array of knowledge and skills to effectively serve farm animals in the dynamic and ever-evolving landscape of farm industries, enterprises, and practices. This course is designed to enhance both the proficiency and confidence of veterinary students, preparing them to adapt to the latest advancements in farming techniques, animal husbandry, and disease management. By equipping students with the tools to address complex challenges, the course ensures would-be veterinarians are capable of providing higher-level services and making meaningful contributions to the farm animal sector.

10. Intended Learning Objectives (ILOs):

a. To educate students needed techniques for full-scale farm animal production and management as well as optimizing career buildup in farms and associated businesses and industries.
b. To render hands on training to students in diagnosis, treatment, prevention and control of various diseases of farm animals.

11. Course Learning Outcomes (CLO):

At the end of the course, students will be able to:

CLO1: apply the theoretical knowledge in a logical and professional manner to the etiology, epidemiology, pathogenesis, clinical features, diagnosis, treatment, prevention and control of farm animals suffering from disease.

CLO2: carry out their fundamental clinical abilities in terms of prophylactic and therapeutic follow-ups

CLO3: apply the fundamentals and methods of providing pediatric cares in farm animals.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course Contents	Lectures
1,2,3	• Field Trip(s) to different government and private Farms of cattle, buffaloes, horses, camels, sheep, goats, and, pigs for practical exposure of disease(s), their therapeutic and prophylactic interventions with detailed health management.	5
2, 3	• Collection and dispatch of specimens to the laboratory for examination and confirmation of diagnosis.	3
2, 3	• Clinical examination of sick animals, diagnosis of the diseases, their treatment and follow- ups.	4
2, 3	• Recording of clinical cases with post-treatment evaluation and interpretation in a note book.	4
2,3	• Diagnosis and treatment of farm animals' diseases at Veterinary Clinics and farm(s) level.	12

1**4**. **Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

1**5**. **Assessment Strategies:**

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.2017. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
2. Samad, M. A.2008. Animal Husbandry and Veterinary Science- Volume 2. 1st edition. LEP publication No. 11, BAU Campus, Mymensingh.
3. Andrews, A.H., Blowey, R.W., Boyd, H. and Eddy, R.G. 2004. Bovine Medicine: Disease and Husbandry of Cattle. 2ndedn. Blackwell Science Ltd.
4. Jackson., P.P.G. and Cockcroft., P.D.2002.Clinical Examination of Farm Animals. 1st edition. Blackwell Science Lt.UK.
5. mvgv`, Gg. G. 2010. cï wPwKrmv we`¨v. 3q cªKvkbv †jc cªKvkbx bs 12. evK…we, gqgbwmsn|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	General Surgery
2.	**Course Code**	:	0841VAS40**5**
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**:		Dr. Abdulla Al Mamun Bhuyan
			Dr. Jashim Uddin

9. Rationale of the Colurse:

This is a basic course in biomedical sciences that provides a gross idea of the surgery of tissues. Surgery is intended for the alleviation or correction of diseases, deformities, or injuries by manual, mechanical, and operative means. General surgery deals with the definition, common terms, common surgical affections, and basic principles of surgery of different soft and hard tissues such as inflammation, abscess, wounds, gangrene, sinus, fistula, cysts, tumors, burns, scalds, shock, lameness and fracture with the methods of therapy. It also gives a gross idea of the indication and management of fluid therapies. So, at the end of the course, the student will get a basic idea of different surgical terms and common surgical affections of soft and hard tissues with their proper management.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. To describe the basic understanding of the scope, importance, and principles of surgery.
b. To provide knowledge on the surgical affection of soft and hard tissue with their management.
c. To facilitate necessary knowledge on the surgical techniques of less tissue invasion and less bleeding.
d. To attain the knowledge to perform successful surgery and fluid therapy.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : explain the handling of common surgical affection of soft and hard tissue with their proper management (e.g. Inflammation, wound, abscess, cyst, tumor, gangrene, hemorrhage, fracture, etc.).
CLO2 : enumerate the scope and importance of the surgery.
CLO3 : describe the indications and assessment of fluid therapies in animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3	3	2			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	I**ntroduction**: scope, and history of surgery. Principles of surgery. Definition of common surgical terms and methods of therapy. Surgical team, Common surgical instruments and their uses. Suture and suture materials. Preparation of a surgical site, sterilization of instruments, post-operative care, setup of an operation theatre.	3
1,2	**General surgical affections:** Inflammation, suppuration and abscess, gangrene, cyst, tumors ulcer, sinus and fistula, affection of uropygial gland in bird, castration.	3
1,2,3	Hemorrhage, hematoma, and hemostasis. Burns and scalds, frostbite, shock, and coma. Tissue grafting, cryosurgery.	7
1,2,3	**Wounds:** closed wound, open wound, septic wound, aseptic wound, healing of a wound, complications of a wound, and myiasis.	6
1,2,3	**Surgical affections of tissues:** Skin and subcutaneous connective tissues, arteries, veins, lymphatics, and nerves.	3
1,2,3	**Surgical affections of bones and joints:** Fracture: Classification, etiology, diagnosis, treatment, healing, and complications of fracture.	3
1,2,3	**Fluid therapy:** Indications, different types of fluid used, assessment of fluid and their administration, electrolyte and acid-base balance	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 2005. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi, India.
2. Adams, O.R. 1974. Lameness in Horses. 3rd Edition.
3. Greenough, P.R., Weaver, A.D. and MacCallum, F.J. 1972. Lameness in cattle.
4. Saltier, D.H. 1985. Textbook of Small Animal Surgery. Volume I and II W.B. Sauders Company, Philadelphia.
5. Michell, A.R., Bywater, R.J., Clarke, K.W., Hall, L.W. and Watreman, A.E. 1991. Veterinary Fluid Therapy. Wiley-Blackwell Scientific Publication, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	General Surgery
2.	**Course Code**	:	0841VAS40**6**
3.	**Course Type**	**:**	Practical
4.	**Course Level**	:	Fourth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**:		Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
This course gives a clear idea of the general consideration of surgery, introduction and uses of different surgical instruments, sutures, and suturing techniques, sterilization of surgical instruments, and preparation of animal

and surgical sites to conduct the intended surgery. This course also provides an insight into surgical anatomy, and common surgical affections (such as inflammation, abscess, wounds, gangrene, sinus, fistula, cysts, tumors, fractures, burns and scalds, and shock) of different soft and hard tissues with practical exposure. It also covers surgical affection causing lameness and various fluid therapies practically. So, after completion of the course, student will understand about basic principles of common surgical cases with their proper management.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. To facilitate necessary knowledge about the principles of surgery, general consideration of surgery along with surgical anatomy, and a focus on reviewing theoretical knowledge.
2. To describe different surgical instruments with their uses and sterilization.
3. To attain knowledge of suture patterns and suturing materials.
4. To provide knowledge on the importance of fluid therapy towards successful surgery.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : explain the principles of surgery, general consideration of surgery along with surgical anatomy, examination, and preparation of animals for surgery.

CLO2 : describe surgical instruments, the pattern of sutures, suturing materials and sterilization of surgical instruments.

CLO3 : enumerate the requirement and administer the technique of fluid therapy around the treatment of general surgical affections of soft and hard tissues.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3	2	3	2		

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	General consideration of surgery, restrain, examination, and preparation of an animal for surgery. Surgical team, Common surgical instruments and their uses. Preparation of a surgical site, sterilization of instruments, post-operative care, setup of an operation theatre.	2
1,2	Dressing, Draping, bandaging, operative techniques, sutures, and suture materials.	4
1,2,3	Diagnosis and treatment of minor surgery like Principles abscess, cyst, tumor, gangrene, sinus fistula etc.	4
1,2,3	Understand about Hemostasis: Name and techniques of applications of the local hemostat, systemic coagulant, ligation, crashing, and cauterization of blood vessels. Practice of parenteral injection: (intravenous, intramuscular, subcutaneous etc) and fluid therapy.	2
1,2,3	Passing of stomach tube, catheter, nerve blocking	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 2005. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi, India.
2. Adams, O.R. 1974. Lameness in Horses. 3rd Edition.
3. Greenough, P.R., Weaver, A.D. and MacCallum, F.J. 1972. Lameness in cattle.

4. Saltier, D.H. 1985. Textbook of Small Animal Surgery. Volume I and II W.B. Sauders Company, Philadelphia.
5. Michell, A.R., Bywater, R.J., Clarke, K.W., Hall, L.W. and Watreman, A.E. 1991. Veterinary Fluid Therapy. Wiley-Blackwell Scientific Publication, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Diagnostic Imaging & Soundness
2.	**Course Code**	:	0841VAS40**7**
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Diagnostic imaging is a branch of medical/veterinary science that deals with the use of radiation for diagnostic or treatment purposes. To have sufficient knowledge of imaging technology, this course deals with Ultrasound, CT-Scan, MRI, and X-ray along with its application, production, development, and interpretation of diagnostic imaging film to diagnose the diseases or disorders of soft and hard tissues. Similarly, the Diagnostic imaging course also discusses, radioisotopes, contrast media, radiation hazards, and factors considered before radiation. Soundness may be defined as having the capacity to perform the function for which the animal is purchased or accepted. This course also discusses the identification of a sound animal with proper certification. It is expected that after successful completion of the course, students will get sufficient knowledge of radiography, its application in veterinary practices and the identification of a sound animal for its respective purpose.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To describe the importance of diagnostic imaging techniques and soundness certificates in veterinary practices.
b. To provide sufficient knowledge of using X-ray, CT-scan, Ultrasound, MRI, etc. to diagnose diseases or disorders, and also in radiotherapy.
c. To attain the knowledge to recognize a sound/ unsound animal in response to veterolegal uses and or overseas transfer of animals and birds.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : use diagnostic imaging techniques such as X-ray, CT-scan, Ultrasound, or MRI for the diagnosis and treatment of diseases.
CLO2 : explians diagnostic images for the proper interpretation of the pattern of disease/ deformities which is a must for effective treatment.
CLO3 : enumerate the basic points of sound/ unsound animals and birds for veterolegal uses and or overseas transfer.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3		2	3		

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction, definition of common terms use in diagnostic imaging, properties of X-rays, X-ray machine, production of X-ray imaging, radiation exposure factors.	5
1,2	Contrast media, positioning of animals, exposure, and processing of films. Radiographic artifacts, interpretation of diagnostic images.	4
1,2,3	Application of modern diagnostic techniques in Veterinary practices: CT-scan, Ultrasound, MRI, etc.	3
1,2,3	Principles and application of radiotherapy in veterinary practice. Radiation hazards and safety.	3
1,2,3	Soundness**:** Introduction, causes of unsoundness; unsoundness due to hereditary and acquired diseases, systemic examinations of animals for soundness.	3
1,2,3	Conformation, color and markings, vices, blemishes.	3
1,2, 3	Examination of animals and birds for soundness and writing of certificate.	3
1,2,3	Unsoundness due to lameness: Definition classification, etiology, clinical signs, diagnosis prognosis, and treatment of different affection-causing lameness.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Douglas, S.W. and Williamson, H.D. 1980. Principles of Veterinary Radiography. 3rd Edition. Bailliere Tindall, London.
2. Carlson, W.D. 1977. Carlson's Veterinary Radiology. 3rd Edition. Lea & Febiger, Philadelphia.
3. Bryan, G.J. 1987. Diagnostic Radiography. Churchill Livingston, London.
4. Kealy, J.K. 1987. Diagnostic Radiology of the Dog and Cat. W. B. Saunders Company, Philadelphia, London.
5. Adams, O.R. 1974. Lameness in Horse. 3rd Edition. Lea & Febiger, Philadelphia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Diagnostic Imaging & Soundness
2.	**Course Code**	:	0841VAS4**08**
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Fourth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Within the fields of medicine and veterinary science, diagnostic imaging deals with the application of radiation for either therapeutic or diagnostic objectives. This course covers the use of ultrasound, CT-scan, MRI, and X-rays as well as the creation, development, and interpretation of diagnostic imaging film to diagnose illnesses or disorders of soft and hard tissues. This is necessary to have a sufficient understanding of imaging technology. Similar to this, radioisotopes, contrast media, factors are taken into account before radiation, radiation dangers, and practically managing radiation hazards are all included in diagnostic imaging courses. It also deals with the preparation and positioning of an animal. This course also intended to make the students skill on the

identification of a sound animal with proper certification. It is expected that at the end of the course, students will be experts in the development of a radiograph to diagnose diseases or disorders and also be able to perform a systemic examination of an animal for its soundness purpose followed by certificate writing.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. To discuss the significance of soundness certificates and diagnostic imaging methods in veterinary offices.
2. To impart an adequate understanding of radiation and the use of diagnostic tools such as MRIs, CT scans, X-rays, and ultrasounds to identify illnesses or problems.
3. To acquire the ability to distinguish between a sound and an unsound animal in reaction to the illegal usage of animals and/or the movement of birds and animals abroad.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1: Use diagnostic imaging techniques such as MRIs, CT scans, ultrasounds, and X-rays practically to diagnose or treat diseases or deformities.

CLO2: Explain diagnostic images for the correct interpretation of the illness pattern or deformities, which is necessary for a successful course of treatment.

CLO3: List the essential characteristics of sound and unsound animals and birds for transfer abroad or for veterinary purposes.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3			
CLO2	2	3			
CLO3	3	2	3		

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1,2	Radiology: Radiographic equipment and accessories, preparation of animals and birds for taking radiographs, estimation of exposure factors.	3
1,2	Contrast media, radiographic safety measures, management of X-ray film and dark rooms.Positioning of animals, exposure and processing of films, viewing of X-ray film.	3
1,2	Application of CT-scan, Ultrasound, MRI. Interpretation of radiographs Radiographic artifacts. Use of infra-red and ultraviolet rays.	3
3	Soundness: Method of examination of animals and birds for soundness and certificate writing.	3
1,2,3	Clinical diagnosis of lameness and their management.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

6. Douglas, S.W. and Williamson, H.D. 1980. Principles of Veterinary Radiography. 3rd Edition. Bailliere Tindall, London.
7. Carlson, W.D. 1977. Carlson's Veterinary Radiology. 3rd Edition. Lea & Febiger, Philadelphia.
8. Bryan, G.J. 1987. Diagnostic Radiography. Churchill Livingston, London.
9. Kealy, J.K. 1987. Diagnostic Radiology of the Dog and Cat. W. B. Saunders Company, Philadelphia, London.
10. Adams, O.R. 1974. Lameness in Horse. 3rd Edition. Lea & Febiger, Philadelphia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fouth Year First Semester

Course Outline

1.	**Course Title**	:	Andrology and Artificial Insemination
2.	**Course Code**	:	0841VAS4**09**
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Md. Jalal Uddin Sarder Dr. Jashim Uddin

9. Rationale of the Course:

This is an applied course of veterinary andrology and artificial insemination which describes the structures and functions of male reproductive organs in different animals as well as artificial insemination in details. Breeding soundness evaluation and libido are the basic concepts of veterinary andrology. Semen collection, semen composition and characteristics, diluents or extenders, semen preservation and artificial insemination (AI) are the major components used to develop the breed.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a : To understand the definition, terminology, history, scope and importance of Andrology and Artificial Insemination

b : To know the structure and functions of reproductive organs and endocrine regulations of different male animals.

c : To learn the spermatogenesis and semen collection, composition, characteristics, evaluation, dilution and preservation

d : To explore the breeding soundness evaluation of male animals and artificial insemination techniques

e : To diagnosis of reproductive diseases with their management and ration formulation of breeding animals.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : Recognize terminology, history, scope and importance of Andrology and Artificial Insemination and understand the structures and functions of male reproductive organs of different animals.

CLO2 : Describe the collect the semen, examination, evaluation, dilutions and preservation of semen.

CLO3 : Enumerate the prepare the semen for final deposition through artificial insemination techniques in heated animals for pregnancy as well as treat the diseased male animals with their prevention and management.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	Definition of common terms, general consideration for Andrology and Artificial Insemination (AI) in Veterinary practices, History of artificial insemination.	3
1	Functional anatomy and physiology of male reproduction. hormonal regualation of the male animals. Spermatogenesis (formation, migration, maturation and ejaculation of semen), fine structure of spermatozoa, semen and its composition.	4

2	Breeding Soundness Evaluation (BSE). Health management of AI stud males. Definition of AI, advantages and disadvantages of AI, Prospects and problems of AI in Bangladesh. Breeding bull, Dummy, Artificial vagina (AV) and Semen collection hall room and Semen collector's preparation, Method of semen collection. Semen evaluation: macroscopic, microscopic, biochemical and microbiological tests and sperm abnormalities. Computer assisted semen analysis (CASA).	10
3	Diluents for semen preservation. Extenders for preservation of semen at different temperatures. Semen additives. Cryopreservation of semen. Effects of cryopreservation on spermatozoa, semen quality and fertility. Thawing protocols of frozen semen. Factors affecting post-thaw semen quality. Ideal protocol for AI in different species of animals. Estrus detection and Timing of AI. Factors affecting semen quality, Semen culture, Tests for assessment of sperm motility, Sperm survival and Fertilizing capacity of spermatozoa (Conception rate; Non-return rate of cows). Factors affecting success of AI. Clinical practice of AI. Recording and clinical analysis of reproductive and AI parameters. practical	8
3	Infertility and uterine infections due to faulty AI. Diseases transmitted through semen. Causes of infertility: hereditary, congenital, infectious, nutritional and hormonal. Pathological and functional disturbances of epididymis, Vas deferens and Accessory sex glands. Diseases of male reproduction. Testicular hypoplasia and degeneration: causes and effect on semen and fertility. Coital injuries and vices of male animals.	5

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Arthur, G. H., Noaked, D. E. and Pearson, H. 1998. Veterinary Reproduction and Obstetrics (Theriogenology). 3rdedn. Bailliere Tindall, London, Sydney, Tokyo.
2. Hafez, F.S.E. 2000. Reproduction in Farm Animals. Lea and Febizer, USA.
3. Mann T and Lutwak-Mann C. 1981. Male Reproductive Function and Semen. Springer-Verlag.
4. Morrow D.A. 1986. Current Therapy in Theriogenology. WB Saunders.
5. Roberts, S. J. 1986. Veterinary Obstetrics and Genital Diseases (Theriogenology). 3rdedn. W. B. Saunders Company, USA.
6. Salisbury, G. B., Vandemark, N. I. and Lidge, J. R. 1978. Physiology of Reproduction and Artificial Insemination in Cattle. 2ndedn. Freeman and Company, Sanfrancisco, USA.
7. Sarder, M.J.U and Joarder, O.I 2010. Genetic Variation in Semen and Fertility of pure and crossbred AI Bulls. Published by VDM Verlag Dr. Muller, Germany, IBSN- 13:978-3-639-30639-2.
8. Sarder, M.J.U. 2010. LabhjonokPushuPalan O KhamarBabosthapona, published by Noor Publications, 37, Bangla Bazar, Dhaka-1100.
9. Youngquist, R. S. 1997. Current Therapy in Large Animal Theriogenology. W. B. Saunders Company, Philadelphia.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fouth Year first Semester
Course Outline

1.	**Course Title**	:	Andrology and Artificial Insemination
2.	**Course Code**	:	0841VAS4**10**
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Fourth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Md. Jalal Uddin Sarder Dr. Jashim Uddin

9. Rationale of the Course:

This is an applied course of veterinary andrology and artificial insemination which describes the structures and functions of male reproductive organs in different animals as well as artificial insemination in details. Breeding soundness evaluation and libido are the basic concepts of veterinary andrology. Semen collection, semen composition and characteristics, diluents or extenders, semen preservation and artificial insemination (AI) are the major components used to develop the breed.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

- **a :** To understand the breeds of breeding bulls with their management and equipments for semen collection for AI programme.
- **b :** To know the breeding soundness evaluation of different male animals.
- **c :** To learn the semen collection, composition, characteristics, evaluation, dilution and preservation practically.
- **d :** To apply the artificial insemination techniques in different animals.
- **e :** To diagnosise the reproductive diseases and management of breeding animals.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : Recognize breeding bulls for AI programme with their management well as behaviors of male different animals.

CLO2 : Describe the collect the semen, examination, evaluation, dilutions and preservation of semen.

CLO3 : Enumerate the prepare the semen for final deposition through artificial insemination techniques in heated animals for pregnancy well as treat the diseased male animals with their prevention and management.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

1	Equipments and material used for semen production in breeding animals. General and rectal examination for biometrics of male gentalia and accessory sex organs.	3
2	Breeding soundness examination (BSE) of male animals. methods of semen collection Semen collection, evaluation, processing and preservation of semen.	3
2	Clinical practices of artificial insemination. Methods of estrus detection. Clinical practices evaluation of bull station and semen laboratory to certify semen to be used at AI.	4
2	Pathomorphological examination of fresh and preserved semen. Collection of seminal fluids for microbiological examination. Microbiological loads of semen. Examination, diagnosis and treatment of infertile male animals. Preparation of teaser bulls, Operative techniques for correction of injuries and affection of male reproductive systems.	3
3	Field trips to regional cattle breeding centre and frozen semen production laboratory at cattle improvement and dairy farm, Rajabarihat for practical classes.	1

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Hafez, F.S.E. (2000). Reproduction in Farm Animals. Lea and Febizer, USA.
2. Mann T and Lutwak-Mann C. 1981. Male Reproductive Function and Semen. Springer-Verlag.
3. Roberts, S. J. (1986). Veterinary Obstetrics and Genital Diseases (Theriogenology). 3rdedn. W. B. Saunders Company, USA.
4. Salisbury, G. B., Vandemark, N. I. and Lidge, J. R. (1978). Physiology of Reproduction and Artificial Insemination in Cattle. 2ndedn. Freeman and Company, Sanfrancisco, USA.
5. Sarder, M.J.U and Joarder, O.I (2010). Genetic Variation in Semen and Fertility of pure and crossbred AI Bulls. Published by VDM Verlag Dr. Muller, Germany, IBSN- 13:978-3-639-30639-2.
6. Rvjvj, Gg.wR.BD (2023), M„ncvwjZ cï-cvwLi †ivM-e¨vwa I AvaywbK wPwKrmv c×vwZ, Z…Zxq ms¯‹iY, b~i cvewj‡Kkb, 37, evsjvevRvi, XvKv|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1. Course Title : Dairy Microbiology
2. Course Code : 0841 VAS 41**1**
3. Course type : Theory
4. Course Level : Level 4 Semester 1
5. Session : 2023-2024
6. Course Credit: 2
7. Total Marks : 100 (Final Examination70, Class Test 20 and Attendance 10)
8. Course Teacher: Prof. Dr. K. M. Mozaffor Hossain**,** Prof. Dr. Mst. Ismat Ara Begum, Prof. Dr. Md. Aktarul Islam, Prof. Dr. Md. Hakimul Haque, Associate Prof. Dr. Md Thoufic Anam Azad

9. Rationale of the Course:
Dairy Microbiology is the branch of microbiology which deals with the study of microorganisms that are associated with milk and milk products. Fundamental knowledge in milk composition and microbiology of the milk will aim the development the students' capacity to dialogue with farmers, veterinarian and others professionals of dairy sector.

10. Intended learning Objectives (ILOs):

f. To understand the fundamentals of milk composition and microbiology of the milk
g. To know the source of contamination of milk and dairy products
h. To learn about various types of microorganisms and antimicrobial substances present in the milk.
i. To help understandings of the destruction of microorganisms and quality control procedure of milk.
j. To gain knowledge on microbiological standards of dairy products and starter culture

11. Course Learning Outcomes (CLO):
Upon completion of the course the graduate student will be able to:

5. know the introduction and significance of dairy microbiology, fundamentals of milk composition and microbiology of the milk and dairy products

6. understand sanitary qualities are influenced by many factors in the course of production, processing, and delivery to the consumers

7. know the composition of starter cultures and their use in dairy products and describe the secondary, adjunct and adventitious microflora found in milk and their biochemical role in milk and milk products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	2	1
CLO2	2	2	2	2	3
CLO3	2	2	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Introduction and significance of dairy microbiology Sources of contamination of milk Hygienic milk production	1
1	Morphology and classification of dairy bacteria Characteristics of important microorganisms – I Characteristics of important microorganisms – II Characteristics of spoilage and pathogenic microorganisms – I	3
1	Characteristics of spoilage and pathogenic microorganisms – II Characteristics of spoilage and pathogenic microorganisms – III Characteristics of dairy associated fungi and bacteriophages	3
1	Microorganisms associated with raw milk and their significance – I Microorganisms associated with raw milk and their significance – II Role of psychrotrophs in milk Effect of processing on microorganisms in milk	2
2.	Role of microbes in spoilage of milk – Microbial interactions Milk fermentations Abnormal milk fermentations	3
2	Mastitic milk – Suitability for processing and public health significance Detection of mastitic milk	2
2	Destruction of microorganism by physical and chemical agent Microbiological standard of milk and dairy products	2
3	Market milk Microbiological methods for quality control of dairy products	3

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading List:

1. Britz, T.J. and Robinson, R.K. 2008. Advanced Dairy Science and Technology. 1st ed. BlackwellPubl. Ltd., UK.
2. Fernandes, R. 2009. Microbiology Handbook: Dairy Products. Royal Society of Chemistry,Revised ed., London.
3. Marth, E.H. and Steele, J. 2001. Applied Dairy Microbiology. 2nd ed. CRC Press, Boca Raton,USA.
4. Robinson, R.K. 2002. Dairy Microbiology Handbook - The Microbiology of Milk and MilkProducts. 3rd ed. Wiley-Interscience, New York.
5. Walstra, P., Wouters, J.T.M. and Geurts, T.J. 2006. Dairy Science and Technology. CRC Press, New York.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Toxicology
2.	**Course Code**	:	0841VAS41**3**
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourt Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Mst. Rokeya Sultana, Dr. S. M. Kamruzzaman

9. Rationale of the course:
This is one of the important courses of medical science which describes properties of poisons/toxins in details. At the beginning, this course provides students a short introduction about poisons/toxins in general. Thereafter, this course provides students in-depth knowledge about poisons/toxins (source, physio-chemical properties, routes of exposures, absorption, distribution, biotransformation, excretion, mechanism of action, toxicity, clinical signs, postmortem lesions, diagnosis, treatment and prevention of different poisons or toxins in animals).

10.Intended learning Objectives (ILOs):
a. To understand about the background, areas, different related terminology, causes, mode of actions, diagnosis and treatment of poisonings in general.
b. To know about the poisonous effects of different chemicals on animals.
c. To know about the hazardous effects of different plants on animals.
d. To make understandings of the harmful effects of environmental pollutants, food additives, drugs or chemical residues etc.
e. To know about the plants and chemicals producing teratogenic, mutagenic, carcinogenic and allergic conditions.

11.Course Learning Outcomes (CLOs):
At the end of the course, students will be able to:
1. familiar with the introduction and economic importance of poisons/toxins in animals.
2. understand in details about poisonous or toxic effects of the chemicals, plants, environmental pollutants, food additives and contaminants, drugs or chemical residues in edible tissues etc.
3. know the use of appropriate drugs against poisons/toxins.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3			
CLO2	2	3			
CLO3	3				

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13.Lesson Plan:

CLOs	Course Contents	Lectures
1	**General toxicology:** Introduction, different areas of toxicology, toxicological terminology. Classification, metabolism and mode of action of poisons, factors altering the action of poisons, common causes, diagnosis and general treatment of poisoning	5
1,2,3	**Chemical and Phytotoxicology:** Study of source, toxicity, mechanism of toxic action, symptoms, diagnosis, treatment and prevention of the following. **Inorganic poisons:** Acids and alkalis, urea, , antimony, arsenic, carbon monoxide, sodium chloride, copper, halogen compounds, lead, mercury, molybdenum, selenium and zinc.	22

	Organic poisons: Anaesthetics, sympatho and parasympathomimetics, anthelmintics, antibiotics and sulfonamides. **Pesticides:** Botanical insecticides, organochlorine, organophosphate and organocarbamate compounds, fungicides, herbicides, rodenticides and acaricides. **Poisonous plants:** Cyanogenetic and oestrogenic plants. Mycotoxins including aflatoxins and argot. Different species of the genera Nerium, Thevetia, Datura, Strychnos, Abrus, Ricinus, Calotropis/Asclapias, Nicotiana, Digitalis, Papever, Cannabis, Lathyrus, Aconitum, Conium and Gossypium	
1,2,3	**Environmental Toxicology:** Various agents causing environmental pollution, i.e. soil, air and water pollution. Food additives and contaminants. Drugs and chemical residues in the edible tissues of animals. Radiation and radioactive materials. Green house effects.	3
1,2,3	**Miscellaneous poisons:** Plants and chemicals producing teratogenic, mutagenic, carcinogenic and allergic conditions.	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists*:*

1. Clarke, M. L., Harvey, D. G. and Humphreys, D. J. 1981. Veterinary Toxicology. 2nd edn. ELBS, Bailliere Tindall.
2. Curtis D. Klaassen, 2018. Cassarett and Doull's Toxicology: The basic science of poison. 9th edn. McGraw-Hill Medical Publishing Division, New York.
3. Lorgue, G., Lechenet, J. and Riviere, A. 1996. Clinical Veterinary Toxicology: 1st English edn. Blackwell Science Inc., Cambridege, USA.
4. Loomis, T. A. and Hayes, A. W. 1996. Loomis's Essentials of Toxicology. 4th edn. Academic Press.
5. Ramesh C. Gupta, 2018. Veterinary Toxicology: Basic and Clinical Principles. 3rd edn. Academic Press, New York, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1	**Course Title**	**:**	Pet and Zoo Animal Pathology
2	**Course Code**	**:**	0841VAS4**16**
3	**Course Type**	**:**	Practical
4	**Course Level**	**:**	Fourth Year First Semester
5	**Session**	**:**	2023-2024
6	**Course Credit**	**:**	1
7	**Total Marks**	**:**	100 (Final Examination 60, Class Test 30, Attendance 10)
8	**Course Teachers**	**:**	1. Dr. Md. Golbar Hossain 2. Dr. Shaziea Rahman

9. Rationale of the Course:
This course discusses the pathological aspects of Pet and Zoo Animal diseases and recognizes them for diagnosis. This course provides students the knowledge based on study of museum specimens, histopathological slides, necropsy examination, sample collection for laboratory investigation, pathological lesions and interpretation on gross and histopathological changes in relation to infectious, non-infectious and other disease agents and age-related changes to aid in diagnosis, prognosis and therapy of the diseases.

10. Intended learning Objectives (ILOs):
a. To understand Pet and Zoo Animal diseases and pathology.
b. To understand the principles of pathological investigation of Pet and Zoo Animal diseases including clinical investigation, necropsy and laboratory investigation.

c. To recognize and interpret the gross and histopathological changes of diseased Pet and Zoo Animal for diagnosis of disease.

11. Course Learning Outcomes (CLOs):

At the end of the course, students will be able to

1. familiarize with Pet and Zoo Animal diseases, perform postmortem examination and interpret findings.
2. diagnose diseases based on pathological changes (hematology, blood biochemistry, urinalysis and histopathology) and etiological agents in relation to clinical findings.
3. explain pathogenesis, formulate differential diagnosis and communicate reports to end users for management of Pet and Zoo Animal population.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	1	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan

CLOs	**Course content**	**Lectures**
1, 2, 3	Introduction to bacterial, viral, mycoplasmal, chlamydial, rickettsial, fungal, parasitic and nutritional diseases of pet and zoo animals.	2
1, 2, 3	Study of various pet and zoo animal diseases using gross laboratory specimens and histopathological slides	2
1, 2, 3	Demonstration of postmortem examinations, interpretations, sample collection, preservation and processing for laboratory investigation	2
1, 2, 3	Introduction to zoo animals: mammals, reptiles, birds, rodents and their age-related pathology (background pathology).	2
1, 2, 3	Investigation of clinical specimens (blood, urine and other body fluids) of pet animals with their interpretation.	3
1, 2, 3	Diseases of zoo animals developed due to captivity, change of habitats, food etc.	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Bell DR. 1995. Lecture Notes on Tropical Medicine, 4th Edition. Blackwell Scientific Publications, Oxford.
2. Fowler ME and Miller RE. 2008. Zoo and Wild Animal Medicine. Elsevier Health Sciences.
3. Jones TC, Hunt RD and King NW. 1997. Veterinary Pathology. 6th Edition. Williams and Wilkins, Philadelphia, USA.
4. Kahn CM and Line C. 2010. The Merck Veterinary Manual. 10th Edition. Merck & Co., Inc., NJ, USA.

5. Miller RE and Fowler ME. 2011. Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 7. Saunders.
6. Terio KA, McAloose D and St. Leger J. Eds. 2018. Pathology of Wildlife and Zoo Animals. Elsevier Inc.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

1.	**Course Title**	:	Companion and Pet Animal Medicine
2.	**Course Code**	:	0841VAS 417
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Fourth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman**, PhD** Professor Aurangazeb Kabir**, PhD** Associate Professor Emtiaj Alom**, PhD** Associate Professor Mst. Ishrat Zerin Moni,Phil

9. Rationale of the Course:
This course provides an in-depth exploration of pet and companion animal medicine, specifically targeting the canine and feline populations. It encompasses the foundational principles of diagnosing and treating various physiological systems in dogs and cats, with a detailed examination of both common and complex medical conditions. Key topics include the diagnosis and management of diseases affecting general health, alongside a thorough investigation of microbial infections viz. bacterial, viral, and fungal etc., parasitic infestations including protozoal and helminthic organisms, as well as external parasites, and systemic diseases that impact multiple organ systems. The course emphasizes the critical components integral to understanding each disease, including etiology, epidemiology, pathophysiology, clinical manifestations, diagnostic approaches, therapeutic interventions, and strategies for prevention and control. By integrating theoretical knowledge with practical application, students will gain the competencies necessary for effective veterinary practice in companion animal care.

10. Intended Learning Objectives:
The objectives of this course are:

a. To introduce the principles of pet and companion animal medicine, emphasizing the integration of educational concepts and components within the framework of animal welfare.
b. To offer a comprehensive analysis of the diseases affecting pets and companion animals, encompassing both infectious and non-infectious conditions, thereby equipping students with a thorough understanding of the health challenges faced by these animals.
c. To acquire knowledge about appropriate pharmacological therapies for managing diseases in small animals, along with effective strategies for their prevention and control.

11. Course Learning Outcomes (CLOs):
At the end of the course, the students will be able to:

CLO1: Focus on techniques for animal restraint, conducting physical examinations, making differential diagnoses, and interpreting laboratory results related to pet diseases. Additionally, this includes understanding the general systemic conditions of various dog and cat breeds and outlining vaccination schedules tailored to their health needs.
CLO2: Acquire knowledge on various aspects of diseases and disorders affecting multiple body systems, including the alimentary tract, respiratory system, cardiovascular and hematological systems, urinary system, nervous system, genital system, as well as ophthalmic, dermatological, and endocrine conditions, among others.
CLO3: Develop an understanding of the etiology, pathogenesis, epidemiology, clinical features, diagnosis, treatment, prevention, and control of both infectious and non-infectious diseases and disorders.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5

CLO1	2	3	2	2	3
CLO2	2	3	3	2	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course contents	Lectures
1	Introductory (Small animals/Pet Animals), restraining, breeds of dogs/ cats other companion/pets, physical and laboratory examination, vaccination schedule etc.	3
1, 2	Hypothermia and hyperthermia, Weakness and syncope, Obesity and anorexia, Cachexia, Polyphagia, Ptyalism, Vomiting, Diarrhea, Constipation, Coughing, Sneezing, Pneumonia, Bronchitis, Choke, Polydipsia, Urinary Incontinence, Urine retention, Discolored urine, Abnormal constitutes of urine, Proteinuria, Alopecia, Pruritis, Papules and pustules, Erosive and ulcerative dermatitis, Shivering and trembling, Ataxia and paresis, Comma and stupor, Seizures and behavioral disorder, Acromegaly, Diabetes and hyperthyroidism, Otitis externa and media, Conjunctivitis, Keratitis, Cataract etc.	8
3	**Bacterial Diseases:** Salmonellosis, Pasteurellosis Campylobacteriosis, Tuberculosis, Pseudotuberculosis, Brucellosis, Actinomycosis, Nocardiosis, Clostridium infection, Leptospirosis, Tetanus, Botulism, Tyzzer's disease, Tularemia, Streptococcosis, Rhodococcosis, Borreliosis, Lyme diseases, Cat scratch disease, Feline Chlamydiosis, Coxiellosis, Ehrlichiosis, Rocky Mountain spotted fever, Helicobacter Infection, Bubonic plague etc.	8
3	**Viral Diseases:** Canine parvovirus infections, Canine adenovirus, Canine reovirus, Canine hepatitis, Canine herpesvirus infection, Kennel cough, Rabies, Pseudorabies, Canine coronavirus, Canine Parainfluenza, Canine minute virus, Canine distemper, Feline panleukopenia, Feline infectious peritonitis, Feline leukemia, Feline infectious anemia, Feline rhinotracheitis, Feline calcivirus infection, Feline upper respiratory disease complex etc.	8
3	**Fungal Diseases:** Dermatophytosis, Blastomycosis, Histoplasmosis, Coccidioidomycosis, Moniliasis, Cryptocccosis, Aspergillosis, Sporotrichosis, Candidiasis, Pythiosis, Mucormycosis etc.	2
3	**Parasitic Diseases:** Giardiasis, Amoebiasis, Coccidiosis, Toxoplasmosis, Babesiosis, Sarcocystosis, Leishmaniasis, Trypanosomiasis. Hookworm disease, Strongylodiasis, Ascariasis, Tapeworm infestation, Whipworm infection, Heartworm disease, Giant kidney worm disease, Hepatobiliary parasitic diseases, Respiratory parasitic diseases, Lice and mite infestation, Mange Echinococcosis, Trichinosis, Gnathostomiasis, Protothecosis, Neosporosis etc.	2
3	**Non-infectious diseases**: Vitamin and mineral deficiency diseases viz. exophthalmia, keratomalacia, Rickets, osteomalacia steatitis, myopathy, Wernicke's encephalopathy, neuropathy and polyneuritis, black tongue, anemia etc. and poisoning caused by plants, household chemicals, pesticides, rodenticides etc.	2

14. Teaching Strategies:

Lectures, assignments, individual/group project, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web based resources, feedback etc.

15. Assessment Strategies:

Quiz/ Class Test, group/individual assignment, presentation, class attendance, final exam etc.

Suggested reading lists:

1. Small and laboratory animal medicine. Rahman M.S. 2nd Edition. 2013.
2. Canine and feline medicine. Rahman M.S. 1st edition. 2006.
3. A textbook of preventive veterinary medicine. Chakrobarti A. Kalyani publishers 2012.

4. Canine medicine and therapeutics. N.T. Gorman. Black well science. 4th edition 1991.
5. Current veterinary dermatology. Griffin C.E., Kwochka K.W., MacDonald J.M. 1991.
6. Diseases of cats: medicine and surgery. Holzworth J. WB Saunders Company 1987.
7. Feline infectious diseases. Pedersen N.C. American veterinary publications 1988.
8. Hand book of zoo medicine. Klös H., Lang E.M., Göltenboth R., Jarofke D. Van Nostrand Reinhold Company. New York, USA 1982.
9. Infectious diseases of dogs and cats. Greene C.E. 4th edition. Elsevier health sciences 2013.
10. Restraint and handling of wild and domestic animals. Fowler M.E. 3rd edition. Wiley-Blackwell publishing. USA 2008.
11. Text book of veterinary internal medicine. Ettinger S.J. 3rd edition. Volume 1 and 2. WB Saunders company 1989.
12. The merck veterinary manual. Kahn C.M., Line S. 10th edition. Merck and Co. inc. and Merial Ltd. USA 2010.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Companion and Pet Animal Medicine
2.	**Course Code**	:	0841VAS41**8**
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fourth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman Professor Aurangazeb Kabir Associate Professor Emtiaj Alom Associate Professor Mst. Ishrat Zerin Moni

9. Rationale of the Course:

This course is structured to equip students with comprehensive practical knowledge essential for diagnosing, treating, preventing, and controlling diseases in pet and companion animals, with a particular emphasis on canine and feline species. It addresses diseases caused by a range of microbial agents and other pathological factors, ensuring students develop the clinical competence to manage these conditions effectively. Additionally, students will refine their ability to prescribe appropriate medications, enhancing their proficiency in therapeutic decision-making and prescription writing.

10. Intended Learning Objectives:

1. To provide an introduction to the various types of pet and companion animals, familiarizing students with their unique characteristics and roles.
2. To impart knowledge on effective techniques for restraining pet and companion animals, ensuring safety for both the animals and handlers during examination and treatment
3. To educate students on how to effectively approach and examine pet and companion animals, enabling them to identify and assess problems within various body systems.
4. To acquire an in-depth understanding of vaccine administration in pet animals, aligned with the standards and recommendations set forth by the OIE (World Organisation for Animal Health).
5. To gain comprehensive knowledge about the etiology, epidemiology, and pathogenesis of diseases affecting pet and companion animals, including bacterial, viral, fungal, mycoplasma, rickettsial, and parasitic (protozoal, endoparasitic, and ectoparasitic) infections. This includes understanding clinical signs, diagnostic and differential diagnostic techniques, as well as treatment, prevention, and control strategies.

11. Course Learning Outcomes (CLOs):

By the end of this practical session, students will be able:

CLO1: To understand the techniques for restraining pet animals, documenting clinical cases of dogs and cats, and writing prescriptions. Additionally, this includes conducting post-treatment evaluations and interpreting the outcomes.
CLO2: To develop skills in the dispensing and administration of medications, including accurate dosing, as well as effective communication with clients and staff members for collaborative teamwork.
CLO3: To develop a comprehensive understanding of clinical diagnostic methodologies, encompassing the meticulous history-taking of canine and feline patients, as well as conducting detailed clinical examinations of diverse body regions and evaluating the functionality of various systems and organs in small animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	3
CLO2	3	2	2	2	3
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. **Lesson Plan:**

CLOs	**Course contents**	**Lectures**
1, 2, 3	An in-depth introduction to the roles and essential requirements of small animal practitioners, encompassing effective techniques for restraining dogs and cats. The curriculum includes comprehensive methods for clinical and laboratory diagnostics in small animals, as well as protocols for drug administration and the development of appropriate drug regimens. Furthermore, students will be trained to meticulously document clinical cases in a clinical notebook, emphasizing thorough post-treatment evaluations and insightful interpretations.	12
1,2,3	Field trips to the Central Veterinary Hospital (CVH) in Dhaka, and a selection of private pet clinics specializing in companion animal care. These educational field trips are designed to offer students in-depth exposure to a variety of clinical practices, enabling them to observe and engage with veterinary procedures in real-world environments.	4

14. Teaching Strategies:
Lectures, assignments, individual/group project, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web based resources, visit disease area and collect data feedback etc.

15. Assessment Strategies:
Quiz/ Class Test, group/individual assignment, presentation, class attendance, final exam etc.

Suggested reading lists:

1. Small and laboratory animal medicine. Rahman M.S. 2nd Edition. 2013.
2. Canine and feline medicine. Rahman M.S. 1st edition. 2006.
3. A textbook of preventive veterinary medicine. Chakrobarti A. Kalyani publishers 2012.
4. Canine medicine and therapeutics. N.T. Gorman. Black well science. 4th edition 1991.
5. Current veterinary dermatology. Griffin C.E., Kwochka K.W., MacDonald J.M. 1991.
6. Diseases of cats: medicine and surgery. Holzworth J. WB Saunders Company 1987.
7. Feline infectious diseases. Pedersen N.C. American veterinary publications 1988.
8. Hand book of zoo medicine. Klös H., Lang E.M., Göltenboth R., Jarofke D. Van Nostrand Reinhold Company. New York, USA 1982.
9. Infectious diseases of dogs and cats. Greene C.E. 4th edition. Elsevier health sciences 2013.
10. Restraint and handling of wild and domestic animals. Fowler M.E. 3rd edition. Wiley-Blackwell publishing. USA 2008.
11. Text book of veterinary internal medicine. Ettinger S.J. 3rd edition. Volume 1 and WB Saunders company 1989.
12. The merck veterinary manual. Kahn C.M., Line S. 10th edition. Merck and Co. inc. and Merial Ltd. USA 2010.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1. Course Title : Topographic and Surgical Anatomy
2. Course Code : 0841VAS4**20**
3. Course Type **:** Practical
4**. Course Level** : Fourth Year First Semester
5**. Session** : 202**3**-202**4**
6**. Course Credit** : 1
7**. Total Marks** : 100 (Final Examination 60, Class Test 30, Attendance 10)
8**. Course Teachers** : Professor Dr. Shah Md. Abdur Rauf
Professor Dr. Md. Royhan Gofur

9. Rationale of the course:
Avian anatomy is a basic course of poultry science which provides an in-depth introduction to the study of birds that includes both avian anatomy with particular emphasis on systems and functions related flight and egg production. Special emphasis will be placed on the unique characteristics of avian morphology using the chicken as the model animal. Aquatic anatomy deals with the anatomical study of fishes. By the end of this course, students should have a thorough understanding the anatomical differences among mammals, birds and fishes.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
f. Students will understand the normal anatomical structure of skeletal system, organs of digestive, respiratory, cardiovascular, urinary and endocrine system of birds and fishes.
g. Students will understand the normal anatomical structure of male and female reproductive organs of birds and fishes.
h. Students will understand the mechanism of voice and egg production in birds.
i. Students will understand the skin and its modification, and different types of feathers in birds.
j. Students will understand the mechanism of flight, body defence, and thermoregulation in birds.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: Understand the normal anatomical structure of different body systems of birds and fishes.
CLO2: Understand the unique characteristics of birds and fishes, specially the mechanism of flight and egg production in birds.
CLO3: Understand the anatomical and physiological differences between mammals, birds and fishes.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	3	1	2
CLO3	3	2	1	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course contents**	**Lectures**
1	Definition of avian and aquatic anatomy Common anatomical terminology	1
1, 2, 3	Avian osteology and skeletal system Role of avian bone in flight mechanism	2
1, 2, 3	Avian myology Role of pectoral muscles in flight mechanism Avian digestive system	2

	Feces colors and their importance to determine health status	
1, 2, 3	Avian respiratory system Air sacs and their role in flight mechanism Mechanism of production of voice Avian urinary system Renal portal system in birds Avian genital system Avian reproductive system Mechanism of egg production Structure and composition of egg	3
1, 2, 3	Avian cardiovascular system Avian skin and appendages Feathers and their role in sex determination and in flight Organs of special sense of birds (eye, ear) Avian endocrine system Flight adaptation and mechanism of flight Body temperature and thermoregulation in birds	2
1, 2, 3	Anatomy of body system of fish	2

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Gofur MR. 2020. Textbook of Avian Anatomy. 1st edition, Uttoran Offset Printing Press, Rajshahi, Bangladesh.
2. Reece WO. 2009. Functional Anatomy and Physiology of Domestic Animals. 4th edition, Wiley-Blackwell, USA.
3. Getty R. 1975. The Sisson and Grossman's the Anatomy of the Domestic Animals. Volume 2. 5th edition, WB Saunders Company, Philadelphia, USA.
4. Horst E. Koenig, Ruediger Korbel, Hans-Georg Liebich, Corinna Klupiec. 2016. Avian Anatomy: Textbook and Colour Atlas, 2nd edition. 5M Publishing Ltd, Sheffield, UK
5. John McLelland. 1990. Color Atlas of Avian Anatomy, Wolfe Publishing Ltd. England.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	**:**	Food Microbiology
2.	**Course Code**	**:**	0841VAS 421
3.	**Course Type**	**:**	Theory
4.	**Course Level**	**:**	Fourth Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credits**	**:**	02
7.	**Total Marks**	**:**	100 (Final Exam.70, Class Test 20, Class Attendance 10)
8.	**Course Teacher**	**:**	Professor K. M. Mozaffor Hossain Professor Mst. Ismat Ara Begum Professor Md. Hakimul Haque, Dr. Md Thoufic Anam Azad

9. **Rationale of the Course:**

This course mainly emphasize on the history, importance of microorganism in food and food industry. The course contains fundamentals of meat hygiene practices, abattoir, milk hygiene, fish borne diseases, eggs and food poisonings. Better understanding of the food microbiology will correlate with best hygienic practices in relation to food production, processing and marketing in food industries.

10. Intended learning Objectives (ILOs):

a. To understand the importance of microorganism regarding different kind of food and food products
b. To ensure hygienic food production, processing, preservation and marketing

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:
CLO1: learn about the significance of microorganism in food and food industry
CLO2: explain detail about meat and hygienic meat production
CLO3: understand the basic factors and mechanism of contamination, spoilage and preservation of meat, milk, fish and egg
CLO4: study detailed about the effect of food contamination on health and its prevention and control measures

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	2	3	1
CLO2	2	2	2	2	1
CLO3	3	2	2	1	2
CLO4	2	2	3	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLO	Course content	No. of Lectures
1	History of microorganisms in foods. Role and significance of microorganisms in nature and foods. Microorganisms important in foods of animal and avian origin. General principles of food preservation General principles of food spoilage.	5
2	Ante-mortem and post-mortem examination transportation of meat animals slaughtering of animals and birds Preharvest and postharvest technology of foods at farm and manufacturing level.	4
2	Principles for planning of an abattoir and situation in Bangladesh. Inspection and judgment of carcasses and examination reports Adulteration and misrepresentation of meat foods. Diseases transmitted through meat and meat products.	4
3	Contamination and spoilage of milk and milk products, adulteration of milk. Diseases transmitted through milk and their significance on health. Bacteriological quality of milk and milk products.	3
3	Contamination and spoilage of fish and fish products, factors affecting kinds and rate of spoilage. Preservation of fish and fish products.	3
3	Contamination of eggs Spoilage of eggs preservation of eggs and eggs products	3
4	Food borne infections and intoxications. Investigation of food borne disease outbreaks. Microbiology in food plant sanitation. Food legislation, standards, and codes of practices.	3

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Frazier, W. C. and Westhoff, D. C. 1995. Food Microbiology. 4th edn. Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Borgstrom, G. 1961. Fish as food. Vol 1. New York and London.
3. Fred W. Tanner. 1952. Food borne infections and intoxications. 2nd edn. The Garrard Press.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	**:**	Food Microbiology
2.	**Course Code**	**:**	0841VAS 422
3.	**Course Type**	**:**	Practical
4.	**Course Level**	**:**	Fourth Year Second Semester
5.	**Session**	**:**	2023-2024
6.	**Course Credits**	**:**	01
7.	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20 and Class Attendance 10)
8.	**Course Teacher**	:	Professor K. M. Mozaffor Hossain, Professor Mst. Ismat Ara Begum Professor Md. Hakimul Haque, Dr. Md Thoufic Anam Azad

9. Rationale of the Course:
This course mainly emphasizes on the practical aspect of food sampling, preparation of the food samples for the microbiological examination. This course will also ensure the quality of food and food product that is fit for human and animal consumption.

10. Intended Learning Objectives (ILOs):

f) To know about the food sampling and preparation for the microbiological examination.
g) To ensure the microbiological quality of food and food samples.
h) To know about the planning, establishment and operational activity of the milk, fish processing plants and slaughterhouse

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:

CLO1: Prepare different type of food samples for the microbiological examination.
CLO2: Perform different microbiological tests according to given method and manual.
CLO3: Interpret test results values to ensure quality food for human and animal consumption.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	2	2
CLO2	3	3	2	3	2
CLO3	3	2	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLO	Course Contents	No. of Lectures
1	Applied techniques in sampling of foods of animal origin and other related materials for bacteriological studies: Sampling of solid, liquid, and surface samples.	5
1	Preparation of dilutions, determination of MPN index and general viable counts. Detection and enumeration of indicator bacteria. Detection and enumeration of pathogenic and toxigenic organisms. Determination of F-value, D-values, and Z-values.	
1	Microbiological examination of specific foods: Meat and Meat products. Liquid milk, dry milk, and other milk products. Canned foods. Frozen foods. Egg and egg products.	4
2	Determination of quality of foods in terms of safety and quality assurance. Differentiation between perfect and imperfect bleeding. Inspection and judgement of carcasses and meats of various food animals.	
3	Field trips to milk and fish processing plants and slaughterhouse.	4

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, Question and answer.

15. Assessment Strategies:
In course Examination/ Tutorial/ Quiz/Class Test/Assignment (20), Class Attendance (10), Final Examination (70).

Suggested Reading Lists

1. Frazier, W. C. and Westhoff, D. C. 1995. Food Microbiology. 4th edn. Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Borgstrom, G. 1961. Fish as food. Vol 1. New York and London.
3. Fred W. Tanner. 1952. Food borne infections and intoxications. 2nd edn.The Garrard Press

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1	**Course Title**	**:**	Poultry Pathology
2	**Course Code**	**:**	0841VAS423
3	**Course Type**	**:**	Theory
4	**Course Level**	**:**	Fourth Year Second Semester
5	**Session**	**:**	2023-2024
6	**Course Credit**	**:**	2
7	**Total Marks**	**:**	100 (Final Examination 70, Class Test 20, Attendance 10)
8	**Course Teachers**	**:**	1. Dr. Md. Golbar Hossain 2. Dr. Shaziea Rahman

9. Rationale of the Course:
This course provides an introduction to characteristic pathological manifestations caused by bacterial, viral, parasitic, fungal, protozoal and other agents of veterinary and zoonotic infectious diseases as well as some nutritional deficiencies of poultry. It provides clear ideas on various disease processes in terms of pathogenesis, clinical signs, and pathological features including both macroscopically and microscopically.

10. Intended learning Objectives (ILOs):
1. To know the overview on prevalence and factors affecting the prevalence of poultry diseases.
2. To understand the systematic approach to performing investigation of poultry diseases.
3. To know the pathogenesis and pathology of infectious and non-infectious diseases and nutritional deficiencies of poultry.

4. To help in understanding the pathology of poultry disease and disease conditions of complex, unknown and toxicological agents.

11. Course Learning Outcomes (CLO):

At the end of the course, students will be able to:

1. familiar with present situation of diseases and factors affecting the diseases in poultry.
2. diagnose poultry diseases of infectious, non-infectious, unknown/complex etiologies, deficiencies or toxicological agents by systemic dissection and pathological lesions.
3. explain the pathogenesis and differentiate diseases based on etiological agents and pathology for diagnosis and management of commercial poultry population.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	1	3	1	3	×
CLO3	2	3	1	2	×

13. Course Contents:

CLOs	Course content	Lectures
1	**Introduction:** Present situation of poultry diseases in Bangladesh	1
2, 3	**Bacterial diseases:** Salmonellosis, colibacillosis, pasteurellosis, infectious coryza, tuberculosis, streptococcosis, staphylococcosis.	5
2, 3	**Viral diseases:** Infectious bursal disease, Newcastle disease, Marek's disease, avian leucosis, fowl pox, infectious bronchitis, infectious laryngotracheitis, avian influenza, chicken infectious anemia, egg drop syndrome, duck plague, duck viral hepatitis, viral arthritis.	5
2, 3	**Fungal diseases:** Aspergillosis (brooder pneumonia and mycotoxicosis), candidiasis	1
2, 3	**Parasitic diseases:** Ascariasis and other nematodiasis, tapeworm infections, coccidiosis, infestation by ectoparasites.	3
2, 3	**Fungal diseases:** Aspergillosis, thrush, candidiasis.	1
2, 3	**Mycoplasmal and chlamydial diseases:** Avian mycoplasmosis, avian chlamydiosis.	2
2, 3	**Non-infectious diseases:** Deficiencies of fat soluble and water-soluble vitamins, deficiencies of calcium, phosphorus, copper, zinc, manganese.	3
2, 3	**Non-infectious diseases:** deficiencies of amino acids and protein, calories and water. Common vices, mycotoxicosis and other poisonings	3
2, 3	**Diseases of complex or unknown etiology:** Gout, multicausal respiratory disease, hydropericardium hepatitis syndrome, ascites and right ventricular hypertrophy, enteric disease complex, spiking mortality syndrome.	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written tests.

Suggested Reading Lists:

1. Swayne DE, Glisson JR, McDougald LR, Nolan LK, Suarez DL and Nair VL. 2013. Diseases of Poultry. 13th edition, Wiley-Blackwell.
2. Chauhan HBS and Roy S. 2018. Poultry Diseases, Diagnosis and Treatment. New Age International (P) Ltd. Publishers, New Delhi, India.
3. ***Pattison*** M, McMullin P, Bradbury JM and Alexander D. 2007. Poultry Diseases. 6th edition. W.B. Saunders Co. Ltd. London, UK.
4. Boulianne M, Brash ML**,** Charlton BR et al. 2013. Avian Disease Manual. [Editor]. 7th edition. American Association of Avian Pathologists, Pennsylvania, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1	**Course Title**	**:**	Poultry Pathology
2	**Course Code**	**:**	0841VAS424
3	**Course Type**	**:**	Practical
4	**Course Level**	**:**	Fourth Year Second Semester
5	**Session**	**:**	2023-2024
6	**Course Credit**	**:**	1
7	**Total Marks**	**:**	100 (Final Examination 60, Class Test 30, Attendance 10)
8	**Course Teachers**	**:**	1. Dr. Md. Golbar Hossain 2. Dr. Shaziea Rahman

9. Rationale of the Course:

This course discusses the techniques of pathological investigation of poultry diseases and recognizes pathology for diagnosis. Therefore, this course provides students the knowledge based on study of museum specimens, histopathological slides, necropsy examination, sample collection for laboratory investigation, pathological lesions and interpretation on gross and histopathological changes in relation to infectious, non-infectious and other disease agents to aid in diagnosis of diseases.

10. Intended learning Objectives (ILOs):

d. To understand various poultry disease pathology using laboratory specimens, histopathological slides.
e. To understand the principles of pathological investigation of poultry diseases including on-farm investigation, necropsy and laboratory investigation.
f. To recognize and interpret the gross and histopathological changes of diseased birds for diagnosis of disease.

11. Course Learning Outcomes (CLOs):

At the end of the course, students will be able to

4. familiarize with poultry diseases, perform postmortem examination and interpret findings.
5. diagnose diseases based on pathological lesions and etiological agents.
6. explain pathogenesis, formulate differential diagnosis and communicate reports to end users for management of commercial poultry population.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	1	3	1	3	×
CLO3	2	3	1	2	×

13. Lesson Plan:

CLOs	Course content	Lectures
1, 2, 3	Study on bacterial diseases of poultry using gross laboratory specimens and histopathological slides	3
1, 2, 3	Study on viral diseases of poultry using gross laboratory specimens and histopathological slides	3
1, 2, 3	Study on fungal diseases of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Study on mycoplasmal and chlamydial diseases of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Study on parasitic diseases of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Study on vitamin deficiency diseases of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Study on mineral deficiency diseases of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Study on diseases caused by unknown etiology of poultry using gross laboratory specimens and histopathological slides	1
1, 2, 3	Preparation and procedures of on-farm investigation of poultry diseases	1
1, 2, 3	Demonstration of postmortem examinations, interpretations, sample collection and preservation for laboratory investigation	1

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists/Essential Readings

1. Swayne DE, Glisson JR, McDougald LR, Nolan LK, Suarez DL and Nair VL. 2013. Diseases of Poultry. 13th edition, Wiley-Blackwell.
2. Chauhan HBS and Roy S. 2018. Poultry Diseases, Diagnosis and Treatment. New Age International (P) Ltd. Publishers, New Delhi, India.
3. Pattison M, McMullin P, Bradbury JM and Alexander D. 2007. Poultry Diseases. 6th edition. W.B. Saunders Co. Ltd. London, UK.
4. Boulianne M, Brash ML**,** Charlton BR et al. 2013. Avian Disease Manual. [Editor]. 7th edition. American Association of Avian Pathologists, Pennsylvania, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Forensic Medicine, Jurisprudence and Veterinary Ethics
2.	**Course Code**	:	0841VAS425
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourth Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Professor Dr. Md. Mahbubur Rahman, PhD Professor Dr. Md. Awrongjeb Kabir, PhD Dr. Emtiaj Alam, PhD Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course :
This course will introduce the students to the application of veterinary medicine to the forensic sciences. Course topics will focus on the fundamental concepts of evidence, burden and standard of proof, judge and jury, types of evidence, witnesses, degrees of certainty, and other relevant aspects of the principles of evidence in a legal investigation, interpretations of injury patterns, cause, manner and mechanism of death. The students will have the basic knowledge of the pathological documentation required for crimes involving animals, including recognition of abuse, crime scene investigation, as well as a clear concept on interacting with the legal community. The goal of teaching jurisprudence in the undergraduate medical course is to produce a physician who will be well informed and alerts about his/her medico-legal responsibilities and will be capable of being discharging medico-legal duties in medical practice.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To provide the education, skills, and experience needed to enter the field of veterinary forensics.
b. To acknowledge the importance of accreditation and certification in the forensic and other science communities.
c. To facilitate necessary knowledge about how forensic veterinarians assist in the investigation and prosecution of animal cruelty cases
d. To develop an understanding of the importance of the interaction between law enforcement, scientists, and the legal profession.
e. To know day-to-day work of a forensic veterinarian.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : develop oral communication skills for discussing the scientific method in a laboratory setting and effectively testifying in a court of law.
CLO2 : understand the scientific principles of crime scene investigation and reconstruction, including evidence collection and preservation and develop written communication skills for presentation of their findings in accordance with established professional guidelines
CLO3 : develop an understanding of the importance of professionalism and ethical behavior in the forensic science community and knowledge on veterinary ethics.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1,3	Introduction of Veterinary Forensic Medicine and Jurisprudence, Aims, scopes, uses and branches of Forensic Medicine. Difference between Forensic Medicine and Jurisprudence. Common Vetero-Legal Terminologies.	3
1,2,3	Veterinarian and law (The legal system)-Criminal law, civil law and combined criminal and civil law. Courts of law and their power, some related terminology. Veterinary medical evidence - Hints for giving evidence and witness.	3
1,2	**Veterinary legislations**: Animal Welfare Act 2019, Fish Feed and Animal Feed Act 2010, Bangladesh Animal Disease Act 2005, Bangladesh Livestock and Animal Products Quarantine Act 2005, The Bangladesh Veterinary Practitioners Ordinance 1982, The Customs Act 1969, The Glanders and Farcy Act 1899, The Code of Criminal Procedure 1898, Cattle Trespass Act 1871, Poisons Act 1919, Dangerous Drugs Act 1930, The Imports and Exports (Control) Act 1950, The Livestock Importation Act 1898, The Cruelty to Animal Act 1920, The animal slaughter (Restriction) and meat (control) act 2011 etc.	6
1,2	**Common frauds in the sale of livestock and its products:** Common offences against animals and birds- mischief, cruelty and bestiality and examination of dead animals in criminal cases. Methods of mischievous killing of animals – Poisoning, slaughtering, violence, starvation, strangulation and drowning. Accidental deaths of animals- lightning stroke and electrocution. Post-mortem examination of veterolegal cases. Submission of specimens in suspected cases of poisoning. Writing of veterolegal reports and certificates. **Insurance, registration and legislation**: Liability and Insurance of animals and related laws. Registration of pet animals.	5
1,2	**Vetero-legal wounds**-Classification and description of veterolegal wounds. Differences among the incised, lacerated and punctured wounds. Differences between ante-mortem and post-mortem wounds. Determination of age of injury. Vetero-legal importance of wound healing, wound certificate.	3
3	**Veterinary medical offices**- Bangladesh Veterinary Council (BVC), Code of Veterinarians Ethics, professional conduct, professional malpractice, Ethical consideration of animal research.	2
3	**Code of Veterinary Ethics**: Justification to ethical views, four views about humanities, duties to animals, the animals right views, the species integrity view, hybrid view, the moral status of animals, ethical theories, vetero-legal cases, role of veterinary profession, ethical decision making in veterinary practice, attitudes of vet students, Veterinary Ethics and Law.	3

14. **Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. **Assessment Strategies:**

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Cooper M. E. and Cooper. J.E. (2008) Introduction to Veterinary and Comparative Forensic Medicine. Blackwell Publishing Ltd. UK
2. Munro. R., and Munro. H. (2008). Animal Abuse and Unlawful Killing: Forensic Veterinary Pathology. London: Elsevier
3. Samad. M. A.(2008). *Animal Husbandry and Veterinary Science*- Volume 2. LEP publication No. 11, BAU Campus, Mymensingh
4. Online resources.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Farm Animal and Clinical Surgery
2.	**Course Code**	:	0841VAS427
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fourth Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**		Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Farm Animal Surgery is one of the most important branches of surgery which has high importance in the context of Bangladesh as well as the world. Surgical affections of Farm animals (cow, goat, sheep, etc.) seek special care and attention due to their anatomical and physiological differences in comparison to small or other animals. Farm Animal Surgery deals with the surgical affections of farm animals with their etiology, clinical signs, diagnosis, and treatment systematically. This course includes ophthalmic surgery, respiratory surgery, gastrointestinal surgery, urogenital surgery, udder and teat surgery, and so on. It is expected that after completion of the course, the student will get adequate knowledge on surgical affections of Farm animals with their proper corrections.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
1. To describe the importance of handling surgical affections of the farm animals.
2. To provide knowledge on the technique of ophthalmic, respiratory, gastrointestinal, urogenital, udder, and teat surgery of farm animals.
3. To facilitate necessary knowledge on effective handling of neurosurgery, disbudding, dehorning, humpsore, yoke gall, etc.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : enumerate the etiology, clinical signs, diagnosis, and examination procedure of common surgical cases of farm animals.
CLO2 : perform the effective surgical operation of farm animals to manage surgical affections linked to the ophthalmic, respiratory, gastro-intestinal, and urogenital systems.
CLO3 : have sufficient knowledge and skill in handling udder and teat surgery of farm animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3	2	3	2		

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	**Ophthalmic surgery:** examination of eye, conjuctivitis, keratitis, keratocele, corneal ulcer, keratoconjunctivitis, ocular foreign body, parasite in eye, dermoid cyst etc.	3
1,2	**Respiratory affections**: Epistaxis, haemoptysis, foreign bodies and parasite in the nostrils, retropharyngeal abscess, roaring.	3
1,2,3	**Gastro-intestinal surgery:** Ranula, chocking, oesophageal stricture and diverticulum, surgical approaches to the abdomen, foreign bodies in the rumen, bloat, impaction, crop impaction in bird, traumatic reticuloperitonitis, abomasal	7

	displacement and torsion, intestinal obstruction, rectal prolapsed, atresia coli, atresia recti, atresia ani, other surgical diseases of abdomen and hernias.	
1,2,3	**Urogenital surgery:** obstruction of urethra, urolithiasis, various types of calculi, rupture of the bladder and urethra, urinary fistula, prolapse of uterus, prolapse of vagina. surgical affection of the penis and prepuce, phimosis, paraphimosis, posthitis, castration, and caponisation etc.	6
1,2,3	**Udder and teat surgery:** Supernumerary teats, imperforate teats, fissure of teat, obstruction in the teat, duct, fistula, papilloma, gangrene, abscess etc.	3
1,2,3	**Surgical affections of horn:** Disbudding, dehorning, horn fracture, avulsion of horn.	3
1,2, 3	**Miscellaneous affections:** Hydrocephalus, empyema of sinus, sinusitis, actinomycosis, cleft palate, contracted tendon, neoplasm and their modern therapy, fistula withers, poll evil, humpsore, yoke gall, bothriomycosis etc.	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 1980. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi.
2. Oehme, F.W. 1988. Textbook of Large Animal Surgery. 2nd Edition. Williams & Wilkins, Baltimore, USA.
3. Slatter, D. 2002. Textbook of Small Animal Surgery 3rd Edition, W.B. Saunders Company, Philadelphia.
4. Venugopalan, A. 2018. Essentials of Veterinary Surgery. 8th Edition. Oxford & IBH Publishing Company Pvt, Ltd, New Delhi.
5. Tyagi, R.P.S. and Singh, J. 1996. Ruminant Surgery. 1st Edition. CBS Publisher and Distributor, New Delhi.
6. Gelatt, K.N. 1991. Veterinary Ophthalmology. 2nd Edition. Lea & Febiger, Philadelphia, London.
7. Cox, J.E. 1987. Surgery of the reproductive tract in large animals. 3rd Edition. Liverpool University Press.
8. Turner, A.S. and Mcllwraith, C.W. 2012. Technique in Large Animal Surgery. 4th Edition. Lea & Febiger, Philadelphia.
9. Jennings, P.B. 1984. The Practice of Large Animal Surgery. W. B. Saunders Company, Philadelphia, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Farm Animal and Clinical Surgery
2.	**Course Code**	:	0841VAS428
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Fourth Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
This course deals with the common surgical affections of Farm animals related to the eye, ear, skin, respiratory system, gastrointestinal system, urogenital system. It also discusses the surgical affections of the udder and teat of the farm animals. Students will be trained to handle common surgical cases practically with proper anesthesia or analgesia when needed. It is expected that after completion of the course, students will be skilled enough to handle the surgical affections of farm animals in the field.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. To provide knowledge through practical demonstration of handling the surgical affections of farm animals in clinical settings.
2. To facilitate the opportunity to perform the surgical operation of the eye, ear, respiratory system, gastro-intestinal system, and urogenital system of farm animals and others in clinical settings.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : enumerate the etiology, clinical signs, differential diagnosis, and proper technique of managing surgical affections in farm animals.

CLO2 : handles the common surgical cases related to the ophthalmic, respiratory, gastro-intestinal system, urogenital system, and udder and teat of farm animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3					

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Handling, and restraining of farm animals to examine and identify the surgical affections. Administration of anesthetic and analgesic agents to farm animals to perform different surgical operations.	2
1,2	**Surgical affections of the eye:** Cataract operation, enucleation of the eyeball, removal of parasite from eye. **Surgical affections of ear:** Opening of the guttural pouch (hyovertebrotomy), foreign bodies in ear.	2
1,2	**Surgical affections Respiratory tract:** Roaring operation (ventriculectomy), tracheotomy etc.	2
1,2	**Gastro-intestinal surgery:** Oesophagotomy, rumenotomy, ligation of Stensen's duct, enterotomy, enterectomy, intestinal anastomoses, spleenectomy, corrections of hernia, atresia of ani, atresia of recti etc.	2
1,2	**Urogenital surgery:** Castration, vasectomy, caponisation, urethrotomy, nephrectomy, cystotomy, amputation of penis, Caslick's operation, episiotomy, trocarisation, correction of prolapse of vagina, uterus, rectum etc.	2
1,2	**Miscellaneous:** Amputation of tail, digit, limb, ablation of udder, etc.	2
1,2	Clinical Practices of surgical cases at Rajshahi University (RU) Veterinary clinic, Government and Private veterinary hospitals and clinics, zoo, and different farms.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 1980. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi.
2. Oehme, F.W. 1988. Textbook of Large Animal Surgery. 2nd Edition. Williams & Wilkins, Baltimore, USA.
3. Slatter, D. 2002. Textbook of Small Animal Surgery 3rd Edition, W.B. Saunders Company, Philadelphia.
4. Venugopalan, A. 2018. Essentials of Veterinary Surgery. 8th Edition. Oxford & IBH Publishing Company Pvt, Ltd, New Delhi.

5. Tyagi, R.P.S. and Singh, J. 1996. Ruminant Surgery. 1st Edition. CBS Publisher and Distributor, New Delhi.
6. Gelatt, K.N. 1991. Veterinary Ophthalmology. 2nd Edition. Lea & Febiger, Philadelphia, London.
7. Cox, J.E. 1987. Surgery of the reproductive tract in large animals. 3rd Edition. Liverpool University Press.
8. Turner, A.S. and Mcllwraith, C.W. 2012. Technique in Large Animal Surgery. 4th Edition. Lea & Febiger, Philadelphia.
9. Jennings, P.B. 1984. The Practice of Large Animal Surgery. W. B. Saunders Company, Philadelphia, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Veterinary Obstetrics
2.	**Course Code**	:	0841VAS429
3.	**Course Type**	**:**	Theory
4.	**Course Level**	:	Fourth Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor Dr. Md. Jalal Uddin Sarder Dr. Abdulla Al Mamun Bhuyan and Dr. Jashim Uddin

9. Rationale of the Course:
This is a functional course of veterinary obstetrics which describes with the oversight of the different female animals during pregnancy and parturition. Fertilization, conception, placentation, pregnancy, parturition, termination of pregnancy, dystocia, obstetrical diseases and disorders and their management protocols are the fundamentals of veterinary obstetrics.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To know the common terminology in relation to veterinary obstetrical study. Scope and importance of veterinary obstetrics. History of obstetrics and present situation of obstetrical problems in Bangladesh.
b. To learn the basic principles and mechanism of fertilization and development of conceptus.
c. To be acquainted with physiology of pregnancy and diagnosis of pregnancy.
d. To explore the parturition mechanism and management of dystocia.
e. To helps the diagnosis of obstetrical diseases with their management protocols.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: narrate with veterinary obstetrics, familiar with obstetrical terminology, scope and importance of veterinary obstetrics. History of obstetrics and present situation of obstetrical problems in Bangladesh.
CLO2: understand the mechanism of fertilization and development of conceptus. Implantation and maternal recognition of pregnancy. Pregnancy diagnosis: clinical, ultrasonographic, endocrinological and other diagnostic laboratory tests.
.**CLO**3 : enumerate the stages of parturition, mechanism of initiation of parturition, problems in parturition and hormonal profiles associated with parturition as well as learn the treatment and management practices of several obstetrical diseases and disorders in different animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Common terminology in relation to veterinary obstetrical study. Scope and importance of veterinary obstetrics. History of obstetrics and present situation of obstetrical problems in Bangladesh.	4
2	Fertilization, gamete transport and development of conceptus: zygote, morula, blastocyst, embryo and foetus. Implantation and maternal recognition of pregnancy. Placentation, fetal circulation and gestation. Age characteristics of fetus. Pregnancy diagnosis: clinical, ultrasonographic, endocrinological and another diagnostic laboratory test.	7
3	Parturition: stages of parturition, mechanism of initiation of parturition, hormonal profiles associated with parturition. Pelvic measurement. Dystocia, its causes and incidence. Maternal dysocia, its types, causes, diagnosis and treatment. Foetal dystocia: its types, causes, diagnosis and treatment Manipulative delivery in farm and companion animals. Foetotomy, Caesarean operation.	8
1,2,3	Retention of placenta. Injuries and diseases incidental to parturition. Postpartum haemorrhage, haematoma of vulva, perineal injuries at parturition, gluteal paralysis, Obturator paralysis, rupture of the uterus and vagina, Prolapse of the uterus, vagina and rectum. Induction of parturition and elective termination of pregnancy. Involution of uterus following normal and abnormal parturition. Care of dam and the newborn.	9

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Arthur, G. H., Noaked, D. E. and Pearson, H. (1998). Veterinary Reproduction and Obstetrics (Theriogenology). 3rdedn. Bailliere Tindall, London, Sydney, Tokyo.
2. Hafez, F.S.E. (2000). Reproduction in Farm Animals. Lea and Febizer, USA.
3. Roberts, S. J. (1986). Veterinary Obstetrics and Genital Diseases (Theriogenology). 3rdedn. W. B. Saunders Company, USA.
4. Salisbury, G. B., Vandemark, N. I. and Lidge, J. R. (1978). Physiology of Reproduction and Artificial Insemination in Cattle. 2ndedn. Freeman and Company, Sanfrancisco, USA.
5. Rvjvj, Gg.wR.BD (2023), M„ncvwjZ cï-cvwLi †ivM-e¨vwa I AvaywbK wPwKrmv c×vwZ, Z…Zxq ms¯‹iY, b~i cvewj‡Kkb, 37, evsjvevRvi, XvKv|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Clinics (Theriogenology)
2.	**Course Code**	:	0841VAS430
3.	**Course Type**	**:**	Practical
4**.**	**Course Level**	:	Fourth Year Second Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	1
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Prof. Dr. Jalal Uddin Sarder Dr. Abdulla Al Mamun Bhuyan

9. Rationale of the Course:

This course deals with the obstetrical problems of Farm animals during pregnancy, parturition and after delivery. It also discusses the surgical affections of female gential system in the farm animals. Students will be trained to handle the common Obstetrical cases practically with proper anaesthesia or analgesia when needed. It is expected that after completion of the course student will be skilled enough to handle the surgical case of obstetrics of farm animals in the field.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a. To implement the theoretical knowledge practically to handle the Obstetrical cases of the farm animals
b. To learn the basic principles and mechanism of fertilization and development of conceptus.
c. To learn the pregnancy diagnosis in different animals by various methods.
d. To be an expert on dystocia handling, retained placenta, prolapse and C-section as well as Fetotomy of farm animals.
e. To be able to perform the surgery related to the female genital system in farm animals.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : describe the examination procedure, etiology, clinical signs, and diagnosis of Obstetrical cases in farm animals.

CLO2 : enumerate the examination of pregnancy of different animals.

CLO3 : perform the handle the common reproductive surgical cases related to dystocia, prolapse, retained placental, caesarean section, fetotomy, termination of pregnancy of farm animals

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Instruments and materials used for veterinary obstetrical cases. Pelvimetory of different species of farm animals.	3
2	Methods of Diagnosis and correction of abnormal fetal presentation, position and posture in phantom box. Epidural anesthesia, Clinical and laboratory practice on pregnancy diagnosis.	4
2	Handling of dystocia in the clinics. Foetotomy and Caesarean operation. Diagnosis and treatment of diseases of female reproduction at the clinics.	3
3	Attending gynaeco-obstetrical and infertility-related cases at the clinics and field conditions.	3
3	Field trips to Rajshahi Cattle Improvement and Dairy Farm, Rajabarihat, Rajshahi	1

	and other Private farms for practical classes.	

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Arthur, G. H., Noaked, D. E. and Pearson, H. (1998). Veterinary Reproduction and Obstetrics (Theriogenology). 3rdedn. Bailliere Tindall, London, Sydney, Tokyo.
2. Hafez, F.S.E. (2000). Reproduction in Farm Animals. Lea and Febizer, USA.
3. Roberts, S. J. (1986). Veterinary Obstetrics and Genital Diseases (Theriogenology). 3rdedn. W. B. Saunders Company, USA.
4. mvgv`, Gg. G. (2001). cïcvjb I wPwKrmvwe`¨v. †jc cÖKvkbv, bs 08, evK…we, gqgbwmsn|
5. Rvjvj, Gg.wR.BD (2023), M„ncvwjZ cï-cvwLi †ivM-e¨vwa I AvaywbK wPwKrmv c×vwZ, Z…Zxq ms¯‹iY, b~i cvewj‡Kkb, 37, evsjvevRvi, XvKv|

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Dairy Technology
2.	**Course Code**	:	0841VAS 431
3.	**Course type**	:	Theory
4.	**Course Level**	:	Fourth Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Prof. Dr. Syed Sarwar Jahan & Prof. Dr. Md. Akhtarul Islam

9. **Rationale of the Course:**
This is a basic course of Dairy Science. It describes definition, classification and composition of cream, butter, ghee, dahi, ice-cream, butter oil, cheese and dairy by-products. It states the manufacturing process of cream, butter, butter oil, ghee, ice-cream, dahi and cheese. This course also explains the food and nutritive value of different dairy products. This subject discusses defects in different dairy products, their causes and remedies, Therefore, this course provides students the basic knowledge of different dairy food products available in local market.

10. Intended Learning Objectives:
The objectives of this course are:

a) To know different types cream, butter, ghee, dahi, ice-crem and cheese.
b) To gain knowledge on principle of cream separation in different methods
c) To learn various methods of cream, butter, ghee, dahi, ice-cream and cheese making and their preservation technique.
d) To introduce with defects in different dairy products and their causes & prevention.
e) To learn the food and nutritive value of common dairy products available in local market.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:
Upon completion of the course, students should be able to:

1. Describe about different dairy products.
2. Explain the preparation technique of various milk products.
3. State the nutritive value quality control of dairy food products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course content	No. of Lectures
1.	Definition, classification, composition, grading and objectives of cream separation. Principle and methods of cream separation, standardization and uses of cream. Factors affecting the efficiency of cream separation.	6
2	Definition, classification, composition, grading and objectives of butter making.	3
2	Method and steps of butter manufacturing. Overrun in butter	3
2.	. Definition & composition, of butter oil and ghee. Methods of manufacturing ghee. Defects in ghee, their causes and remedies. Utilization of ghee	2
2.	Definition, classification and composition of ice-cream. Ice-cream ingredients. Food value of ice-cream.	3
2.	Calculation of ice-cream mix. Methods and steps of ice-crem manufacturing. Overrun in ice-cream. Soft ice-cream.	3
2.	Composition and types of dahi. Food value and manufacturing process of dahi. Defects of dahi and their remedies.	2
2.	Composition, classification and nutritive value of cheese. Principle and methods of cheese making, coagulants and their properties.	3
3	Nutritive value and quality control of different dairy food products	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1. Spreer, E.1998. Milk and Dairy Products Technology. Marcel Dekker Inc. New York. The USA.
2. Venden Ber, J C T. 1998. Dairy Technology in the Tropics and Sub Tropics. Pudoc Wageningen, Netherlands.
3. Rangappa, K S. and Achraya, K T. 2005. Indian Dairy Products. Asia Publishing House. India.
4. Andrew, L.2 004. Milk and Milk Products. Kate Barber Winton. Agrobios. India.
5. Lampert, L M.1965. Modern Dairy Products. Lampert Chemical Publishing Company. New York.The USA.
6. Tomar, S. 2013. An Introduction to Dairy Technology. Oxford Book Company. Jaipur. India.
7. Singh, S. 2014. Dairy Technology. Vol.1. Milk and Milk Processing. New India Publishing Agency, New Delhi, India.
9. De, S. 2013. Outlines of Dairy Technology. Oxford University Press. New Delhi. India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year **Second** Semester

Course Outline

1. Course Title : Dairy Technology
2. Course Code : 0841VAS 432
3. **Course type** : Theory
4. Course Level : Fourth Year Second Semester
5. Session : 2023-2024
6. Course Credit : 1
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Md. Akhtarul Islam

9. Rationale of the Course:

This is a basic course in Dairy Science that designates how to assemble a cream separator machine and identify the different parts of a cream separator, perform cream separation using a cream separator from whole milk. It helps students to know how to evaluate, grade and standardize & judge different dairy products This course also describes the manufacturing processes of butter, ghee, dahi, ice-cream, cheese, chhana, rasamalai and rassogolla. It helps students to know how to judge different dairy products, design and plan an ideal dairy plant.

10. Intended Learning Objectives:

The objectives of this course are:

a) To know how to assemble a cream separator machine and identify the different parts of a cream separator.
b) To perform cream separation using cream separator from whole milk
c) To introduce with different manufacturing process of various dairy products.
d) To introduce with different equipment and appliances used in dairy industry.
e). .To learn practical knowledge of designing and planning an ideal dairy plant.

11. Course Learning Outcome (CLO):

After the successful completion of the course, the students will be able to:
1. handle different dairy products making machine.
2. describe manufacturing technology of various milk products.
3. state quality control of dairy products.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	**Course contents**	**No. of Lectures**
1.	Identification and function of different parts of a cream separator	2
1.	Separation of cream using cream separator from cow milk.	2
2.	Evaluation, grading and standardization of cream	1
2	Manufacture of butter.	1
2.	Manufacture of ghee and butter oil.	2
3a.	Dahi/yoghurt preparation	1
3b.	Ice-cream and cheese making.	2
3c.	Quality control methods and visit in different dairy plants.	3

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists

1. Thompkinson, D K. 2012. Quality Assessment of Milk and Milk Products. New India Publishing Agency, New Delhi, India.
2. Spreer, E. 1998. Milk and Dairy Products Technology. Marcel Dekker Inc. New York. USA.
3. Rangappa, K S. and Achraya, K T. 2005. Indian Dairy Products. Asia Publishing House. India
4. Lampert, L M. 1965. Modern Dairy Products. Lampert Chemical Publishing Company. New York. USA.
5. Tomar, S. 2013. An Introduction to Dairy Technology. Oxford Book Company. Jaipur. India.
6. Singh, S. 2014. Dairy Technology. Vol.1. Milk and Milk Processing. New India Publishing Agency, New Delhi, India.
7. De, S. 2013. Outlines of Dairy Technology. Oxford University Press. New Delhi. India.
8. Davis, W L. 1993. Indian Indigenous Milk products. Spink and Company Private limited. Kolkata.India.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester
Course Outline

1.	**Course Title**	:	Epidemiology and Preventive Medicine
2.	**Course Code**	:	0841VAS433
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Fourth Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:

The epidemiological part of the course will concentrate on key aspects of epidemiology, including the causation of diseases within populations, ecological factors, and fundamental epidemiological terminology. It will cover measurements of health and disease, as well as methods for investigating sporadic, endemic, epidemic, and pandemic diseases. Additionally, the course will explore clinical and sero-epidemiology concepts, with a focus on immunodiagnostic tests, and examine the determinants of both disease and health. The preventive medicine part of the course will focus on the principles and objectives of preventive medicine, including the evaluation of economic losses caused by specific diseases and strategies for the prevention and control of both infectious and non-infectious diseases. This section will also address disease control strategies and their limitations, direct and indirect challenges, vaccinology, and veterinary extension education aimed at mitigating disease risk factors. Finally, zoonotic diseases will be examined. This course aims to enhance students' epidemiological skills, applicable to both private and public veterinary practice, while also offering insights into the application of advanced preventive medicine concepts to reduce the prevalence of various diseases.

10. Intended Learning Objectives:

The objectives of the course are:

a. to comprehend the fundamentals of epidemiology and preventive medicine.
b. to increase understanding of the notion of various epidemiological research and strategies for disease prevention against various risk factors.
c. to get expertise in epidemiology in order to design and implement targeted interventions, enhancing disease management and prevention efforts across different environments, from individual farms to large-scale public health initiatives.

11. Course Learning Outcomes (CLOs):

At the end of the course, the successful students will be able to:

CLO1: Gain knowledge of veterinary epidemiology, epidemiological terminologies, health and disease measurements, disease investigation, concepts of clinical and sero-epidemiology, health and disease determinants, and expanding knowledge of various epidemiological studies.

CLO2: Learn the fundamentals of veterinary preventive medicine as well as how to create and implement a preventative plan that addresses the risk factors for various diseases.

CLO3: build epidemiological expertise to manage a range of diseases, as well as create and implement preventative and control plans for zoonotic diseases.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	2	3	2
CLO2	3	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course Contents**	**Lectures**
1	I. **Epidemiology:** Definition and basic concepts, principles, objectives and uses of epidemiology. Causation of disease in population: Multifactorial theory of disease causation, One Health Concepts, occupational health hazards and safety, Evan's postulate, Koch's postulate. Definition, principles, objectives and application of ecology.	2
1	Glossary terms used in epidemiology: Sporadic, endemic, outbreak, epidemic, pandemic, determinants, population at risk, cost-benefit analysis, sample survey, monitoring, surveillance, observational study, case control study, cross sectional study, longitudinal study, cohort study, prospective study, retrospective study etc.	2
1	Measurements of health and disease: Morbidity rate, mortality rate, case fatality rate, prevalence and incidence rates, measurement of productivity etc.	4
1	Epidemiological investigation of sporadic, endemic, epidemic and pandemic diseases.	2
1	Concepts of clinical and sero-epidemiology with immunodiagnostic tests.	2
1	Determinants (risk factors) of disease and health.	3
2	II. **Preventive Medicine:** Definition, aims and objectives of preventive medicine. Assessment of economic losses due to specific diseases- direct and indirect losses and methods of assessment.	2
2,3	Principles of prevention and control of infectious and non-infectious diseases on group (herd) and region basis.	1
2,3	Disease control strategies and their limitation. Direct challenges (immunization) and indirect challenges (immunization); Biosecurity.	2
2, 3	**Vaccinology:** Passive and active immunization with available vaccines used in livestock with their merits and demerits. Vaccination failure.	2

2	Principles of veterinary extension education to prevent the risk factors of diseases with special emphasis to importance of colostrum feeding in newborns, mastitis, anthrax, foot and mouth disease, LSD, rabies, aspiration pneumonia, broncho-pneumonia, urolithiasis, coenuriasis, photosensitization, tetanus, hemorrhagic septicemia, foot rot, tickborne diseases, ephemeral fever, hump sore, myiasis, production diseases etc.	5
3	**Zoonoses:** Concepts of zoonosis , control and eradication of zoonotic diseases, emergence and reemergence of zoonoses, Control of zoonotic diseases with special emphasis to anthrax, salmonellosis, brucellosis, colibacillosis, tuberculosis, listeriosis, yersiniosis, leptospirosis, glanders, strangles, Q-fever, ehrlichiosis, rotavirus, foot and mouth disease, cow pox, vesicular stomatitis, influenza, measles, rabies, rift valley fever, rocky mountain spotted fever, dermatomycosis, coccidioidomycosis, babesiosis, trypanosomiasis, toxoplasmosis, echinococcosis etc.	5

14. Teaching Strategies:
Lectures, assignments, individual/group project, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web based resources, feedback etc.

15. Assessment Strategies:
Quiz/ Class Test, group/individual assignment, presentation, class attendance, final exam etc.

Suggested Reading List:

1. Aiello, S. E. and Mays, A. 2016. The Merck Veterinary Manual. 11thedn. Merck & Co., Inc, USA
2. Andrews, A. H., Blowey, R. W., Boyd, H. and Eddy, R. G. 2004. *Bovine Medicine: Disease and Husbandry of Cattle.* 2ndedn. Blackwell Science Ltd., Oxford, U.K.
3. Fleiss, J. L., Levin, B. and Paik, M. C. 2003.Statistical methods for rates and proportion, 3rd edition, John Willey and Sons, New York.
4. Martin, S. W.; Meek, A.H. and Willeberg, P. 1994. *Veterinary Epidemiology: Principles and Methods*. Iowa State University Press, Ames, Iowa.
5. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
6. Samad, M. A. 2008. A textook of Animal Husbandry and Veterinary Science. Volume 2, LEP publication No. 11, BAU Campus, Mymensingh.
7. Schlesselman, J. J. and Stollery, P. D. 1982. Case control studies design, conduct and analysis. Oxford University Press, New York.
8. Thrusfield, M. V. 2007. *Veterinary Epidemiology.* 3rd edn. Blackwell Science, Oxford, U.K.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year Second Semester

Course Outline

1.	**Course Title**	:	Epidemiology and Preventive Medicine
2.	**Course Code**	:	0841VAS **43**4
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fourth Year Second Semester
5.	**Session**	:	202**3**-202**4**
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:
This course equips students with practical knowledge in epidemiology and preventive medicine, emphasizing their applications in veterinary medicine. Key topics include data collection related to disease conditions in known epidemiological areas, gathering animal health and production data, conducting farm

visits to assess livestock feeding, housing, and management practices, as well as evaluating immunization schedules in both farm and rural settings. By participating in this course, students will enhance their epidemiological skills within the context of veterinary practice. Additionally, they will gain hands-on experience in preventive medicine, focusing on strategies to avert various diseases. The course emphasizes case-based learning and problem-solving skills, fostering the ability to apply theoretical concepts to real-world challenges in veterinary medicine.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

a.To gain a comprehensive understanding of how to collect epidemiological data effectively and to acquire practical knowledge of the fundamentals of veterinary preventive medicine.

b.To develop a structured daily routine for a farm, incorporating effective strategies for feeding, housing, and vaccination to optimize animal health and productivity.

c. To enhance disease prevention and communication skills, enabling effective interaction and education with stakeholders about health management practices.

11. Course Learning Outcomes (CLO):

At the end of the course, the successful students will be able to:

CLO1: improve epidemiological skills for the effective collection of epidemiological data and to gain practical knowledge of the fundamentals of veterinary preventive medicine.

CLO2: design and implement the daily routine of a farm, focusing on strategies for feeding, housing, and vaccination to ensure optimal animal welfare and productivity.

CLO3: develop and apply effective oral and written communication skills when interacting with veterinarians, animal health technicians, staff, and the general public.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	**Program Learning Outcomes (PLOs)**				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	3	2	2
CLO2	2	3	2	3	3
CLO3	2	2	2	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	**Course contents**	**Lectures**
1,3	Investigate, collect, and collate data regarding disease conditions within a defined epidemiological area to enhance understanding of disease prevalence and inform management strategies.	6
1,3	Conduct direct onsite inspections and collect data on animal health and production to assess overall farm performance and identify areas for improvement.	5
2,3	Perform farm visits to evaluate the feeding, housing, and management practices of livestock, focusing on their relationship to overall health and well-being.	4
2, 3	Evaluate the immunization schedule implemented under both farm and rural conditions to ensure effective disease prevention and control among livestock.	4
1,2,3	Field Trip: Livestock Research Institute (LRI), Mohakhali, Dhaka; Bangladesh Livestock Research Institute (BLRI), Savar, Dhaka; International Centre for Diarrheal Disease Research Bangladesh (ICDDRB), Mohakhali, Dhaka; Central Disease Investigation Laboratory (CDIL), Dhaka and related Field Disease Investigation Laboratories (FDILs) elsewhere to provide valuable insights into livestock research and disease investigation practices in Bangladesh, enhancing students' understanding of the practical aspects of veterinary medicine.	3

14. Teaching Strategies:
Lectures, assignments, individual/group project, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web based resources, visit disease area and collect data feedback etc.

15. Assessment Strategies:
Quiz/ Class Test, group/individual assignment, presentation, class attendance, final exam etc.

Suggested Reading Lists:

1. Aiello, S. E. and Mays, A. 2016. The Merck Veterinary Manual. 11thedn. Merck & Co., Inc, USA
2. Andrews, A. H., Blowey, R. W., Boyd, H. and Eddy, R. G. 2004. *Bovine Medicine: Disease and Husbandry of Cattle.* 2ndedn. Blackwell Science Ltd., Oxford, U.K.
3. Fleiss, J. L., Levin, B. and Paik, M. C. 2003.Statistical methods for rates and proportion, 3rd edition, John Willey and Sons, New York.
4. Martin, S. W.; Meek, A.H. and Willeberg, P. 1994. *Veterinary Epidemiology: Principles and Methods*. Iowa State University Press, Ames, Iowa.
5. Constable, P. D., Hinchcliff, K. W., Done, W.H., and Grunberg, W.,2016. Veterinary Medicine: A textbook of the diseases of cattle, horses, sheep, pigs and goats. 11th edition. W. B. Saunders Co., Philadelphia.
6. Samad, M. A. 2008. A textook of Animal Husbandry and Veterinary Science. Volume 2, LEP publication No. 11, BAU Campus, Mymensingh.
7. Schlesselman, J. J. and Stollery, P. D. 1982. Case control studies design, conduct and analysis. Oxford University Press, New York.
8. Thrusfield, M. V. 2007. *Veterinary Epidemiology.* 3rd edn. Blackwell Science, Oxford, U.K.

Outcome Based (OBE) Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fourt Year Second Semester

Course Outline

1. **Course Title :** Rural Sociology and Livestock Extension Education
2. **Course Code :** 0314VAS435
3. **Course Type :** Theory
4. **Course Level :** Fourt Year Second Semester
5. **Course Credit**: 2
6. **Session :** 2023-2024
7. **Total Marks :**100 (Final Examination70, Class Test 20 and Attendance 10)
8. **Course Teacher:** Professor Dr. Royhan Gofur & Mr. Soshe Ahmed

9. Rationale of the course:
The course is designed to familiarize students with basic sociological concepts. The course is oriented toward providing the student with a rational understanding of the sociological perspective and the discipline of sociology. It examines the interactive dynamics of social institutions and organizations and studies how people group themselves (families, social groups, formal and informal organizations, societies) and behave in groups. This course will focus on several social issues related to livestock production, analyzing causative factors and exploring alternative solutions. The latter portion of the first section of the course deals specifically with the social research process of data collection, analysis, and interpretation, including quantitative and qualitative research methods. In the second section, this course also provides students with knowledge about extension concepts, how to raise initiatives, awareness, leadership for adopting and spreading new technologies, and all other social communication skills among animal producers for higher returns with lower costs.

10. Intended Learning Objectives:
The objectives of this course are:

a. Demonstrate their ability to explain basic sociological and extension concepts.
b. Demonstrate an understanding of how sociologists analyze individuals, groups, and organizations through a qualitative lens.
c. To provide concepts including quantitative research design, sampling methods, components of survey research, measurement and analysis of variables, and standards of ethical practice.

d. To understand the learners how to develop and diffuse adoption of innovation capacity and the steps of programmed planning and evaluation of the project related to veterinary extension work.
e. For comprehensive understanding of the learners regarding the steps of programmed planning and evaluation of projects related to veterinary extension work.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course

CLO1: Students are taught sociology's fundamental concepts and principles to demonstrate that they have constructed sociological perspectives to illuminate contemporary phenomena.
CLO2: The student will be able to apply various dimensions of what constitutes community and how to use community organizing, consensus-building, and sustaining commitment to address social issues.
CLO2: The learners will be able to apply appropriate teaching methods in the field, plan the research and development program or project effectively, and evaluate the project's ultimate outcomes.

12.Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	0	0	2	1	3
CLO2	0	1	2	1	3
CLO3	1	1	2	2	3

13. Lesson Plan:

CLOs	**Course content**	**No. of Lectures**
1	Definition: sociology, rural sociology, culture, elements of culture and its characteristics	02
2	Social groups (primary groups, secondary groups, reference group), group dynamics and behavior, formal organizations, the role of groups and organizations in social change, Social stratification and social inequality, rural class	03
1	Ethnocentrism and cultural relativism, culture shock, cultural diversity, cultural complexity	03
3	Research problems, research design, methods of data collection, primary data collection, interviews, FGDS, observational approach, collection of secondary data	03
3	Participatory and non-participatory research, quantitative and qualitative research methods, PAR, PRA, RRA, techniques, and tools of participatory research	04
1	Agricultural Extension: Concept, meaning, and principles of Agricultural Extension.	01
3	**Extension Teaching Methods:** Classify extension teaching methods, their essential elements, requirements, and preparation/conduct of important extension teaching methods. Also, discuss the advantages and limitations of using different extension teaching methods regarding Bangladesh's condition.	03
3	**Diffusion and Adoption of Innovation:** This chapter covers innovation and its types, elements in the diffusion process, a part diagram of the innovation-decision process, innovativeness, and adopter categories.	02
3	**Programme Planning and:** Concept, importance, principles, and steps of extension programmed planning for livestock development.	02
3	**Evaluation in Extension:** Meaning, purpose, principles, and steps of monitoring and evaluating projects related to veterinary extension work.	02

1**4. Teaching Strategies**:
Lectures, Demonstration, open discussion, assignments, individual/group projects, group discussion, Guided discussion, Guided exercise, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading List:

1. Bernard, H.R. 2000. Social Research Methods: Qualitative and Quantitative Approaches. Sage Publications, Inc., Thousand Oaks, California, U.S.A.
2. Giddens, A. 2009. Sociology. 6th edn. Cambridge: Policy Press, London.
3. Doshi, S. L. and Jain, P. C. 2001. Rural Sociology. Rawat Publications, Jaipur, India.
4. Stringer, E. T. 2007. Action Research. 3rd ed. Sage Publications, Inc., Thousand Oaks, California, U.S.A.
5. Creswell, W. J. 2014. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4th ed. SAGE Publications, Inc., California, U.S.A.
6. Williman, N. 2011. **Research methods are the basics**. New York, New York: Routledge. (Or the most recent edition).
7. Kashem, M. A. 1992. Samprasaran Bijnan (Extension Science). The Bangladesh Packing Press, Dhaka.
8. Van den Ban, A. W. and Hawkins, H. S. 1996. Agricultural Extension. 2nd edn. Blackwell Science Ltd., London.
9. Bhyiya, M. H. 1988. Krishi Samprasaran Parichiti. Jamuna Printers, Dhaka

Outcome Based (OBE) Courses and Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fourt Year Second Semester

Course Outline

1. **Course Title :** Rural Sociology and Livestock Extension Education
2. **Course Code :** 0314VAS436
3. **Course Type :** Practical
4. **Course Level :** Fourt Year Second Semester
5. **Course Credit**: 1
6. **Session :** 2023-2024
7. **Total Marks :**100 (Final Examination70, Class Test 20 and Attendance 10)
8. **Course Teacher:** Professor Dr. Royhan Gofur & Mr. Soshe Ahmed

9. Rationale of the course:
This course discusses the technique of production-type extension work with livestock. Therefore, it provides students with practical knowledge about how to justify the present Livestock situation and improve it by spreading livestock-related new technologies among animal producers for higher returns with lower costs through improved communication skills, motivation, Adoption of innovation, and effective programmed planning and evaluation.

10. Intended Learning Objectives:
The objectives of this course are:
a. To understand the Present Live stock situation.
b. To know the basic principles of social communication skill improvement.
c. To develop a questionnaire for data collection
d. To plan an effective program or project and evaluation.
e. To spread livestock-related new technologies among animal producers.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, you will be able to:
CLO1: Acquire comprehension knowledge of related extension organizations and their purposes.
CLO2: Develop questionnaires for data collection, apply social communication skills, and adopt and spread new technologies among farmers.
CLO3: They will be able to plan a program or project effectively and evaluate the project's ultimate outcomes.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	0	0	2	1	3
CLO2	0	1	2	3	3
CLO3	1	1	2	2	3

13. Lesson Plan:

CLOs	Course content	No. of Lectures
1	An orientation to different organizations related to agricultural and livestock development.	3
2,3	The questionnaire, its types, and steps of design of the questionnaire, guidelines for constructing questionnaire/ interview schedule	3
2	Preparation of teaching aids: posters, flashcards, and leaflets.	5
2,3	Group discussion techniques: lecture, Role-playing, and Philip 66.	3
1,2,3	Extension Field trip to rural areas/Upazila Headquarters to observe rural development activities in the field situation with particular emphasis on livestock.	2

14. Teaching Strategies:
Lectures, Demonstration, open discussion, assignments, individual/group projects, group discussion, Guided discussion, Guided exercise, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Kashem, M. A. 1992. Samprasaran Bijnan (Extension Science). The Bangladesh Packing Press, Dhaka.
2. Van den Ban, A. W. and Hawkins, H. S. 1996. Agricultural Extension. 2nd edn. Blackwell Science Ltd., London.
3. Bhyiya, M. H. 1988. Krishi Samprasaran Parichiti. Jamuna Printers, Dhaka

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1	**Course Title**	**:**	Clinical Pathology and Necropsy
2	**Course Code**	**:**	0841VAS502
3	**Course Type**	**:**	Practical
4	**Course Level**	**:**	Fifth Year First Semester
5	**Session**	**:**	2023-2024
6	**Course Credit**	**:**	1
7	**Total Marks**	**:**	100 (Final Examination 60, Class Test 30, Attendance 10)
8	**Course Teachers**	**:**	1. Dr. Md. Golbar Hossain 2. Dr. Afia Khatun

9. Rationale of the Course:
Clinical pathology is an important bridge between the basic sciences and clinical medicine, and laboratory results are important in diagnosis of disease, prediction of prognosis and monitoring of disease progression and/or response to treatment. An in-depth understanding of the pathophysiologic bases for clinical signs and laboratory findings is vital to understanding the clinicopathologic bases for health and disease and the laboratory results associated with these. Principles, procedures and interpretations of clinical laboratory tests and necropsy examination will be taught in the course.

10. Intended learning Objectives (ILOs):
1. To know the set up of a clinical pathology laboratory, operation and management
2. To know collection, preservation and shipment of clinical samples for laboratory diagnosis of disease.
3. To learn techniques of laboratory tests used for diagnosis with their interpretation.
4. To know necropsy procedure, recording of necropsy data and report writing for disease diagnosis and aid in medico-legal practice.

11. Course Learning Outcomes (CLO): *After successful completion of the course, students will be able to*
1. set up and operate a clinical pathology laboratory
2. collect, preserve and shift clinical pathology samples, perform laboratory tests and interpret results
3. perform postmortem examinations of animals and birds, interpret the findings, write report and maintain records.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	1	3	1	3	×
CLO3	1	3	1	2	×

13. Lesson Plan:

CLOs	Course content	Lectures
1	**Introduction:** Definition and scope of clinical and forensic pathology, setting up a clinical pathology laboratory, cleaning and maintenance of glassware and instruments used in clinical pathology, preparation of various buffers, stains and reagents	1
2	**Clinical hematology:** Methods of collection of blood, serum and plasma. Routine hematological test-total erythrocyte count, total leukocyte count, hemoglobin	2

	estimation, erythrocyte sedimentation rate, packed cell volume tests for coagulation disorders; interpretation of hematological findings in animals and birds, hemoparasites	
2	**Clinical biochemistry:** Tests for heart, muscles, liver, kidney, pancreas and bone function with their interpretations.	1
2	**Urinalysis:** Clinical tests (pH, specific gravity, microscopic) for urine and their interpretations.	1
2	**Clinical diagnosis of parasitic diseases:** Qualitative and quantitative examination of fecal samples. Examination of skin scrapings.	2
2	**Clinical laboratory diagnosis of bacterial and fungal infections:** methods of sample collection, culture, common staining and antibiotic sensitivity tests.	1
2	**Immunodiagnosis:** ELISA, agar gel precipitation test, hemagglutination and hemagglutination inhibition tests, rapid plate agglutination tests.	2
2	**Anatomic Pathology:** Diagnosis of biopsy cases and impression smears based on histomorphology and immunohistochemistry. Methods of writing clinical reports.	1
3	**Necropsy:** Techniques of postmortem examination of animals and poultry: interpretations of postmortem findings, selection, collection, preservation and shipment of pathological specimens to the diagnostic laboratories for diagnosis of specific disease or disease conditions. Methods of disposal of carcasses. Methods of recording of necropsy findings and writing report. Concerns for necropsy for forensic purposes.	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, practical tests, home assignment.

15. Assessment Strategies:

g. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.
h. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.
i. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists/Essential Readings:

1. Cowell RL. 2004. Veterinary Clinical Pathology Secrets. First edition. Hanley & Belfus, Elsevier Mosby, St Louis, MO, USA.
2. Freeman K. 2007. Veterinary cytology: dog, cat, horse and cow: self-assessment color review. Manson Publishing, London, UK.
3. Reagan WJ, Irizarry Rovira AR and DeNicola DB. 2008. Veterinary hematology: Atlas of common domestic and non-domestic species. 2nd edition. Wiley-Blackwell, New Jersey, USA.
4. Stockham SL and Scott MA. 2008. Fundamentals of Veterinary Clinical Pathology. 2nd edition. Wiley-Blackwell, New Jersey, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Zoo, Wild, Aquatic and Laboratory Animal Medicine
2.	**Course Code**	:	0841VAS503
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	3
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. **Rationale of the Course**:

This comprehensive clinical course delves into the multifaceted health concerns of wildlife populations, emphasizing an integrative approach to the myriad challenges facing both free-ranging and captive wildlife. Central to this course is a robust exploration of critical issues impacting wildlife health, including conservation and biodiversity dynamics, as well as the intricate biological data pertinent to diagnosing and managing diseases across diverse taxa. The curriculum offers dynamic, hands-on educational experiences covering a spectrum of infectious and non-infectious diseases—bacterial, viral, fungal, parasitic, zoonotic, nutritional, and miscellaneous—affecting wild mammals including carnivores, marsupials, artiodactyls, perissodactyls, non-human primates, laboratory animals, reptiles, and both aquatic and terrestrial birds and related species. Special emphasis is placed on understanding the etiology, pathophysiology, pathogenesis, clinical manifestations, diagnostic methodologies, therapeutic interventions, and preventive strategies for these conditions. Additionally, the course incorporates practical training in the collection, preservation, and dispatch of biological samples for histopathological, immunoserological, and advanced microbiological laboratory diagnostics. This component is critical for effectively managing wildlife diseases and understanding their potential spillover effects into human populations.

10. Intended Learning Objectives (ILOs):

The objectives of this course are:

1. To acquire general and in-depth knowledge on biological data, biodiversity and conservation of captive and free-ranging wildlife species;
2. To facilitate comprehensive knowledge on overall management of captive and free-ranging wildlife species by keeping animal welfare issues addressed;
3. To gain all-encompassing knowledge on restraining, general and special clinical examination of captive and free-ranging wildlife species;
4. To achieve thorough knowledge on disease diagnosis with emphasis on causes, pathophysiology, pathogenesis, clinical signs, therapeutic intervention of captive and free-ranging wildlife species;
5. To develop consolidated knowledge on managing zoonotic diseases in a zoo with particular emphasis on identification, notifying and educating stakeholders, animal isolation, waste management, regulatory reporting and medical management.

11. **Course Learning Outcomes (CLOs):**

After having successful completion of the course, the students will be able to:

CLO1 : acquire in-depth knowledge on zoo education and research, purposes, policies, operational outlays, planning and establishment of zoological facilities.

CLO2 : develop consolidated knowledge on biology, housing, feeding and nutrition, reproductive and territorial management, biodiversity and conservation of captive and free-ranging wildlife species.

CLO3 : gain all-encompassing knowledge on restraining, associated stresses, animal welfare, general and special clinical examination for the purposes of research, disease diagnosis with emphasis on causes, pathophysiology, pathogenesis, clinical signs, and therapeutic intervention of captive and free-ranging wildlife species.

CLO4 : develop consolidated knowledge on managing zoonotic diseases in a zoo with particular emphasis on identification, notifying and educating stakeholders, animal isolation, waste management, regulatory reporting and medical management.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	2	3	3	2
CLO4	3	3	2	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Conservation of Captive and free-ranging wildlife species and preserving biodiversity. Zoo education and research, policy, operational outlays, planning and establishment of a zoological garden, providing a protected environment for rare and endangered species, protecting the rarest animals in the world.	2
2,3	Topics highlight the current state of studies on biology, housing, feeding and nutrition, reproductive and territorial management, general and special restraint, epidemiology, clinical manifestations, pathogenesis, clinical diagnosis, therapeutic intervention, with preventive and control strategies of infectious and non-infectious diseases of captive and free-ranging wildlife species of the followings:	3
2,3	**Felidae:** Wild cat, Bobcat, African golden cat, Ocelot, Puma, Leopard, Cheetah, Jaguar, Lion, Tiger	3
2,3	**Canidae:** Wild Dogs, Wolves, Coyotes, Jackals, Dhole and Foxes	2
2,3	**Mustilidae:** Weasel, Mink, Polecat, Tayra, Badger, Skunk, Otter, Wolverine	1
2,3	**Procyonids**: Raccoon, Kinkajou, Red panda	1
2,3	**Viverids**: Mongoose, Civet, Meerkat, Genets	1
2,3	**Ursidae**: American Black Bear, Polar Bear, Grizzly, Panda	2
2,3	**Hyaenidae**: Spotted Hyena, Brown Hyena, Striped Hyena, Aardwolf	2
2,3	**Proboscidea**: African Bush Elephants, African Forest Elephants, Asian Elephants	2
2,3	**ARTIODACTYLA** **Bovidae**: Wildebeest, Bison, Yak, Cape Buffalo, Wild goats, Gazelle, Antelopes, Impala **Cervidae**: Deer, Moose, Reindeer, Elk, **Camelidae**: Camel, llamas, alpacas **Giraffidae**: Giraffes, Okapis **Suidae**: Peccaries, Pigs **Hippopotamidae:** Hippopotamus	6
2,3	**PERISSODACTYLA** **Equidae:** Zebras, Assess, Wild Horses **Rhinocerotidae:** Rhinoceroses (White/Sumatran/Indian/Black) **Tapiridae:** Tapirs (South American/ Mountain/ Baird's, Malayan)	2
2,3	**Monkeys and Great Apes:** Baboon, Mandrill, Macaque, Vervet, Proboscis Monkey, Chimpanzees, Langur, Marmoset, Orangutans, Gorillas, Tamarin **Prosimians:** Lemurs, Lorises, Pottos, Galagos	4
2,3	**Marsupials:** Kangaroos, Koalas, Wallabies, Opossums, Possums, Tasmanian devils, Gliders, Marsupial Moles, Bandicoots, Bilby, Wombats	2
2,3	**Insectivores:** Hedgehogs, Moles	1
2,3	**Xenarthra:** Anteaters, Armadillos, Sloths, Pangolins	1
2,3	**Lagomorpha:** Pikas, Rabbits and Hares	1
2,3	**Rodentia:** Porcupines, Guinea pigs, Rats, Mice, Beavers, Squirrels	2
2,3	**Hyrocoidea:** Hyraxes	1
2,3	**Cetacea:** Whales, Dolphins	1

2,3	**Pinnipedia:** Walrus, Sea lions, Seals	1
2,3	**REPTILES** **Chelonians**: Turtles, Tortoises **Crocodilians:** Crocodiles, Caiman, Alligators, Gharial **Sphenodontia**:Tuatara **Lacertilians**: Lizards, Skinks, Geckos **Komodo dragons(** Monitor Lizards) **Ophidians**: Snakes	3
2,3	**Monotremata:** Platypus	1
2,3	**AVES** **Ratites**: Ostriches, Rheas, Emus, Cassowaries, and Kiwis **Tinamiformes:** Tinamous **Sphenisciformes:** Penguins **Gaviiformes, Podicipediformes, and procellariformes:** Loons, Grebes, Petrels, and Albatrosses **Pelecaniformes**: Pelicans, Tropicbirds, Gannets, Cormorants, Frigatebirds, Anhingas **Ciconiiformes:** Herons, Ibises, Spoonbills, Storks **Phoenicopteriformes:** Flamingos **Charadriiformes:** Gulls, Skimmers, Sandpipers, Oystercatcher, Snipes, thick-knees **Anserformes:** Waterfowls- Wild Ducks, Geese, Swans, Canada Goose, Australian magpie goose **Falconiformes:** Falcons, Hawks, Eagles, Kites, Harriers, Buzzards, Ospreys, Caracaras, Secretary Birds, Old World and New World Vultures **Exotic Galliformes:** Guans, Chalacas, Currasows, Pheasants, Peafowl and Guinea fowl **Gruiformes**: Cranes, Limpkins, Rails, Gallinules, Coots, Bustards **Columbiformes**: Rock Doves, Dodo, Wild Pegions **Psittaciformes**: Parrots, Kakapo, Kea, Kaka, Cockatoos, Cockatiel **Cuculiformes**: Cuckoos, Roadrunners **Strigiformes:** Owls, Tyto, Phodilus **Caprimulgiformes**: Nightjars and nighthawks, frogmouths **Trochiliformes:** Hummingbirds **Coraciiform:** Kingfishers, Bee-Eaters, Hornbills **Piciformes**: Woodpeckers **Passeriformes**: Songbirds, Perching birds	8
4	Sources of zoonotic diseases and their modes of transmissions in captive wild animals and birds with particular emphasis on identification, notifying and educating stakeholders, animal isolation, waste management, regulatory reporting and medical management.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 10, Edited by Eric Miller, Nadine Lamberski, Paul Calle, Elsevier, Saunders, 3251 River port Lane, St. Louis, Missouri 63043, USA (2023).
2. Restraint and handling of wild and domestic animals. Murray Fowler, 3rd Edition, Wiley-Blackwell Publishers, USA (2008).
3. Mader's Reptile and Amphibian Medicine and Surgery. Stephen J. Divers and Scott J. Stahl, 3rd Edition, Elsevier Inc.
4. The Merck Veterinary Manual. Research Laboratory Merck. 11th Edition, Merck & Co., Inc., Rahway, NJ, USA (2016).
5. Handbook of Zoo Medicine: Diseases and Treatment of Wild Animals in Zoos, Game Parks, Circuses, and Private Collections (English Edition) – Edited by Heinz-Georg & Ernest M. Lang Klos, Van Nostrand Reinhold Publishers, Germany (1982).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Zoo, Wild, Aquatic and Laboratory Animal Medicine
2.	**Course Code**	:	0841VAS504
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

10. **Rationale of the Course**:
This course is designed to equip students with specialized training in diagnosing, treating, and preventing diseases in both captive and free-ranging wildlife. It covers essential techniques for the safe restraint of zoo animals, wildlife, and aquatic creatures, preparing students for a wide range of clinical scenarios. Students will learn to apply advanced pharmaceuticals and vaccines, perform detailed clinical exams, collect and process specimens, and send them for lab analysis to diagnose both infectious and non-infectious diseases. The course emphasizes customized therapeutic strategies suited to the specific needs of wildlife species. Practical experience is central to the program, with students participating in real-world diagnostic and treatment activities in wildlife reserves, zoos, and safari parks. Workshops and advanced training sessions further enhance their understanding, building both technical expertise and a strong foundation in wildlife health management.

9. Intended Learning Objectives (ILOs):

a. To acquire general and in-depth knowledge on biological data, biodiversity and conservation of captive and free-ranging wildlife species;
b. To facilitate comprehensive knowledge on overall management of captive and free-ranging wildlife species;
c. To gain comprehensive knowledge on all modes of restraining, general and special clinical examination of captive and free-ranging wildlife species;
d. To achieve thorough knowledge on disease diagnosis with emphasis on causes, pathophysiology, pathogenesis, clinical signs, therapeutic intervention of captive and free-ranging wildlife species;
e. To develop precise practical knowledge on application of various groups of drugs, anesthetics and other medicaments as well as clinical management along with intervention of zoonoses in zoological settings.

12. **Course Learning Outcomes (CLOs):**
After having successful completion of the course, the students will be able to:
CLO1 : acquire in-depth knowledge on zoo education and research, purposes, policies, operational outlays, planning and establishment of zoological facilities.
CLO2 : develop consolidated knowledge on biology, housing, feeding and nutrition, reproductive and territorial management, biodiversity and conservation of captive and free-ranging wildlife species.
CLO3 : gain all-encompassing knowledge on all modes of restraining, general and special clinical examination for the purposes of research, disease diagnosis with emphasis on causes, pathophysiology, pathogenesis, clinical signs, and therapeutic intervention using various groups of drugs, anesthetics and other medicaments of captive and free-ranging wildlife species.
CLO4 : develop consolidated knowledge on intervention of zoonoses emphasizing on emerging and re-emerging diseases into perspectives in various zoological settings.

13. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2

CLO2	2	3	2	3	2
CLO3	2	3	2	3	2
CLO4	3	2	3	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

14. Lesson Plan:

CLOs	Course Contents	Lectures
1	Conservation of captive and free-ranging wildlife species and preserving biodiversity. Zoo education and research, policy, operational outlays, planning and establishment of a zoological garden, providing a protected environment for rare and endangered species, protecting the rarest animals in the world.	2
2,3	Topics highlight the practical aspects of current state of studies on biology, housing, feeding and nutrition, reproductive and territorial management of captive and free-ranging wildlife species through first hand participation to the national zoological garden, safari park and other wildlife settings.	2
2,3	Practical training on investigation of diseases of captive and free-ranging wildlife species through identifying causes and risk factors, implement prevention and control measures by means of vaccination and other strategies adapted from evidence-based practices.	3
2,3	Demonstrating all modes of general and special restraint, clinical examination, diagnosis, therapeutic and prophylactic intervention using various groups of anesthetics, drugs and other medicaments against captive and free-ranging wildlife species.	4
3	Collection and dispatch of specimens from the diseased captive or free-ranging wildlife species to the laboratory for confirmatory disease diagnosis.	2
4	Practical handling of zoonoses in captive wild animals and birds with particular emphasis on identification, disease transmission, notifying and educating stakeholders, animal isolation, waste management, regulatory reporting and medical management.	4
1,2,3,4	Recording of clinical cases in a clinical note book with post treatment evaluation and interpretation.	1
1,2,3,4	Field trips to various Safari parks and zoological gardens, including Bangabandhu Sheikh Mujib Safari Park in Gazipur and Dulahazara Safari Park in Cox's Bazar. Additionally, this educational trip to prominent zoological gardens such as the Bangladesh National Zoo, Chittagong Zoo, Rangpur Zoo, Comilla Zoo, Rajshahi Zoo, and others will provide invaluable hands-on experience. These trips aim to enhance students' understanding of wildlife management, veterinary care, and the ecological significance of these habitats, allowing them to observe and participate in the care and treatment of diverse animal species in their environments.	3

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 10, Edited by Eric Miller, Nadine Lamberski, Paul Calle, Elsevier, Saunders, 3251 River port Lane, St. Louis, Missouri 63043, USA (2023).
2. Restraint and handling of wild and domestic animals. Murray Fowler, 3rd Edition, Wiley-Blackwell Publishers, USA (2008).
3. Mader's Reptile and Amphibian Medicine and Surgery. Stephen J. Divers and Scott J. Stahl, 3rd Edition, Elsevier Inc.
4. The Merck Veterinary Manual. Research Laboratory Merck. 11th Edition, Merck & Co., Inc., Rahway, NJ, USA (2016).
5. Handbook of Zoo Medicine: Diseases and Treatment of Wild Animals in Zoos, Game Parks, Circuses, and Private Collections (English Edition) – Edited by Heinz-Georg & Ernest M. Lang Klos, Van Nostrand Reinhold Publishers, Germany (1982).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Poultry Medicine
2.	**Course Code**	:	0841VAS505
3.	**Course Type**	:	Theory
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:
This course is designed to introduce senior veterinary students to a series of lectures on the poultry health, hatchery management, poultry stock immune profiling and predictive health status, clinical conditions and diseases including their epidemiology, clinical features, pathogenesis and pathology for the diagnosis, treatment, prevention and control of poultry and avian diseases as well as welfare issues.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
1. To provide knowledge on importance of poultry medicine, terminologies and veterinarians' role in the poultry industry.
2. To attain basic understanding on infectious, non-infectious, metabolic and other diseases and disorders in poultry birds.
3. To acquaint students with theoretical knowledge on epidemiology, clinical features, necropsy procedures and findings necessary to diagnose and treat the poultry diseases.
4. To correctly diagnose diseases based on the clinical, pathological examinations and laboratory tests in poultry birds.
5. To facilitate necessary knowledge of immunology and therapeutics for the prevention and control of poultry diseases.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1: Explain perspectives and importance of poultry medicine.
CLO2: Describe on infectious, non-infectious, metabolic and other diseases and disorders of poultry birds
CLO3: Illustrate the diagnosis, therapeutic management, prevention and control of various poultry diseases.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Introduction to poultry medicine (importance, perspectives, terminologies), economic	2

	importance of poultry and their diseases, Role of Veterinarian(s) in poultry industry.	
3	Principle of disease control in poultry. Handling disease outbreaks.	1
1,2,3	Studies on the diseases of various poultry species with special emphasis of the followings. Systemic diseases: Principles of dysfunction with manifestations, diagnosis and treatment of the diseases of different body systems. Systemic diseases and disorders of different body systems of birds with special emphasis to- crop impaction, enteritis, stunted chick disease, round heart disease, bumble foot, endocarditis, nephrosis and gout, egg bound, abnormal egg production, egg peritonitis etc.	4
1,2,3	Studies on the diseases of various poultry species with special emphasis of the followings. Microbial diseases: Avian streptococcosis, avian staphylococcosis, avian salmonellosis. Avian Cholera, Anatipestifer infection, Infectious coryza, Avian colibacillosis, Avian clostridiosis, Botulism, Ulcerative enteritis, Necrotic enteritis, gangrenous dermatitis, Avian tuberculosis, Pseudomonas infection, Avian listeriosis, Haemophilous catarrh, Avian mycoplasmosis, Infectious synovitis, Avain Chlamydiasis, Avian pox, Newcastle disease, Avian influenza, Infectious bronchitis, Infectious laryngotracheitis, Marek's Disease, Lymphoid leukosis, Egg drop syndrome 76, Infectious bursal disease, Hydropericardium hepatitis syndrome, chicken infectious anemia. Duck plague, Duck virus hepatitis, Aspergillosis, Candidiasis, Favus, Mycotoxicosis.	10
1,2,3	Studies on the diseases of various poultry species with special emphasis of the followings: Parasitic Diseases: Nematode, cestode and trematode infections, Avian coccidiosis, Histomoniasis, Trichomoniasis, Leucocytozoonosis, Avian malaria, Haemoproteus infections, External parasitic infestation (Flea, lice, tick, mite).	3
1,2,3	Studies on the diseases of various poultry species with special emphasis of the followings: Metabolic and Nutritional deficiency diseases: Protein, Carbohydrate, Fat Vitamin and Mineral deficiency diseases.	2
2, 3	Studies on the diseases of various poultry species with special emphasis of the followings. Poisoning: Arsenic, calcium, copper, lead, nitrate, bicarbonate, sodium chloride, potassium permanganate, organic insecticides, chlorinated hydrocarbons and organophosphorus poisoning.	3
1,2, 3	Studies on the diseases of various poultry species with special emphasis of the followings. Miscellaneous conditions: Ascites and oedema, right ventricular hypertrophy, heat stress, ammonia blindness, cannibalism, egg eating, cage layer fatigue, acute death syndrome in broiler, multicausal respiratory disease, hydropericardium hepatitis syndrome, enteric disease complex, spiking mortality syndrome. Hatchery and egg borne diseases. Avian diseases of public health significance.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Samad, M. A. 2013. Avian Medicine. LEP publication No. 13, BAU Campus, Mymensingh
2. Burr, E.W. 1987. Companion Bird Medicine. Iowa State University Press, Ames, Iowa, USA.
3. Calnek, B.W. (1997). Diseases of Poultry. 10th edn., Iowa State University Press, Ames, Iowa, USA.
4. Hoefer, H. L. 1997. Practical Avian Medicine. Veterinary Leaming System, USA.
5. Jordan. F.T.W and Pattison, M. (2000). Poultry Diseases. 5th edn., Bailliere Tindall, London.
6. Rosskepf, W. M. J. and Woerpel, R. 1996. Diseases of Cage and Aviary Birds. Woerpel, Williams and Wilkins, USA.
7. Online resources.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Poultry Medicine
2.	**Course Code**	:	0841VAS506
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor M. Mahbubur Rahman, PhD Professor Aurangazeb Kabir, PhD Associate Professor Emtiaj Alam, PhD Associate Professor Mst. Ishrat Zerin Moni, MPhil

9. Rationale of the Course:
An intensive course of avian diseases to introduce participants to clinical case diagnosis, sampling and reporting from various poultry farms. The purpose of this course is to make the participants proficient in definitive (confirmatory) diagnosis of poultry diseases using laboratory methods. Students practice their skills in avian necropsy, lesion-scoring, vaccination and treatment birds, collecting samples, estimation of biosecurity strategies in poultry farm. This course focuses on the ambulatory-poultry birds, perlustration of poultry farm and hatchery. Students are expected to gain in-depth technical expertise in diagnosing a wide range of infectious, non-infectious, metabolic, and other diseases and disorders in poultry. This includes mastering advanced diagnostic techniques, implementing effective therapeutic interventions, and promoting poultry welfare. Activities will depend on the particular caseloads available, but will include management of outpatient and hospitalized poultry species, possible field service calls to poultry farms, participation in rounds discussions, special procedures.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
1. To engage students in effective oral and written communication skills through observation of faculty clinicians, acceptance and solicitation of feedback from clinicians, and incorporation of suggestions into practice.
2. To demonstrate practical skills in proper capture, control and physical examination methods for different poultry species.
3. To determine which clinical pathological tests to use, what samples to collect, interpret the laboratory results and explain their relevance to each clinical case
4. To attain basic understanding in performing clinical examination and basic laboratory tests.
5. To acquaint students with performing necropsy of poultry and other avian carcasses and can interpret its results, diagnosing diseases based on anamnesis and various clinical examinations and Perform treatment and implement control and preventive measures of poultry diseases

11.Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : perform effective communication with clinicians, farm owners and other stake holders of the respective field.
CLO2 : control and handle various poultry species, perform physical, clinical, laboratory examination necessary to diagnose disease in poultry birds, and farms.
CLO3 : handle common disease outbreaks of poultry patients, also prevent and control various metabolic contagious diseases of poultry birds.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13.Lesson Plan:

CLOs	Course Contents	Lectures
1	Practical introduction of poultry farms and farm equipments and flock management. Risk factors of diseases and their methods of management.	1
2	Methods of controlling and handling of different species of poultry for collection of blood and other specimens.	1
1,2,3	Methods of diagnosis of diseases of birds in the clinic and flocks in the poultry farms.	10
1,2,3	Demonstration and dispensing of poultry drugs and their uses, doses, route of administration, duration of treatment. Adverse drug reactions on health and production.	10
1,3	Practical demonstration of available poultry vaccines and their uses, doses route of administration, Advantages and disadvantages, duration of immunity and vaccination failure under field and farm condition	3
1,2,3	Recording of clinical cases and/or outbreaks of diseases in poultry flocks with their prescription writing, post treatment evaluation and interpretation.	10
1,2,3	Field Trips: Comprehensive visits to government and private poultry operations, including farms specializing in chickens, ducks, quail, and pigeons, as well as backyard poultry rearing units and hatcheries. These educational trips are designed to provide students with advanced, hands-on experience in modern poultry management techniques, disease prevention strategies, biosecurity protocols, and reproductive technologies, ensuring a holistic understanding of both commercial and small-scale poultry production systems.	3

14.Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15.Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Burr, E.W. 1987. Companion Bird Medicine. Iowa State University Press, Ames, Iowa, USA.
2. Calnek, B.W. (1997). Diseases of Poultry. 10th edn., Iowa State University Press, Ames, Iowa, USA.
3. Hoefer, H. L. 1997. Practical Avian Medicine. Veterinary Leaming System, USA.
4. Jordan. F.T.W and Pattison, M. (2000). Poultry Diseases. 5th edn., Bailliere Tindall, London.
5. Rosskepf, W. M. J. and Woerpel, R. 1996. Diseases of Cage and Aviary Birds. Woerpel, Williams and Wilkins, USA.
6. Samad, M. A. 2013. Avian Medicine. LEP publication No. 13, BAU Campus, Mymensingh.
7. Online resources.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fourth Year First Semester

Course Outline

1.	**Course Title**	:	Pet and Companion Animal Surgery
2.	**Course Code**	:	0841VAS507
3.	**Course Type**	**:**	Theory
4**.**	**Course Level**	:	Fifth Year First Semester
5**.**	**Session**	:	2023-2024
6**.**	**Course Credit**	:	2
7**.**	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8**.**	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Due to animal diversity, and the difference in their anatomical and physiological structure, Veterinary Surgery has been divided into various branches, and Small Animal Surgery is one of them. Small Animal Surgery deals with the etiology, clinical signs, diagnosis, and treatment of the surgical affections of small animals (dogs, cats, etc). This course includes ophthalmic and aural surgery, dental surgery, gastrointestinal surgery, urogenital surgery, and orthopedic surgery. It is expected that after completion of the course, the student will get a detailed idea of the surgical affections of small animals with their proper corrections.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
1. To describe the causes, clinical signs, diagnosis, differential diagnosis, effective surgical treatment protocols, and economic importance of handling common surgical cases of Pet and Companion Animals.
2. To attain knowledge of surgical instruments and equipment related to each surgery.
3. To provide knowledge on effective handling of ophthalmic, aural, dental, gastro-intestinal, urogenital, orthopedic, and neurosurgery of Pet and Companion Animals.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : explain the causes, clinical signs, diagnosis, differential diagnosis, effective surgical treatment protocols, and economic importance of handling common surgical cases of Pet and Companion Animals.
CLO2 : perform ophthalmic, aural, dental, gastro-intestinal, urogenital, orthopedic, and neurosurgery of Pet and Companion Animals along with specific surgical instruments and equipment related to each surgery.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	2	3			
CLO3					

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1,2	**Surgical affections of eye:** Cherry eye, entropion, ectropion, staphyloma, obstruction of lacrimal duct, dacrocystitis, dacroadenitis, periodic ophtahlmia, uveitis, hydropthalmia, panopthalmia, glaucoma, etc.	3
1,2	**Surgical affection of ear:** Hematoma, otorrhoea, foreign bodies in the ear, lateral ear canal ablation etc.	3
1,2	**Dental Surgery:** Abnormal eruption and arrangement of teeth, dental tarter, dental carries, pyorrhea, gingivitis, dental fistula, dentigerous cysts, extraction of teeth and dental abscess	3
1,2	**Gastro-intestinal surgery:** Salivary mucocele, sialoliths, gastro-esophageal reflex, foreign body, gastric dilatation-torsion, traumatic gastritis, foreign bodies in the	7

	stomach, intussusception, volvulus, strangulation, megacolon, intestinal anastomosis, anal sac disease, cholelithiasis, peritonitis, etc.	
1,2	**Urogenital surgery:** Pyelonephritis, hydronephrosis, obstruction of urethra, feline urologic syndrome, urolithiasis, retention of urine, urinary fistula, surgical affection of the penis and prepuce, canine venereal granuloma, hyperplasia of the prostate gland, Neutering, spaying neoplasm, and other diseases.	4
1,2	**Orthopedic surgery:** classification, diagnosis and treatments of different types of fracture. Modern techniques in fracture treatments.	5
1,2	**Neurosurgery:** affection of brain and spinal cord, intervertebral disc herniation.	3

14. Teaching Strategies: Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 1980. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi.
2. Slatter, D. 2002. Textbook of Small Animal Surgery 3rd Edition, W.B. Saunders Company, Philadelphia.
3. Venugopalan, A. 2018. Essentials of Veterinary Surgery. 8th Edition. Oxford & IBH Publishing Company Pvt, Ltd, New Delhi.
4. Gelatt, K.N. 1991. Veterinary Ophthalmology. 2nd Edition. Lea & Febiger, Philadelphia, London.
5. Alexander, J.W. 1985. Leonard's Orthopedic Surgery of the Dog and Cat. W.B. Saunders Company, Philadelphia, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Pet and Companion Animal Surgery
2.	**Course Code**	:	0841VAS508
3.	**Course Type**	**:**	Practical
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Dr. Abdulla Al Mamun Bhuyan Dr. Jashim Uddin

9. Rationale of the Course:
Due to animal diversity and differences in their anatomical and physiological structure, Veterinary Surgery has been divided into various branches, and Pet and Companion Animal Surgery is one of them. Pet and Companion Animal Surgery deals with the aetiology, clinical signs, diagnosis, and treatment of the surgical affections of small animals (dogs, cats, etc). This course includes ophthalmic and aural surgery, dental surgery, gastrointestinal surgery, urogenital surgery, and orthopaedic surgery of small animals. It is expected that after completion of the course, the student will be able to diagnose and treatment of different surgical affections of small animals with their proper management practically.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

a. To know the examination procedure of pet and companion animals to identify various surgical affections practically.
b. To be able to administer analgesics and anesthetics to the pet and companion animals to perform various surgical operations.
c. To know and attain skills in ophthalmic, aural surgery, dental, Gastrointestinal, urogenital, orthopedic, and neuro-surgery.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course, the students will be able to:

CLO1 : know how to administer analgesics and anesthetics to pet and companion animals to perform the specific operation.

CLO2 : have sufficient knowledge of the diagnosis of surgical affections of eye, ear, teeth of pet and companion animals with proper management.

CLO3 : diagnose and perform the gastro-intestinal, urogenital, orthopedic, and neuro-surgery surgery of pet and companion animals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2		
CLO2	3	2			
CLO3	2	3			

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	**Introduction:** Handling and restraining of small animals to examine and identify the surgical affections. Administration of anesthetic and analgesic agents to small animals to perform different surgical operations.	2
1,2	**Surgical affections of eye:** Entropion and ectropion operation, enucleation of eyeball. **Surgical affections of ear:** Lateral ear canal resection/aural rejection.	2
1,2,3	**Surgical affections Respiratory tract:** Entriculochordectomy (debarking), tracheotomy etc.	2
1,2,3	**Gastro-intestinal surgery**: Grastrotomy, enterotomy, enterectomy, intestinal anastomoses, Typhlectomy, colopexy, spleenectomy, cholecystectomy etc.	2
1,2,3	**Urogenital surgery:** Neutering, spaying, uretrotomy, vasectomy, cystotomy, amputation of penis, nephrectomy etc.	2
1,2,3	**Miscellaneous:** Amputation of tail, digit, and dewclaw.	2
1,2,3	Clinical Practices of surgical cases at Rajshahi University (RU) Veterinary clinic, Government and Private veterinary hospitals and clinics, zoo, and different farms.	2

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Oconnor, J.J. 1980. Dollar's Veterinary Surgery. 4th Edition. CBS Publisher and Distributor, New Delhi.
2. Slatter, D. 2002. Textbook of Small Animal Surgery 3rd Edition, W.B. Saunders Company, Philadelphia.
3. Venugopalan, A. 2018. Essentials of Veterinary Surgery. 8th Edition. Oxford & IBH Publishing Company Pvt, Ltd, New Delhi.
4. Gelatt, K.N. 1991. Veterinary Ophthalmology. 2nd Edition. Lea & Febiger, Philadelphia, London.
5. Alexander, J.W. 1985. Leonard's Orthopedic Surgery of the Dog and Cat. W.B. Saunders Company, Philadelphia, London.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Second Year First Semester

Course Outline

1. Course Title : Reproductive Biotechnology
2. Course Code : 0841VAS509
3. Course Type **:** Theory
4**. Course Level** : Fifth Year First Semester
5**. Session** : 202**3**-202**4**
6**. Course Credit** : 2
7**. Total Marks** : 100 (Final Examination 70, Class Test 20, Attendance 10)
8**. Course Teachers** : Prof. Dr. Jalal Uddin Sarder
Dr. Jashim Uddin and
Dr. Abdulla Al MamunBhuyan

9. Rationale of the Course:
This is a basic course of veterinary reproduction which describes the application of knowledge of andrology, gynecology and obstetrics in the field of veterinary reproduction. Advanced biotechnological approaches to reproduction such as estrus synchronization, MOET management, in-vitro and in vivo fertilization, ultrashography, sperm sexing, cloning, transgenic animals are the basic tools of reproductive biotechnology.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:
a. To familiar with background and scope of biotechnology, introduction of genetic engineering, tissue culture. Application of biotechnology in veterinary sciences. History, importance of reproductive biotechnology in animal, introduction to embryo biotechnology, endocrine therapeutics.
b. To know the biotechnological approaches to reproduction, estrus synchronization, management of MOET.
c. To know the in vitro and in vivo fertilization, sexing of sperm and embryos.
d. To know the different methods of gene transfer, cloning and production of transgenic animals.
e. To know the ultrasound equipments and fundamentals of ultrasonography. Sonographic assessment of male and female genital system. Radiographic imaging of the male and female genital system.

11. Course Learning Outcomes (CLOs):
After the successful completion of the course, the students will be able to:
CLO1 : explain the background and scope of biotechnology, introduction of genetic engineering, tissue culture. Application of biotechnology in veterinary sciences. History, importance of reproductive biotechnology in animal, introduction to embryo biotechnology, endocrine therapeutics.
CLO2 : describe the estrus synchronization, MOET management, in-vitro and in-vivo fertilization.
CLO3 : enumerate the advanced animal reproductive technology (cloning, transgenic animals) and to explore the knowledge of sonology and ultrasonography

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	3	2	3
CLO2	3	2	3	2	3
CLO3	3	2	3	2	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1	Background and scope of biotechnology, introduction of genetic engineering, tissue culture. Application of biotechnology in veterinary sciences. History, importance of reproductive biotechnology in animal Introduction to embryo biotechnology, endocrine therapeutics.	6
1,2	Biotechnological approaches to reproduction: Selection of donors and recipients,	8

	Estrous cycle regulation: Estrus synchronization Induction of folliculogenesis and ovulation, Termination of luteal activity, Suppression of ovarian activity. Superovulation and Artificial insemination, Surgical and non-surgical collection of embryos, Embryo culture and Evaluation of embryos. Cryopreservation of embryos and Embryo transfer. Management of MOET. In vitro fertilization, in vitro maturation, micromanipulation of embryos. Sexing of sperm and embryos. Different methods of gene transfer and their limitations, embryo splitting, embryo sexing by different methods.	
1,2	Cloning of domestic animals. Different applications of embryonic stem cells. Somatic cell nuclear transfer and transgenic animal production, cryopreservation of gametes. Introduction to stem cells, types, identification, characterization and development of stem cells, Transfection of gene in embryonic blastomeres. Stem cell therapeutics: prospects and limitations.	10
3	Ultrasound equipments and fundamentals of ultrasonography. Sonographic assessment of male and female genital system. Radiographic imaging of the male and female genital system Field trips to Animal Biotechnology Laboratory, Bangladesh Agricultural University, Mymensingh / National Institute of Biotechnology, Savar, Dhaka, Regional cattle breeding centre, Rajabarihat, Rajshahi	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Becker JM, Cold Well GA & Zachgo EA. (2007). Biotechnology a Laboratory Course. Academic Press.
2. Brown CM, Campbell I & Priest FG. (2005). Introduction to Biotechnology. Panima.
3. Ball PJH & Peter AR. (2004). Reproduction in Cattle. Blackwell.
4. Gordon I. (2005). Reproductive Techniques in Farm Animals. CABI.
5. Hafez, FSE. (2000). Reproduction in Farm Animals. Lea and Febiger, USA.
6. McDonald LE and Pineda, MH (1989). Veterinary Endocrinology and Reproduction. 4th edition; Published Lea and Febiger, USA.
7. Shenoy, M (2007). Animal Biotechnology. First Edition, JAIN BOOK AGENCY, New Delhi.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1.	**Course Title**	:	Broiler and specialized fowl production
2.	**Course Code**	:	0841VAS 511
3.	**Course type**	:	Theory
4.	**Course Level**	:	Fifth Year First Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	2
7.	**Total Marks**	:	100 (Final Examination 70, Class Test 20, Attendance 10)
8.	**Course Teachers**	:	Professor Dr. Syed Sarwar Jahan & Soshe Ahmed

9. Rationale of the Course:
This is an applied course of broiler and specialized fowl production which describes history & development of broiler industries and design & planning of broiler farms, requirements for successful broiler production, growth, feed efficiency and carcass yield, necessary equipment for broiler farm, fumigation of broiler sheds, practical brooding program for broilers, vaccination schedule for various species of poultry. It also deals with lighting and placement of essential equipment, housing, environmental controlled and open houses, feeding broiler, starter and finisher ration. Further, it discusses origin and domestication, problems and prospects of duck, quail, pigeon, turkey, guinea fowl and ostrich farming in Bangladesh. Therefore, this course provides applied knowledge of broiler and specialized fowl production. It helps students to know various technical know-how of broiler farming in modern production system.

10. Intended Learning Objectives:
The objectives of this course are:

a) To know scenario of broiler industry, broiler strains and housing of broiler.
b) To learn brooding, feeding, care and management of broiler, produced organic and safe broiler production system, Prevention and control of common broiler diseases and also know broiler processing plant and processing techniques.
c) To introduce duck breeds and care & management of duck.
d) To know Pigeon, Quail, Turkey, Ostrich and Guinea fowl Different breeds, varieties; characteristics and management of Pigeon, Quail, Turkey, Guinea fowl Ostrich, Geese and Pheasant.

11. Course Learning Outcome (CLO):
After the successful completion of the course, the students will be able to:

CLO1 : Explain about the scenario of broiler industry and broiler strains.
CLO2 : State the brooding, feeding, housing, care and management and disease prevention of broiler and specialized fowl and narrate broiler processing plant and processing techniques.
CLO3 : Enumerate the breeds of specialized production and their care and management practices.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan

CLOs	Course content	Lectures
1.	Present scenario of broiler industry. Chronological development of modern broiler strains, Requirements for successful broiler production	3
1.	Housing requirements, environmental controlled and open houses, litter management for the production of good quality broiler.	5
2.	Brooding, feeding, watering, lighting and other management practices for broilers. Welfare issues in broilers, organic and safe broiler production,	4

2	Flock uniformity, grading and post grading management, male management, Stress management, production parameters for breeders, Prevention and control of common broiler diseases. Broiler processing plant and processing techniques, dressing percentage and dressed broilers. Contract growing of parent stock and commercial broiler	5
3.	**Introduction**: Origin and domestication of duck, prospects of duck rearing in Bangladesh, advantages of duck rearing over chicken. **Duck breed:** classification of duck breeds, characteristics of egg type, meat type and ornamental type duck breeds. **Management of Duck:** Brooding, rearing, housing, feeding and watering of ducks, integrated duck farming; general preventive measures of diseases in a duck farm.	5
3.	**Pigeon, Quail, Turkey and Guinea fowl:** Different breed and varieties; characteristics and management of Pigeon, Quail, Turkey and Guinea fowl. problems and prospect of pigeon, quail, turkey and guinea fowl production	6
3.	**Ostrich, Geese and Pheasant:** Different breed and varieties; characteristics and management of Ostrich, Peafowl, and Pheasant. **Bio-security**: General preventive and control measures of diseases for specialized fowl farm.	4

14. Teaching Strategies:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, poster presentation, group/individual assignment, final exam, class attendance etc**.**

Suggested Reading Lists
1. Shanaway, M M. 1994. Quail Production Systems. Food and Agricultural Organization (FAO) of the United Nations, Rome, 1994.
2. Scott, M L. and Dean, W F. 1991. Nutrition and Management of Ducks. M. L. Scott oFIthaca, New York, 1991.
3. Farrel, D J and Stapleton, P.1985. Duck Production Science and World Practice University of New England, Armidle, Australia.
4. Jull, M A. 1947. Raising Turkeys. 1947. McGraw-Hill Co., Inc., New York, 2nd edition.
5. Parkurst, C R. and G. J. Mountney, G J. 1997. Poultry Meat and Egg Production. 1st Indian edition. Publishers and Distributions, New Delhi-110002.
6. Wheelar, H G. 1978. Exhibition and Flying Pigeons. Saiga Publishing Co., Ltd., Royal Parade, Hindhead, Surrey, GU 26 6TD, England.
7. Johari, D C. and Hussain, K Q. 2001. Broiler Production. International Book Distributing Co., Lucknow, India.
8. S. Leeson, S. and Summers, J D. 2010. Broiler Breeder Production. Nottingham University Press.
9. Nesheim, M C., Austric, R E. and Card, L E. 1979. Poultry Production. Lea and Febigar, Philadelphia, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year First Semester

Course Outline

1. Course Title : Broiler and Speciallized Fowl Production
2. Course Code : 0841VAS512
3. Course Type : Practical
4. Course Level : Fifth Year First Semester
5. Session : 2023-2024
6. Course Credit : 1
7. Total Marks : 100 (Final Examination 70, Class Test 20, Attendance 10)
8. Course Teachers : Professor Dr. Md. Shariful Islam

9. Rationale of the Course:
This is an applied course in Poultry production that describes the identification of various strains of broiler & sexing of Day-old chicks. It also designates the history, development, and design & planning of broiler farms in relation to biosecurity, necessary equipment for broiler farms, fumigation of broiler sheds, practical brooding programs for broilers, and vaccination schedules for various species of poultry. It also deals with financial statements of commercial broiler and duck farms, and managemental procedures for quail and pigeon production. Therefore, this course provides students with applied knowledge of broiler farming and management.

10. Intended Learning Objectives (ILOs):
The objectives of this course are:

- **a.** Students will be able to identify various strains of broiler & sexing of Day-old chicks.
- **b.** Students will know the history and development of the broiler industry in Bangladesh.
- **c.** Students will be introduced to necessary equipment for broiler farms, fumigation of broiler sheds, practical brooding programs for broilers, and vaccination schedules for various species of poultry.
- **d.** Students will gain knowledge design & planning of broiler farms in relation to biosecurity.
- **e.** Students will learn the financial statements of commercial broilers and duck farms, and managemental procedures for quail and pigeon production.

11. Course Learning Outcome (CLO):
At the successful completion of the course, students will be able to:

CLO1: identify of various strains of broiler & sexing of Day-old chicks.
CLO2: comprehend the history, development, and design & planning of broiler farms in relation to biosecurity, necessary equipment for broiler farms, fumigation of broiler sheds, a practical brooding program for broilers, and vaccination schedule for various species of poultry.
CLO3: assess financial statements of commercial broiler and duck farm and grading, slaughtering, dressing % estimation of broiler, and managemental procedures for quail and pigeon production.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	3	1	3
CLO2	3	1	3	1	3
CLO3	3	1	3	1	3

13. Lesson Plan:

CLOs	**Course content**	**Lectures**
1	Identification of different Specialized fowls (Ducks, Geese, etc).	2
1	Identification of various duck breeds and varieties. sexing of Day-old chicks of various species.	2
2	History and development of the broiler industry in Bangladesh	1
2	Introduced the necessary equipment for broiler farm	2
2	Fumigation of broiler sheds, and vaccination schedule for various commercial stocks.	2
2	Practical brooding program for broilers Design & planning of broiler farms in relation to biosecurity.	2
3	Financial statement of commercial broiler and duck farm,	1
3	Grading, slaughtering, dressing % estimation of broiler	1
3	Field trip to visit managemental practices for commercial broiler, quail and pigeon production.	1

1**4. Teaching Strategies**:
Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested reading lists:

1. Lacy, P. M. 2002. Commercial Chicken Meat and Egg Production. 5th edn. Edited by- Donald D. Bell and William D. Weaver Jr., Springer Publishers, Midtown Manhattan, New York, USA.
2. Shanawany, M. M. 1994. Quail Production Systems: A Review. Food & Agriculture Organization. Rome, Italy.
3. Cambell, H. I. 1994. Quail Production and Management. Rex Bookstore Publishers, Inc. Philippines.
4. Cherry, P. & Morris, R. T. 2008. Domestic Duck Production: Science and Practice. CABI Publishing, Wallingford, England.
5. Hams, F. 2000. Domestic Ducks and Geese. Osprey Publishing, Oxford, United Kingdom.
6. Scott, M. L. and Dean, W. F. 1991. Nutrition and Management of Ducks. M.L. Scott of Ithaca Publishers, New York, USA.
7. Haynes, K. S. 2010. Practical Pigeon Production- A Practical Manual and Reliable Handbook on Squab Production as a Profitable Enterprise. Read Books Publisher, United Kingdom.
8. Cooper, G.R. and Adabi, G. S. 2012. Guinea Fowl Production. Publisher: Lulu.com, USA.

Outcome Based OBE Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fifth Year First semester

Course Outline

1. Course Title : Livestock Economics and Agribusiness Management
2. Course No. : 0311VAS513
3. Course Type : Theory
4. Credit : 2
5. Course Level : Fifth year First Semester
6. Session : 2023-2024
7. Total Marks :100 (Final Examination70, Class Test 20 and Attendance 10)
8. Course Teacher : Dr. Royhan Gofur & Mr. Soshe Ahmed

9. **Rationale of the course:**

This course introduces the basic economic concepts. It introduces the students to functional business areas such as management and organization, human resources, financing, and accounting. In addition, this course establishes a general understanding of entrepreneurship, business plans, marketing strategies, retailing, and supply chain management.

10. Intended Learning Objectives:

The objectives of this course are:

a. Explain the basic economic concepts such as demand, supply, etc.

b. Demonstrate the production function, such as the "Break-even point" and "Shut-down point," and explain the short-run and long-run conditions of a firm.

c. Summarize the law of diminishing marginal utility, describe the process of utility maximization, and explain the cost of production.

d. Describe the business-related terms, business planning, leadership, and entrepreneurship.

e. Learn about business management, organization, human resource planning, and the nature of controlling functions. Earn knowledge and understanding of the principles of marketing and marketing strategies.

11. Course Learning Outcomes (CLOs):

After the successful completion of the course:

CLO1: Learners will be able to determine the situation of demand and supply and explain the relationship of demand and supply with price. In addition, they will be able to calculate the various business costs, income, assets, liabilities, income, and profit and loss.

CLO2: Students will be able to develop a farm business plan, outline a model of organizational staffing, and demonstrate the various types of business ownership and entrepreneurship and their advantages and disadvantages.

CLO3: Learners will determine the appropriate marketing strategies for a business firm.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	1	2	0	3
CLO2	2	2	2	1	3
CLO3	0	1	1	1	3

13. **Lesson Plan**:

CLOs	Course content	No. of Lectures
1	Definition of economics, agricultural economics, scope of livestock economics. Distinguish between microeconomics and macroeconomics. Define G.D.P., G.N.P., N.N.P. Discuss the ways of measuring national income. Briefly discuss the circular flow of income with a diagram. Define national income. Describe the concept of national income.	03
1	Supply, demand, theory of demand and supply. Law of demand, factors influencing demand, the exception to the law of demand, demand curve, and demand schedule. The relationship between price and demand. The law of supply, supply curve, and supply schedule. Demand and market equilibrium. A change in Supply, Market equilibrium, the production function: Break-even and Shut-down point of production, the short run and in the long run	04
1	Cost Concepts: Economic costs, Opportunity costs, Fixed and Variable costs, Direct or Traceable costs, and Indirect or Non-Traceable costs,	02
1	Define the following terms: assets, liabilities, net worth, income, expenses, depreciation, profit, and loss. Compute net worth, profitability, and interest	02
2	Definition of planning, Importance of having a farm business plan, steps in preparing a farm plan, Components of farm plan. Develop a farm business plan	03
2	Small Business, Entrepreneurship, and Franchisees, the entrepreneur, key traits, challenges, and success	02
2	Definition of management and organization and the challenge of management. Define three terms related to managerial decision-making: decision, risk, and problem.	03
2	The definition of leadership specifies successful leaders' significant traits, characteristics, and behaviors, explains leadership styles, and describes what the leader can do to foster teamwork and quality.	02
2	The meaning and sources of power and authority in the organization, the process of empowerment in organizations, and the difference between line authority and staff authority are discussed.	02
2	Identify the most critical components of human resource planning; outline a model of organizational staffing; summarize the F.S.M. laws regarding equal employee compensation; explain methods of staff orientation and training	03
2	Discuss the nature of the controlling function and describe the differences among three levels of controls in firms: operational, tactical, and strategic; define controlling and describe the six stages of the control process.	03
3	Marketing strategies develop product, place (distribution), promotion, and pricing strategies. Segmenting and Targeting Markets, cooperating marketing, marketing channels, traceability and Supply Chain Management (S.C.M.), brand and branding	03

1**4. Teaching Strategies**:

Lectures, assignments, individual/group projects, group discussion, guided discussion, Q-card and Flash card discussion, audio-visual display, hands-on training, web-based resources, feedback, etc.

1**5. Assessment Strategies:**

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading List:

1. Timothy Taylor, Steven A. Greenlaw, Eric Dodge. 2014. Principles of Microeconomics. ISBN 13: 9781938168246, Publisher: OpenStax
2. Robert S. Pindyck and Daniel L. Rubinfeld. Microeconomics - 9th Edition
3. Pearson Series in Economics
4. Koontz H., Cannice M.V. and Weihrich H. Management A global and entrepreneurial perspective 12thEdition.
5. Downey, W.D. & S.P. Enieson, 1998. Agricultural Business Management, McGraw-Hill Book Co; Singapore.
6. Terry G.R. and Franklin, 1992. Principles of Management, Interstate Printers and Publishers, Illinois, U.S.A.
7. Lamb, Charles W., Joseph F. Hair, and Carl McDaniel. Essentials of marketing. 6th ed. Mason, Ohio: South-Western; London: Cengage Learning [distributor], c2009 (or most recent edition).
8. Allen, K.R. (1999). Entrepreneurship and Small business Management (2nd ed) New York:Glence/Mcgraw-Hill. (or most recent edition)
9. Burrow, James L. Marketing. 3rd ed. Mason, OH: South-Western Cengage Learning, c2009 (or most recent edition).
10. Agribusiness: Fundamentals and Applications, by C. Rickeetts and K, Ricketts, 2th Edition, 2001, Delmar, Cengage Learning (or most recent edition).
11. Olson, K.K. Farm Management: Principles and Strategies, Boston: Wiley-Blackwell, 2003 (or most recent edition).
12. Karnam Lokanadhan, Mani, K. and Mahendran, K. 2009. Innovations in Agri-Business Management. New India Publishing Agency, Pitam Pura, New Delhi-110088.
13. Richard L. Kohls and Joseph N. Uhl., 2009. Marketing of Agricultural Products. 9th edition, PHI Learning Private Limited, New Delhi-110001.

DEPARTMENT OF VETERINARY AND ANIMAL SCIENCES
FACULTY OF VETERINARY AND ANIMAL SCIENCES
UNIVERSITY OF RAJSHAHI

Outcome Based (OBE) Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fifth Year Second Semester (Internship)
Course Outline

1. Course Title	**:**	Hospital Practices
2. Course Code	**:**	0841VAS516
3. Course Level	**:**	Fifth Year Second Semester (Internship**)**
4. Course Type	**:**	Practical
5. Session	**:**	2023-2024
6. Course Credit	**:**	1
7. Total Marks	**:**	100 (Final Examination 90, Attendance 10)
8. Course Teacher	**:**	Veterinarians (Clinicians)/Teachers on duty at the hospitals

9. Rationale of the Course:
Hospital practices provides clinical experiences (learning by doing or direct observation) on diseases and injuries of large animals, small animals and birds. Improve day 1 skills on disease diagnosis, treatments and prevention of common clinical cases in Bangladesh.

10. Intended learning Objectives (ILOs):

a. To attain practical knowledge on common clinical cases (learning by doing/ direct observation approach).
b. To improve day 1 skills on disease diagnosis, treatments and prevention of common clinical cases.
c. To attain knowledge on prevalence of diseases, diagnostic approaches and treatment protocols of different reputed veterinary hospitals of Bangladesh.

11. Course Learning Outcomes (CLOs): From practical class students will be able to

1. Diagnose various diseases of large animals, small animals and birds confidently by history, clinical findings and laboratory diagnostic techniques.

2. To provide treatments of diseases and injuries of large animals, small animals and birds, to provide vaccination schedules and vaccination techniques.
3. To perform various surgery common to Bangladeshi veterinary hospitals.

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Course Contents:

CLOs	Course contents	Number of Lectures
1,2,3	**Diagnosis (Clinical and laboratory) treatments and prevention of different clinical cases:** at teaching veterinary hospitals or clinics of Rajshahi University, Chittagong Veterinary and Animal Sciences, Bangladesh agricultural University and others veterinary institutes.	20
1,2,3	**Diagnosis (Clinical and laboratory), treatments and prevention of different clinical cases specially pet animals:** at Central veterinary hospitals and pet animal clinics of CVASU, Dhaka and Rajshahi	5
1,2,3	**Diagnosis and treatments and prevention of different clinical cases specially ruminants and birds:** at District and Upazila Veterinary hospitals.	30

14. Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, learning by direct practice, Question and answer etc.

15. Assessment Strategies:
Class Attendance (10), Final Examination (70).

Suggested Readings Lists:
Books and references related to medicine, surgery and theriogenology and other related disciplines.

Outcome Based (OBE) Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fifth Year Second Semester (Internship)

Course Outline

1. Course Title : Farm Practices
2. Course Code : 0841VAS518
3. Course Level : Fifth Year Second Semester (Internship**)**
4. Course Type : Practical
5. Session : 2023-2024
6. Course Credit : 1
7. Total Marks : 100 (Final Examination 90, Attendance 10)
8. Course Teacher : Veterinarians /Farm Manager/Teachers on duty at the farms

9. Rationale of the Course:
This is an intensive and advanced course of DVM degree. It includes visiting the farming activities and managemental procedures in Gov. and private farms. This course will introduce the students with farm animal management, artificial insemination, diseases prevention and control. This course focuses on technical know-how of profitable and economic farming.

10. Intended Learning Objectives (ILOs):
a) Students will be introduced with dairy farming and their activities.
b) Students will know poultry farm activities and development policy.
c) Students will be introduced the modern goat and sheep farming and feed formulation.

d) Students will gain knowledge of profitable farm development policy in private sector and their strategy application.
e) Students will be introduced with breeding policy for farm animals.

11. Course Learning Outcomes (CLOs):
After completion of this course, students will be able to:

1. gather knowledge about GOV. and private farms and their policy
2. learn modern farming practices in profitable way
3. explain the principles, business plan, design and operational procedure of dairy, egg, meat and feed producing farms and companies

12. Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	2	2	1
CLO2	3	1	2	2	1
CLO3	3	1	2	2	1

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course content	No. of Lectures
1	Rajshahi Dairy Cattle Improvement Farm	4
1	CCBS & DF, Savar	8
2	Central Poultry Farm, Mirpur	6
2	Central Duck Farm, Narayangonj, Naogoan	4
3	Rajshahi Goat Farm	4
3	Central Poultry Farm, Mirpur Regional Poultry Farm, Rajshahi Fodder Production Farm	6

14.Teaching strategies:
Lecture, Open discussion, Group discussion, Audio visual, learning by direct practice, Question and answer etc.

15. Assessment Strategies:
Class Attendance (10), Final Examination (70).

Suggested Readings Lists:

1. Hatchery Operation and Management; E. M. Funk and N. R. Irwin; New York, John Wiley and Sons, Inc., London-Chapman and Hall Ltd.; 1955
2. Prasad, J. 2002. Principles and Practices of Dairy Farm Management. Kalyani Publishers, New Delhi, India.
3. Walstra P, Wouters, Jan T. M. and Geurts T J. 2005. Dairy Science and Technology (2ndEdn.), CRC Press-Taylor & Francis Group LLC, New York, USA.
4. Feed Manufacturing Technology-IV. Robert, R. and McEllhiney. American Feed Industry Association, Inc., Suite 1100, 1500 Wilson Blvd., Arlington, VA 22209. 199

Outcome Based (OBE) Curricula Layout for
Doctor of Veterinary Medicine (D.V.M.) Degree
Fifth Year Second semester (Internship)

Course Outline

1	**Course Title**	:	Disease Diagnostics and Control Practices
2	**Course Code**	:	0841VAS520
3	**Course Type**	:	Practical
4	**Course Level**	:	Fifth Year Second Semester
5	**Session**	:	2023-2024
6	**Course Credit**	:	1
7	**Total Marks**	:	100 (Final Examination 90, Attendance 10)
8	**Course Teachers**	:	Veterinarian/Clinician/Teachers of Specific filed

9. Rationale of the Course:
This course provides training in the practical and applied aspects of pathological investigation of disease including necropsy technique, histopathology, clinical pathology and cytology. It would suit refreshing students' basic skills in pathology and provide increased exposure in diagnostic pathology. Students will participate in the work of cases submitted to/collected at the Veterinary Hospital under the guidance and supervision of pathologists. This will include examining medical histories, formulating differential diagnosis lists and diagnostic plans, postmortem investigations, tissue trimming and histopathological assessment, report writing and scientific communication.

It also includes field epidemiology and its application. This course will introduce the students with the laboratory biosafety and biosecurity guideline as well as vaccine production and application for effective control practices. Thjs course also introduce intern students regarding veterinary related research activities in different institutes of Bangladesh.

10. Intended learning Objectives (ILOs):

1. To know collection, preservation and shipment of clinical specimens for diagnosis of disease in a laboratory setting and to learn techniques of laboratory tests used for diagnosis with their interpretation.
2. To know the procedures and practices related to control and prevention of diseases.
3. To be familiar with disease diagnostics and control practices of different universities/institutes of Bangladesh.

11. Course Learning Outcomes (CLO):
After successful completion of the course, students will be able to

1. select appropriate samples using suitable techniques for examination and perform laboratory tests, prepare report and preserve record. research the pathogenesis, differential diagnosis and significance of the diseases which are encountered, and advise on disease problems at both the individual and population level using appropriate language directed at various end users (veterinarians, farmers).
2. Follow the principles of control and prevention of diseases including the biosafety management and vaccination.
3. Understand the basic disease diagnostic and control activities in consideration of livestock development in Bangladesh.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	3	1	2	×
CLO2	1	3	1	3	×
CLO3	1	3	1	2	×

13. Lesson Plan

CLOs	Course content	Lectures
1	**Introduction:** Definition and scope of diagnostic pathology, cleaning and maintenance of glassware and instruments used in diagnostic pathology laboratory, preparation of various buffers, stains and reagents.	1
2	**Hematology:** Collection of blood, serum and plasma. Routine hematological test- total erythrocyte count, total leukocyte count, hemoglobin estimation, erythrocyte sedimentation rate, packed cell volume, tests for coagulation disorders; interpretation of hematological findings in animals and birds.	2
2	**Blood biochemistry:** Tests for heart, muscles, liver, kidney, pancreas and bone function with their interpretations.	1
2	**Urinalysis:** Clinical tests (pH, specific gravity, total protein, microscopic) for urine and their interpretations.	1
2	**Diagnostic tests for parasite and fungus:** Qualitative and quantitative examination of fecal samples. Examination of skin scrapings.	2
2	**Culture and sensitivity tests:** Collection of samples for culture, common staining and antibiotic sensitivity tests.	1
2	**Immunodiagnostic tests:** ELISA, hemagglutination and hemagglutination inhibition tests, rapid plate agglutination test.	2
2	Biosafety management, food safety and hygiene, vaccine production process and its application in disease control and prevenation	2
3	Introduction on disease diagnostics and control practices implied by different government institutes and universities.	2

14. Teaching-learning strategies:

Lectures followed by discussion, individual/group projects, digital slide, museum specimens, hands on training, practical tests, home assignment.

15. Assessment Strategies:

a. **Class attendance:** The marks will be assigned based on attendance and satisfactory interactions in the lectures. However, marks will not be assigned solely on attendance to classes.

b. **Class test(s):** There will be short comprehensive exam, surprise quiz, individual/group performance, home assignment to prepare the students for their final hurdle examination.

c. **Final exam:** The final exam will cover both theory and practical components and will include written test, practical task(s), home work (Notebook), and viva-voce.

Suggested Reading Lists:

1. Cowell RL. 2004. Veterinary Clinical Pathology Secrets. First edition. Hanley & Belfus, Elsevier Mosby, St Louis, MO, USA.
2. Freeman K. 2007. Veterinary cytology: dog, cat, horse and cow: self-assessment color review. Manson Publishing, London, UK.
3. Reagan WJ, Irizarry Rovira AR and DeNicola DB. 2008. Veterinary hematology: Atlas of common domestic and non-domestic species. 2nd edition. Wiley-Blackwell, NewJersey, USA.
4. Stockham SL and Scott MA. 2008. Fundamentals of Veterinary Clinical Pathology. 2nd edition. Wiley-Blackwell, New Jersey, USA.

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year Second Semester (Internship)

Course Outline

1.	**Course Title**	:	Zoo, Wild, Aquatic and Laboratory Animal Practices
2.	**Course Code**	:	841VAS522
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fifth Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 90, Attendance 10)
8.	**Course Teahers**	:	Veterinarians/Clinicians/Zoo Expert/Techers of related course

9.Rationale of the Course:

This course is structured to equip students with comprehensive, hands-on experience in the care and management of zoo, wildlife, aquatic, and laboratory animals. It covers key areas such as housing, nutrition, breeding, disease diagnosis, therapeutic interventions, preventive strategies, and overall animal welfare. Emphasis is placed on the accurate diagnosis of diseases, effective treatment options, and preventive measures to ensure optimal health and well-being. Students will have the opportunity to explore every section of the zoo and safari park, including the research, education, and survey section, the zoo museum, carnivores, large mammals and herbivores, animal health and nutrition, birds, small animals, reptiles, and related departments. The course also includes on-site visits, data collection, report writing, presentations, assignments, and participation in pre-clinical, para-clinical, clinical, and animal science sessions to foster a well-rounded understanding of wildlife management and care.

10. Intended Learning Objectives (ILOs):

a. To gain a comprehensive understanding of the foundational knowledge related to Safari Parks, Zoos, Game Reserves, and Aquariums, including their establishment, essential requirements, design principles, and various management practices.
b. To acquire practical experience in the housing, feeding, nutrition, and breeding of zoo, wildlife, aquatic, and laboratory animals, both in captivity and in the wild, while focusing on their overall management and addressing related welfare concerns.
c. To increase in-depth knowledge of various methods of animal restraint, along with general and specialized clinical examination techniques for captive, free-ranging wildlife, laboratory, and aquatic species.
d. To develop essential skills in disease diagnosis, emphasizing etiology, pathophysiology, clinical signs, treatment, prevention, and control in captive and free-ranging wildlife, as well as aquatic and laboratory animals.
e. To expand precise practical expertise in the use of various drug groups, anesthetics, vaccines, and other medications, alongside clinical and prophylactic management, including zoonotic disease interventions, in Safari Parks, Zoos, Game Reserves, and Aquariums.

11. **Course Learning Outcomes (CLOs):**

After having successful completion of the course, the students will be able to:

CLO1 : To acquire in-depth knowledge of zoo education and research, including their purposes, policies, operational budgets, and the planning and establishment of zoological facilities.

CLO2 : To develop a comprehensive knowledge on the biology, housing, feeding and nutrition, reproductive and territorial management, welfare, biodiversity, and conservation of captive and free-ranging wildlife species, as well as laboratory and aquatic animals.

CLO3 : To acquire comprehensive expertise in restraint techniques, focusing on disease diagnosis, medication, general management, and research applications. This entails a thorough understanding of disease causes, pathophysiology, clinical signs, and therapeutic interventions, employing various drug groups, anesthetics, and other medications for both captive and free-ranging wildlife species.

CLO4 : To gain a consolidated knowledge on zoonotic disease interventions, emphasizing the dynamics of emerging and re-emerging diseases within diverse zoological environments. This encompasses an exploration of the implications, challenges, and strategic management approaches necessary for effectively addressing zoonoses across various zoological settings.

12. Mapping of Course Learning Outcomes (CLOs) With Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	3	2	3	2
CLO2	2	3	2	3	2
CLO3	2	3	2	3	2
CLO4	3	2	3	3	3

Note: 3-more emphasis, 2-emphasis, 1-less emphasis

13. Lesson Plan:

CLOs	Course Contents	Lectures
1, 2, 3, 4	Internship educational hands-on training at Bangabandhu Sheikh Mujib Safari Park in Gazipur, Dulahazara Safari Park in Cox's Bazar, and several zoological gardens, including the Bangladesh National Zoo, Chittagong Zoo, Rangpur Zoo, Comilla Zoo, and Rajshahi Zoo etc., offer a comprehensive learning experience. Intern students will engage in practical applications related to the housing, feeding, nutrition, breeding, welfare, and ethical considerations of zoo, wild, aquatic, and laboratory animals, alongside disease diagnosis and therapeutic interventions. The internship also includes visits to specialized sections, such as zoo research, education, the zoo museum, carnivores, large mammals, animal health, nutrition, birds, small animals, and reptiles, allowing interns to gain valuable insights and in-depth knowledge.	14

14. Teaching Strategies:

Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Fowler's Zoo and Wild Animal Medicine Current Therapy, Volume 10, Edited by Eric Miller, Nadine Lamberski, Paul Calle, Elsevier, Saunders, 3251 River port Lane, St. Louis, Missouri 63043, USA (2023).
2. Restraint and handling of wild and domestic animals. Murray Fowler, 3rd Edition, Wiley-Blackwell Publishers, USA (2008).
3. Mader's Reptile and Amphibian Medicine and Surgery. Stephen J. Divers and Scott J. Stahl, 3rd Edition, Elsevier Inc.
4. The Merck Veterinary Manual. Research Laboratory Merck. 11th Edition, Merck & Co., Inc., Rahway, NJ, USA (2016).
5. Handbook of Zoo Medicine: Diseases and Treatment of Wild Animals in Zoos, Game Parks, Circuses, and Private Collections (English Edition) – Edited by Heinz-Georg & Ernest M. Lang Klos, Van Nostrand Reinhold Publishers, Germany (1982).

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year Second Semester (Internship)

Course Outline

1. **Course Title** : Livestock Development (Private Sectors)
2. **Course Code** : 841VAS524
3. **Course Type** : Practical
4. **Course Level** : Fifth Year Second Semester
5. **Session** : 2023-2024
6. **Course Credit** : 1
7. **Total Marks** : 100 (Final Examination 90, Attendance 10)
8. **Course Teachers** : Veterinarians/Clinicians/Zoo Expert/Techers of related course

9. Rationale of the Course:

This is an intensive, hands-on and advanced course of DVM degree. It includes private organizations and their activities. This course will introduce the students with livestock farm, feed mill, hatchery, dairy and meat industry. This course focuses on private organization and their development in relation to livestock and feed industry. Therefore, this course will introduce students with the importance of private sector related to livestock and feed industry.

10. Intended Learning Objectives (ILOs):

a. Students will be introduced with the private organization and their activities.
b. Students will know about the farm activities and development policy.
c. Students will be introduced the modern hatchery, dairy industry and feed mill.
d. Students will gain knowledge about development policy of private sector and their strategy application.
e. Students will be introduced with meat processing industry.

11. Course Learning Outcome (CLOs):

After completion of this course, students will be able to:

1. Gather knowledge about private organization and their policy
2. Learn modern husbandry practices of production efficiency in livestock farm
3. Demonstrate the principles, business plan, design and operation of hatchery, dairy, meat and feed industry.

12. Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	1	2	2
CLO2	3	1	1	2	2
CLO3	3	1	1	2	2

13. Lesson Plan

CLOs	**Course content**	**No. of Lectures**
1	The present scenario of private industry in Bangladesh, organogram and development policy of private organization	4
1	Activities of private sector in livestock development	8
2	Modern rearing techniques of poultry and livestock farm.	6
2	Identify the equipment and machineries related poultry and livestock production	4
3	Feed mill design, feed mill operation and compound feed manufacturing	4
3	Plan, design, construction and operational principles of hatchery, dairy industry and meat processing plant	6

14. **Teaching Strategies:** Lectures, demostartion, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:
Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists/Essential Readings

1. Hatchery Operation and Management; E. M. Funk and N. R. Irwin; New York, John Wiley and Sons, Inc., London-Chapman and Hall Ltd.; 1955
2. Prasad, J. 2002. Principles and Practices of Dairy Farm Management. Kalyani Publishers, New Delhi, India.
3. Walstra P, Wouters, Jan T. M. and Geurts T J. 2005. Dairy Science and Technology (2ndEdn.), CRC Press-Taylor & Francis Group LLC, New York, USA.
4. Feed Manufacturing Technology-IV. Robert, R. and McEllhiney. American Feed Industry Association, Inc., Suite 1100, 1500 Wilson Blvd., Arlington, VA 22209. 199

Outcome Based Education (OBE) Curricula Layout for
Doctor of Veterinary Medicine (DVM) Degree
Fifth Year Second Semester (Internship)

Course Outline

1.	**Course Title**	:	Report, Project and Presentation
2.	**Course Code**	:	841VAS526
3.	**Course Type**	:	Practical
4.	**Course Level**	:	Fifth Year Second Semester
5.	**Session**	:	2023-2024
6.	**Course Credit**	:	1
7.	**Total Marks**	:	100 (Final Examination 90, Attendance 10)
8.	**Course Teachers**	:	Teachers (Internship Committee)

09. Rationale of the Course:

Report Writing, Project Development and Presentation is a hands-on training related practical course during internship semester to make student efficient in assignment and report writing as well as to encourage them to conduct their internship activities fruitfully. Under this course student effectively learn how to prepare an assignment and report. Every student is bound to prepare an assignment on a specific topic related to day one skills of a veterinarian. The record of activities of the students during internship should keep in specific format (log book) provide by the internship committee. The log book and assignment should submit after the completion of the internship as report. Presentation skill is also important for DVM graduates. The intern student should focus on presentation of their activities during internship. Every student should prepare a presentation on their internship activities which have to be presented after completion of internship. The internship committee members mentor the students regarding presentation skill.

10. Intended learning Objectives (ILOs):

a. To provide hands on training for report writing.
b. Make efficient to prepare a project on a specific topic.
c. To alert the students about record keeping of their field activities. .
d. To be familiar with the preparation of presentation of their field related activities.

11.Course Learning Outcomes (CLO):
At the end of the course, students will be able to:

1. Understand the procedures/techniques of a good report developmet to keep the records of any activities related to veterinary science.
2. Develop a short simple reserch project related to livestock development/research.
3. Make a good presentation with good quality content and excellent presentation skill.

12.Mapping of Course Learning Outcomes (CLO) with Program Learning Outcomes (PLOs):

CLOs	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	1	2	1
CLO2	3	3	1	2	1
CLO3	3	3	1	2	1

13.Lesson Plan:

CLOs	Course content	No. of Lectures
1	Definition, objectives, structure and contents of assignment	2
1	Formatting of assignment based on specific topics (Figures, table etc.)	2
1	Citation and referencing in an assignment	2
2	Definition, objectives, types of report	2
2	Basic structures of report writing	2
2	Preparation of log book on specific topics	2
3	Development of project related to intership activies based on livestock development and reserch in Bangladesh.	4
3	Definition, objectives, scope and types of presentation	1
3	Basic rules of a good presentation	2
3	Techniques to be follow to make an excellent power point presentation	2
3	A practical lesson to be a good presenter	2

14.Teaching Strategies: Lectures, assignments, individual/group projects, group discussion, Q-card and Flash card discussion, audio-visual display, hands on training, web-based resources, feedback etc.

15. Assessment Strategies:

Quiz/class test, presentation, group/individual assignment, final exam, class attendance etc.

Suggested Reading Lists:

1. Assignment & Thesis Writing, 4th Edition, Jonathan Anderson & Millicent Poole, https://www.wiley.com/en-gb/9780471421818; ISBN: 978-0-471-42181-8
2. How to Write Essays & Assignments by Jonathan Weyers & Kathleen McMillan; 2011, 2nd edition, Prentice Hall; ISBN-13 : 978-0273743811
3. Writing a Report by John Bowden, 2011 Constable & Robinson; 9th edition, ISBN-13 : 978-1845284701
4. Report Writing by Michelle Reid Bloomsbury Publishing, 2nd edition 2018, ISBN 9781352003031
5. Presentation Zen: Simple Ideas on Presentation Design and Delivery by Garr Reynolds, 3rd Edition, New Riders; 3rd edition, 2019, ISBN-13: 978-0135800911
6. Speak Without Fear: Rock Star Presentation Skills to Get People to Hear by Deb Sofield, Firefly Printing Press, 2020, ASIN: B08PN1QM