



Program: Doctor of Veterinary Medicine
Course title Laboratory of Veterinary Microbiology and Immunology
Course code VSPA332

Academic degree level ☒ Bachelor ☐ Graduate Diploma ☐ Master
☐ Higher Graduate Diploma ☐ Doctor
Faculty / College / Institute: Faculty of Veterinary Science
Department of Pre-clinic and Applied Animal Science

TQF 3 Course Specification

Section 1 General Information

1. Course Code and Title

In Thai สฟปส ๓๓๒ ปฏิบัติการจุลชีววิทยาและภูมิคุ้มกันวิทยาทางการแพทย์
In English VSPA 332 Laboratory of Veterinary Microbiology and Immunology

2. Number of Credits

1 (0-3-1)
(Theory 0 hrs. Practice 3 hrs. Self-Study 1 hrs./week)

3. Curriculum and Course Type

3.1 Curriculum Bachelor Degree Program (Thai)
3.2 Course Type Specific Course ☒ Compulsory Course ☐ Electives

4. Course Coordinator and Lecturer

4.1 Course Responsible Lecturers

4.1.1 Assistant Professor Norasuthi Bangphoomi, Ph.D.
Department of Pre-clinic and Applied Animal Science
Contact: 02-4415242 Ext.1509 e-mail address: norasuthi.ban@mahidol.edu
4.1.2 Lecturer Nathita Phumthanakorn, Ph.D.
Department of Pre-clinic and Applied Animal Science
Contact: 02-4415242 Ext.1544 e-mail address: nathita.phu@mahidol.edu

4.2 Lecturers

4.2.1 Lecturer Kridsada Chaichoun, Ph.D.
Department of Pre-clinic and Applied Animal Science
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4.2.2 Associate Professor Wittawat Wiriyarat, Ph.D.
Department of Pre-clinic and Applied Animal Science
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4.2.3 Lecturer Dulyatad Gronsang, Ph.D.
Department of Pre-clinic and Applied Animal Science
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4.2.4 Assistant Professor Norasuthi Bangphoomi, Ph.D.

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4.2.5 Lecturer Nathita Phumthanakorn, Ph.D.

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4.2.6 Associate Professor Sookruetai Boonmasawai, Ph.D.

Department of Pre-clinic and Applied Animal Science

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4.2.7 Assistant Professor Aporn Leesombun, Ph.D.

Department of Pre-clinic and Applied Animal Science

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4.2.8 Assistant Professor Natharin Ngamwongsatit, Ph.D.

Department of Clinical Sciences and Public Health

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4.2.9 Assistant Professor Charoonluk Jirrapattanaseth, Ph.D.

Department of Pre-clinic and Applied Animal Science

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4.2.10 Lecturer Karunasinee Suphaphiphat, Ph.D.

Faculty of Veterinary Medicine and Applied Zoology, HRH princess Chulabhorn College of Medicinal Science, Chulabhorn Royal Academy

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4.2.11 Lecturer Savek Kiatsompob, Ph.D.

Faculty of Veterinary Medicine and Applied Zoology, HRH princess Chulabhorn College of Medicinal Science, Chulabhorn Royal Academy

Contact: 02-7655700 Ext.8250 e-mail address: savek.kia@cra.ac.th

4.2.12 Staff - The Monitoring and Surveillance Center for Zoonotic Diseases in Wildlife and Exotic Animal

4.2.13 Staff – The Center of Veterinary Diagnostic

5. Semester/Class Level

5.1 Semester 1 / Class Level Year 3

5.2 Number of Students Allowed Approximately 80 Students

6. Pre-requisite

-not required-

7. Co-requisites

7.1 VSPA330 Veterinary Microbiology

7.2 VSPA331 Veterinary Immunology

8. Study Site Location Faculty of Veterinary Science, Mahidol University

9. Date of Preparation/Latest Revision of the Course Specifications

Day 2 Month March Year 2020

Section 2 Aims and Objectives

1. Course Goals

This course is designed for undergraduate students to know, understand and practice sample collection, laboratory diagnosis and interpretation for veterinary microbiology. The course also requires students to raise awareness and management of pathogenic microorganisms and have a positive attitude toward veterinary medicine according to a global standard.

2. Objectives of Course Development/Revision

2.1 Course Objectives

This course aims to provide knowledge and abilities as follows:

- (1) To demonstrate microbiological skills, including specimen collection, aseptic technique, classification, isolation, biochemical identification and antimicrobial susceptibility testing.
- (2) To explain the principle of the microbiology laboratory for diagnostic infectious microorganisms
- (3) To explain the principle of prevention and control of infectious diseases
- (4) To demonstrate laboratory techniques in immunology to detect antigens and antibodies for infectious disease.

2.2 Course-level Learning Outcomes: CLOs

On completion of the course, the students will be able to

1. CLO1 Demonstrate in specimens collection for the microbiology laboratory under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.
2. CLO2 Demonstrate in diagnostic tests in microbiology and immunology to identify infectious agents in veterinary medicine (bacteria, fungi and virus) and interpret these diagnostic tests under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.
3. CLO3 Explain concepts in the prevention of infectious agents in veterinary medicine and zoonotic agents, including bacteria, fungi and viruses, and design strategies for infection prevention under Professional standards for Veterinarian Practitioners Guideline 2009 Section 16.
4. CLO4 Validate self-and peer-assessment to help students improve to implement in animal health and public health under Professional standards for Veterinarian Practitioners Guideline 2009 Section 4.
5. CLO5 Demonstrate self-learning skills to assess updated laboratory microbiology and immunology resources

Section 3 Course Description and Implementation

1. Course Description

การเก็บตัวอย่าง เทคนิคปลอดเชื้อ การจำแนกลักษณะ การเพาะแยกเชื้อ การทดสอบคุณสมบัติทางชีวเคมีของเชื้อจุลินทรีย์ การทดสอบความไวของเชื้อต่อยาปฏิชีวนะ หลักการทางห้องปฏิบัติการในการวินิจฉัยเชื้อจุลินทรีย์ ปฏิบัติการทางภูมิคุ้มกันวิทยาสำหรับตรวจหาสารก่อภูมิคุ้มกันและสารภูมิคุ้มกัน

Sample collection, sterilization, classification, culture, isolation and identification, biochemical properties of microorganism, drug sensitivity; microbial laboratory diagnosis, immunological assay for antigen and antibody detection

2. Number of hours per semester

Theory (hours)	Practice (hours)	Self-study (hours)
-	45	15

3. Number of Hours per Week for Individual Advice

The first point of directly contact should be your Course Responsible Lecturers. Lecturers are contactable during the university day on the 5th floor Department of Pre-clinic and Applied Animal Science, Faculty of Veterinary Science, Monday-Friday 8.30-16.30. In an emergency, students can be contacted lecturers directly via email: norasuthi.ban@mahidol.edu or nathita.phu@mahidol.edu

Section 4: Development of the expected learning outcomes

1. A brief summary of the knowledge or skills expected to develop in students; the course-level expected learning outcomes (CLOs)

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

1. CLO1 Demonstrate in specimens collection for the microbiology laboratory under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.
2. CLO2 Demonstrate in diagnostic tests in microbiology and immunology to identify infectious agents in veterinary medicine (bacteria, fungi and virus) and interpret these diagnostic tests under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.
3. CLO3 Explain concepts in the prevention of infectious agents in veterinary medicine and zoonotic agents, including bacteria, fungi and viruses, and design strategies for infection prevention under Professional standards for Veterinarian Practitioners Guideline 2009 Section 16.
4. CLO4 Validate self-and peer-assessment to help students improve to implement in animal health and public health under Professional standards for Veterinarian Practitioners Guideline 2009 Section 4.
5. CLO5 Demonstrate self-learning skills to assess updated laboratory microbiology and immunology resources

2. How to organize learning experiences to develop the knowledge or skills stated in number 1 and how to measure the learning outcomes

CLOs	Teaching and learning experience management				Learning outcomes measurements						
	Group work	Demonstration	practice	Role model	MCQ	Practice exam	Individual report	Group report	presentation	Behavior assessment	Participation
CLO1	✓	✓	✓		✓	✓	✓	✓	✓		✓
CLO2	✓	✓	✓				✓	✓	✓	✓	✓
CLO3	✓	✓	✓	✓			✓	✓		✓	✓
CLO4				✓						✓	
CLO5	✓			✓				✓	✓	✓	

SECTION 5 LESSON PLAN AND EVALUATION

1. Lesson Plan

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
1	Biosafety in Microbiological laboratory		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Kridsada and staff
2	Sample Collection and Aseptic Technique		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Wittawat and staff
3	Techniques in Bacterial Diagnosis		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Norasuthi and staff
4	Bacterial Staining		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Norasuthi and staff
5	Biochemical Test of Bacteria		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Nathita and staff
6	Laboratory Diagnostic for Pathogenic Bacteria 1		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Norasuthi and staff
7	Laboratory Diagnostic for Pathogenic Bacteria 2		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Natharin and staff
8	Laboratory Diagnostic for Pathogenic Bacteria 3		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Nathita and staff
9	Laboratory Diagnostic for Pathogenic Fungi 1		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Norasuthi and staff
10	Laboratory Diagnostic for Pathogenic Fungi 2		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Norasuthi and staff
11	Techniques for Diagnosis of Viral Infection		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Kridsada and staff
12	Latex agglutination test and Fluorescence Assay		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Dulyatad and staff
13	Hemagglutination Inhibition Test		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Wittawat and staff

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
14	ELISA		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Wittawat and staff
15	Nucleic Acid Detection		3.00	Demonstration and Laboratory practice Work practice in the workplace	Dr.Krudsada and staff
	Total hours of the entire semester	-	45		

2. Plan for Assessment of Expected Course-Level Learning Outcomes (CLOs)

2.1 Measurement and Evaluation of learning achievement

A. Formative Assessment

The assessment is performed during the course to measure the progress and development of students' learning by observing the behavior change and improvement of students' behavior and performance. The assessment results will be notified to the students (feedback) so that the students are constantly able to improve themselves. The assessment results are not included with the test scores at the end of the course.

B. Summative Assessment

(1) Tool and weight for measurement and evaluation

Learning Outcomes	Evaluation Method*					Weight (Percentage)
	MCQ	Group work	presentation	Practice exam	Behavior assessment	
CLO1 Demonstrate in specimens collection for the microbiology laboratory under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.	5	-	-	1.5	-	6.5
CLO2 Demonstrate in diagnostic tests in microbiology and immunology to identify infectious agents in veterinary medicine (bacteria, fungi and virus) and interpret these diagnostic tests	60	-	-	18		78

under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.						
CLO3 Explain concepts in the prevention of infectious agents in veterinary medicine and zoonotic agents, including bacteria, fungi and viruses, and design strategies for infection prevention under Professional standards for Veterinarian Practitioners Guideline 2009 Section 16.	5	-	-	1.5		6.5
CLO4 Validate self-and peer-assessment to help students improve to implement in animal health and public health under Professional standards for Veterinarian Practitioners Guideline 2009 Section 4.	-	-	-	-	2.5	2.5
CLO5 Demonstrate self-learning skills to assess updated laboratory microbiology and immunology resources	-	-	6.5	-	-	6.5
total	70	0	6.5	21	2.5	100

(2) Measurement and evaluation

The measurement and evaluation use either the criteria-based or group-based system, according to the conditions and methods for academic results evaluation of the Faculty of Veterinary Science, Mahidol University. The grading symbols are: A, B+, B, C+, C, D+, D, and F. Students must receive a 'D' grade or above to pass the criteria.

(3) Re-examination (if the course allows any.)

In case that students received an 'F' grade, the course coordinator and the program's Teaching and Learning Development Committee should, altogether, agreed to allow the students to take the re-examination or extra-course work to pass the course with the following conditions. For the course with the mean score is higher than 75.00 and the minimum score is not less than 45.00. Students must receive the score higher than 47.50 to take to re-examination or extra-course work. For the course with the mean score between 60.00 – 74.99, students must receive the score higher than 40.00. However, when the mean score is less than 60.00, students, then, should receive the score higher than 40.00 in order to take the re-examination or extra-course work.

Once students took the re-examination (extra-course work) and the course coordinator had considered the students' re-examination/course work to pass the criteria, then the students will receive the 'D' grade. While waiting for the re-examination or extra-course work result, the students' score should be indicated as 'I' grade.

3. Students' Appeal

Should the students have any suspicion or appeals to the teaching and learning activities and the grade assessment, students could make the appeal by filling in the form at MUVS' Academic Affairs. The appeal will be proposed to the course coordinator to consider the request. If the appeal could not be addressed at this point, it will be further process by the program's Teaching and Learning Development Committee. In case that the committee suggested further investigation should be done, the appeal will be purposed to the faculty's appealing committee to address the issue.

Section 6 Teaching Resources

1. Required Texts

1) Brown, Alfred E., Smith, Heidi R. (2017) *Benson's microbiological applications: Laboratory manual in general microbiology, concise version*, New York: McGraw-Hill Higher Education.

2) Cappuccino, J. and Welsh, C. (2018). *Microbiology: A Laboratory Manual, Global Edition*. 11st ed. Pearson Education.

Section 7 Evaluation and Improvement of Course Implementation

1. Strategy for Course Effectiveness Evaluation by Students

At the end of each course, it is required for the students to assess the teaching of each instructor based on the following criteria: punctuality, good role model, application of morals and ethics for the instruction, ability to convey knowledge and encourage students to learn, giving opportunities for students to ask questions and to comment during the study.

The overall outcomes of each course will also be assessed by the students for the following issues: the instructor's knowledge and competency, the course's effectiveness, student's satisfaction with the study, and other comments from students. The evaluation is conducted through online platform.

2. Strategy for Teaching Evaluation

The instructors or the course coordinators are assigned to conduct the evaluation as follows.

2.1 the students' evaluation for the instruction and overall outcomes of the course in accordance to criteria mentioned in No. 1 – Strategy for Course Effectiveness by Students.

2.2 The instructors must perform self-assessment for the following criteria.

- (1) Appropriate time spent to prepare for the teaching.
- (2) The instructor's satisfaction with the teaching results.
- (3) Solutions or recommendations for the program's teaching improvement or self-improvement for the next class/academic year.

3. Teaching Improvement

Prior to each academic year, there are meetings/seminars for the instructors of each course to plan to improve the course's teaching and learning management based on the following information.

- (1) the students' academic performance
- (2) the students' evaluation results
- (3) the instructors' assessment results

4. Verification of Standard of Learning Outcome for the Course

The verification of the standard of the Learning Outcome for the Course is conducted by the course coordinators based on the following aspects.

1. The goals of the learning outcomes are clear and feasible.
2. The learning experience is aligned with the expected goals.
3. The learning experience encourages the students to research and practice self-learning skills.
4. The evaluation methods are appropriate to assess the expected goals and learning experience.

5. The program applied the educational theory and the results from the previous evaluation to plan for improvement.

At the end of each academic year, the course coordinators, instructors, the Program Committee, and the Teaching and Learning Development Committee will consider the assessment results and the Learning Outcome for the Course to plan for the improvement of the next academic year.

Appendix

Relations between the course and the program

Table 1 Relations between the course and the PLOs

Course Name Laboratory of Veterinary Microbiology and Immunology (Course Code) VSPA332	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
	P	P	-	P	P	R	-	R

Table 2 Relations between CLOs and PLOs

(Course Code) VSPA332	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1 Demonstrate in specimens collection for the microbiology laboratory under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.		2.4, 2.5		4.2				
CLO2 Demonstrate in diagnostic tests in microbiology and immunology to identify infec-	1.1			4.2				

tious agents in veterinary medicine (bacteria, fungi and virus) and interpret these diagnostic tests under Professional standards for Veterinarian Practitioners Guideline 2009 Section 28.								
CLO3 Explain concepts in the prevention of infectious agents in veterinary medicine and zoonotic agents, including bacteria, fungi and viruses, and design strategies for infection prevention under Professional standards for Veterinarian Practitioners Guideline 2009 Section 16.				4.2,4.3				
CLO4 Validate self-and peer-assessment to help students improve to implement in animal health and public health under Professional standards for Veterinarian Practitioners Guideline 2009 Section 4.								8.1, 8.2
CLO5 Demonstrate self-learning skills to assess	1.1				5.1, 5.2	6.1		

updated laboratory microbiology and immunology resources								
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