Course (*TY02019*): (VETERINARY MICROBIOLOGY)

1. General information

- Term: 4
- Credits: **Total credits 3 (Lecture: 2.5 – Practice: 0.5)**
- **Self-study: 9** credits
- Credit hours for teaching and learning activities: 37.5 hrs
- Self-study: 112.5 hrs.
- Department conducting the course:
  - Department: Veterinary Microbiology & Infectious Disease
  - Faculty: Veterinary Medicine
- Kind of the course:

Foundation □		Fundamental ☒		Option 1 □		Option 2 □	
Compulsory □	Elective □	Compulsory ☒	Elective □	Compulsory □	Elective □	Compulsory □	Elective □

- Prerequisite course(s): TY02005_General microbiology

2. Course objectives and expected learning outcomes

**** Course objectives*:**

- Knowledge: Course provided for students with knowledge in the biological characteristics of some bacteria and viruses that cause common infections, and measures to diagnose and prevent diseases caused by those bacteria and viruses. Course equips students with knowledge and achievements in the field of microbiology

- Skills: Course provide students with skills in microbiological research, applied in the diagnosis, prevention, and treatment of diseases

**** Course expected learning outcomes***

Notation	**Course expected learning outcomes (CLOs)** After successfully completing this course, students are able to	**Program performance criteria (PPC)**
Knowledge		
CLO1	**Apply** veterinary knowledge to the prevention and control of animal diseases effectively	2.3
Skills		
CLO2	**Implement** proficiently clinical and non-clinical skills, technical procedures in disease diagnosis and treatment for domestic animals, and animal disease prevention and control to contribute to the protection of public health	8.1
CLO3	**Consult** techniques, technology and business in the veterinary field to bring economic benefits with consideration of human safety, animal health, and the ecological environment	9.2
CLO4	**Use proficiently** information technology and modern equipment of the veterinary industry to serve animal disease	10.2

	diagnosis, treatment, prevention and management to achieve the set goals	
CLO5	**Research** to solve the problems in the veterinary field successfully	11.3
Attitude		
CLO6	**Comply** with regulations and law, maintain professional ethics	12.1

3. Course description

Brief description of the course: This course consist of Micrococcaceae; Corynebacteriaceae; Parvobacteriaceae; Enterobacteriaceae; Bacillaceae; Clostridiaceae; Mycobacteriaceae; Spirochaetaceae; Viruses causing hemorrhage, Viruses causing immunodeficiency, Psychotropic viruses, Epidermal viruses, Viruses causing tumor. *Teaching methods:* lecturers and students give presentations, and participate in practicing microbiological research techniques. Learners receive knowledge in many forms: through lectures, reference textbooks, and through the exchange, sharing, seminars, group exercises, and information related to the course. Evaluation method: Diligence (20%); Presentation (30%); Final exam (50%). *Prerequisite course: TY02005 (General Microbiology).*

4. Teaching and learning & assessment methods

CLOs	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Teaching methods						
Teaching through presentation	x		x	x	x	x
Teaching through practical work		x	x	x	x	x
Assessment						
Rubric 1. Attendance (20%)	x	x	x	x	x	x
Rubric 2. Presentation (30%)	x		x	x	x	x
Rubric 3. Final exam (50%)	x	x				

5. Student tasks

- Attendance: All students taking this course must attend the full theory class as prescribed.
- Preparation for the lecture: All students taking this course must read the relevant book chapter and handout before each class session
- Presentation and Discussion: All students taking this course must discuss during the lectures and answer questions. In addition, they need to prepare the topic which will be presented according to their group. The number of groups will be divided based on the total number of students. Finally, the score will be assessed after discussion and question/answer part.
- Practice: All students taking this course must participate in all practical lectures. Each student should be dress a white coat, be in time in the practical lecture. They have to submit a report when the practical class finishes. They will be evaluated by test including theory practice and skills.
- Final exam: the student must take the final exam as university's schedule.

6. Text books and references

**** Text Books/Lecture Notes:***

1. Nguyễn Bá Hiên, Đặng Hữu Anh, Vũ Thị Ngọc, Cao Thị Bích Phượng (2021). Giáo trình Vi sinh vật thú y, NXB Nông Nghiệp, Hà Nội

2. Nguyễn Bá Hiên, Huỳnh Thị Mỹ Lệ, Lê Văn Phan, Trương Hà Thái, Đặng Hữu Anh, Ngô Minh Hà, Vũ Thị Ngọc, Cao Thị Bích Phượng, Chu Thị Thanh Hương, Nguyễn Văn Giáp, Mai Thị Ngân, Lê Văn Trường, Trần Thị Hương Giang (2021). Thực hành vi sinh vật và bệnh truyền nhiễm thú y, NXB Nông Nghiệp, Hà Nội.

**** Additional references:***

1. S Jane Flint; V R Racaniello; Glenn F Rall; Anna Marie Skalka; L W Enquist. (2015). Principles of virology. Washington DC: ASM Press. 4th Edition

2. Maclachlan NJ, Dubovi EJ. (2017) Fenner's Veterinary Virology, 5th Edition

3. Nguyễn Bá Hiên, Huỳnh Thị Mỹ Lệ, Lê Văn Lãnh, Đỗ Ngọc Thúy, Nguyễn Văn Giáp, Đặng Hữu Anh, Trương Hà Thái, Chu Thị Thanh Hương (2020). Giáo trình bệnh truyền nhiễm thú y, NXB Nông Nghiệp, Hà Nội.

7. Course outline

Week	Content	Course expected learning outcomes
1	***Chapter 1. Micrococcaceae***	
	***A/* Main contents:** *(3.33 hrs)* **Theories:** *(2.49 hrs)* *1.1 Staphylococcus aureus* *1.2 Streptococcus suis* **Exercise:** *(0.83 hrs)*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
	***B/* Self-learning contents:** *(9.99 hrs)* Prevention and control of *Staphylococcus aureus* and *Streptococcus suis* infection	
2	***Chapter 2. Corynebacteriaceae***	
	A/* Main contents: *(2.08 hrs)* **Theories:** *(1.66 hrs)* 2.1. Erysipelothrix (*E. rhusiopathiae*) **Exercise:** *(0.41 hour)* Observation of morphology and growth characteristics of *E. rhusiopathiae*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
	***B/* Self-learning content**: *(6.25 hrs)* Prevention and control of *E. Rhusiopathiae* infection	
	Chapter 3. Parvobacteriaceae	
	***A/* Main content:** (4.16 hrs)	

2, 3	**Theories:** *(3.33 hrs)* 3.1. Pasteurella 3.2. Malleomyces **Exercise:** *(0.83 hrs)* Observation of morphology and growth characteristic of *Pasteurella multocida* ***B/* Self-learning content**: *(12.5 hours)* Brucellosis (*Bucella abortus, Bucella melitensis*)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
4	***Chapter 4. Enterobacteriaceae***	
	***A/* Main content:** (4.16 hrs) **Theories:** *(3.33 hrs)* 4.1. Salmonella 4.2. Escherichia **Exercise:** *(0.75 hour)* *Salmonella* *Escherichia coli*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
	***B/* Self-learning content**: *(7.5 hours)* Salmonellosis *(S. choleraesuis, S. typhisuis, S. Pullorum, S. gallinarum)*	
5	***Chapter 5. Bacillacea***	
	***A/* Main content:** (2.08 hrs) **Theories:** *(1.67 hrs)* 5.1. Bacillus (*B.anthracis*) **Excersie:** *(0.41 hrs)* *B.anthracis* ***B/* Self-learning content:** (*6.25 hrs*) Anthrax	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
6, 7	***Chapter 6. Clostridiaceae*** ***A/* Main content:** *(1.25 hrs)* **Theories:** *(0.41 hrs)* 5.1. Clostridium (*Clostridium tetani*) **Seminar/discussion** *(0.83 hrs)* ***B/*Self-learning content:** *(3.75 hrs)* *Clostridium tetani* *Clostridium chauvoei*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6

7	***Chapter 7. Mycobacteriaceae*** ***A/* Main content:** (2.08 hrs) **Theories:** *(0.83 hrs)* Mycobacterim (*M.tuberculosis*) **Excersie:** *(0.41 hrs)* *M.tuberculosis* ***B*//Self-learning content:** *(6.25 hrs)* *M.tuberculosis*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
7	***Chapter 8. Spirochaetaceae*** ***A/* Main content:** (1.67 hrs) **Theories:** *(0.83 hrs)* 5.1. Leptospira **Seminar/Discussion** *(0.83 hrs)* ***B*/Self-learning content:** *(5 hrs)* *Leptospira*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
8,9,10	***Chapter 9. Viruses causing hemorrhage*** ***A/* Main content***: (9.16 hrs)* **Theories:** *(4.17 hrs)* 1.1. Pestis sum virus 1.2. Newcastle disease virus 1.3. Avian influenza virus 1.4. Anatid alphaherpesvirus-1 or DVE virus (DVEV) 1.5. Avihepatovirus or duck hepatitis virus **Practise:** *(1.67 hrs)* *Medium, cell culture and diagnostic methods of Newcastle disease virus, DVE virus, DVE virus.* **Seminar/Discussion** *(3.33 hrs)* ***B/* Self-learning content**: *(27.5 hrs)* 1.1. Adenoviridae 1.2. Filoviridae 1.3. Bunyaviridae ***1.4.*** Flaviridae	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
11	***Chapter 10. Epidermal viruses***	
	A/* Main content: (0.83 hrs)* **Theories:** *(0.41 hrs)* 2.1. Foot and mouth disease virus (FMDV) 2.2. Variola virus **Seminar/Discussion:** *(0.41 hrs)*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
	***B/* Self-learning content**: *(2.5 hrs)* Studies on FMDV and Variola virus.	

11	***Chapter 11. Psychotropic viruses*** ***A/* Main content:** *(0.83 hrs)* **Theories:** *(0.83 hrs)* 3.1. Rabies virus 3.2. Aujeszky virus ***B/* Self-learning content**: *(2.5 hrs)* *Herpesviridae, Rabdoviridae, Japanese encephalitis virus, dengue fever virus, chikungunya virus*	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
	Chapter 12.* Viruses causing tumor** ***A/* Main content:** *(0.83 hrs)* **Theories:** 4.1. Marek's disease virus 4.2. Leukosis – Sarcoma virus ***B/ /* Self-learning content:** *(2.5 hrs)* ***Avian leukosis viruses (ALV), Renticuloendotheliosis virus (REV)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
11, 12,13	***Chapter 13. Viruses causing immunodeficiency***	
	***A/* Main content:** *(5.41 hrs)* **Theories:** *(2.08 hrs)* 5.1. Gumboro virus 5.2. Porcine reproductive and respiratory syndrome virus (PRRSV) 5.3. Porcine circovirus type 2 (PCV2) 5.4. Porcine Epidemic Diarrhea virus (PEDV) 5.5. Retrovirus 5.6. Reovirus **Practise:** *(1.67 hrs)* Medium, Propagation of virus on cell culture, identification of $TCID_{50}$ based on cytopathic effect (CPE) **Seminar/Discussion:** *(1,67 hrs)* ***B/ /* Self-learning content:** *(16.25 hrs)* Studies on PEDV, PCV2	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6