



Program: Doctor of Veterinary Medicine
Course title: Laboratory Animal Medicine
Course code: VSCL 458

Academic degree level ☒ Bachelor ☐ Graduate Diploma ☐ Master
☐ Higher Graduate Diploma ☐ Doctor
Faculty / College / Institute: Faculty of Veterinary Science
Department of Clinical sciences and Public Health

TQF 3 Course Specification

Section 1 General Information

1. Course Code and Title

In Thai สพวค ๔๕๘ เวชศาสตร์สัตว์ทดลอง
In English VSCL 458 Laboratory Animal Medicine

2. Number of Credits 3 (2-3-5)

(Theory 2 hrs. Practice 3 hrs. Self-Study 5 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 Yada Akkhawattanakul, DVM Tel.: 0-24415245-6 (2282)	Department of Veterinary Clinical Science and Public Health E-mail: yada.akk@mahidol.edu
4.1.2 Kewvaree Hommuang, DVM Tel.: 0-24415245 (2210)	Department of Veterinary Clinical Science and Public Health E-mail: kewvaree.hom@mahidol.edu

4.2 Lecturers

4.2.1 Wantanee Rattanasak, DVM Tel.: 0-24415235	Special lecturer E-mail: wantanee.rat@mahidol.ac.th
4.2.2 Assoc. Prof. Parntep Ratanakorn Tel.: 0-2441-0613	Special lecturer E-mail: parntep.rat@mahidol.ac.th
4.2.3 Assist. Prof. Dr. Sasitorn Rungarunlert Tel.: 0-244114245-6 (1418)	Department of Preclinical and Applied Animal Science E-mail: sasitorn.run@mahidol.edu
4.2.4 Yada Akkhawattanakul, DVM Tel.: 0-24415245-6 (2282)	Department of Veterinary Clinical Science and Public Health E-mail: yada.akk@mahidol.edu
4.2.5 Khuanwalai Maklon, DVM, PhD Tel.: 0-24415245-6 (2228)	Department of Veterinary Clinical Science and Public Health E-mail: khuanwalai.mal@mahidol.ac.th

4.2.6 Assist. Prof. Dr. Panida Chanapiwat	Department of Veterinary Clinical Science and Public Health
Tel.: 0-24415245-6 (2229)	E-mail: panida.chn@mahidol.ac.th
4.2.7 Kewwaree Hommuang, DVM	Department of Veterinary Clinical Science and Public Health
Tel.: 0-24415245 (2210)	E-mail: kewwaree.hom@mahidol.edu
4.2.8 Wongsakorn Wongwadhunyoo, DVM	The Monitoring and Surveillance Center for Zoonotic Diseases in Wild-life and Exotic Animals
Tel.: 0-24415245-6 (1917)	E-mail: wongsakorn.won@mahidol.ac.th
4.2.9 Thanakhorn Rawangsue	Veterinary Diagnosis Center
Tel.: 0-24419342 (1803)	E-mail: thanakhorn.raw@mahidol.ac.th

5. Semester/Class Level

5.1 Semester 2 / Class Level 5

5.2 Number of Students Allowed Approximately 80 Students

6. Pre-requisite

VSPA 316, VSCL 443

7. Co-requisites

N/A

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

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

29th May 2020

Section 2 Aims and Objectives

1. Course Goals

Learning experiences organization for students to explain international standard in laboratory animal care and use, relevant regulations and laws, and disease prevention and surveillance in laboratory animal facilities. Students can explain differences in diseases biology and pathology, method of anesthesia, and pain assessment and management in laboratory animals. Students can perform basic procedures in laboratory animal humanely, assess risks and design animal care and use protocol for research appropriately.

Objectives /Goals of Course Management:

1. Explain from an instructor's intention in a broad perspective of principles, knowledge and skills related to the field of study and consider what skills the course responsible person aims to develop so that the learners can apply those skills for further studies and further careers (in correspondence with requirements at the program level).
2. Course goals will determine the course description accordingly.

2. Objectives of Course Development/Revision

2.1 Course Objectives

This course aims to provide knowledge and abilities as follows:

- 2.1.1 International standard in laboratory animal care and use ethically, relevant laws and regulations, and disease prevention and surveillance in laboratory animal facilities.
- 2.1.2 Disease biology, etiology, and pathology, prevention systems, and pain managements.
- 2.1.3 Basic procedures performance in laboratory animal humanely.

Course Objectives:

- A. Explain from the perspective of the course responsible person on the knowledge, understanding, skills, abilities, responsibilities and characteristics of the learners that the course needs to develop in order to achieve the course goals (as specified in Item 2.1).
- B. Course Objectives may be defined in accordance with educational domains including
 - 1) Cognitive Domain: Cognitive Domain: What knowledge and understanding do the learners need?
 - 2) Affective Domain: What attitudes do the learners need?
 - 3) Social Domain [*Communication & Collaboration / Work with Team*]
 - What communication skills do the learners need?
 - What skills do the learners need to collaborate/work with other?
 - 4) Psychomotor Domain: What kinds of psychomotor skills do learners need?

2.2 Course-level Learning Outcomes: CLOs

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

1. CLO1 To explain international standard in laboratory animal care and use ethically, relevant laws and regulations, and disease prevention and surveillance in laboratory animal facilities.
2. CLO2 To illustrate differences in diseases biology and pathology in laboratory animals.
3. CLO3 To opt methods of anesthesia and pain management in laboratory animals appropriately.
4. CLO4 To perform basic procedures in laboratory animals humanely.

5. CLO5 To assess the risk associated with operations involving laboratory animals.
6. CLO6 To design animal care and use protocol for research appropriately.

Section 3 Course Description and Implementation

1. Course Description

จรรยาบรรณ แนวปฏิบัติในการใช้สัตว์ทดลองตามมาตรฐานสากล การเขียนขอใช้สัตว์ทดลอง ชีววิทยาและโรคของสัตว์ทดลอง การจัดการ การเฝ้าระวัง การวินิจฉัย การควบคุมโรค และการดูแลทางการแพทย์โดยสัตวแพทย์ การระงับความเจ็บปวดและการวางยาสลบ อาชีวอนามัยและความปลอดภัยของบุคลากร เทคนิคพื้นฐานในการปฏิบัติต่อสัตว์ทดลอง

Ethics and welfare, international standard and protocol writing for the laboratory animal care and use; biology and diseases of laboratory animals, veterinary care, pain management and anesthesia; occupational health and safety of personnel; basic techniques and procedures in laboratory animals

The course description should reflect the course goals, and it is a concept-based description instead of a teaching topic to facilitate the flexibility of adjusting the lesson plan to keep pace with changes.

2. Number of hours per semester

Theory (hours)	Practice (hours)	Self-study (hours)
30	45	75

3. Number of Hours per Week for Individual Advice

Contacting lecturer through course coordinators an hour per week

Identify the following information: The process or method that the person in-charge uses and time allocated for individual students

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 To explain international standard in laboratory animal care and use ethically, relevant laws and regulations, and disease prevention and surveillance in laboratory animal facilities.
2. CLO2 To illustrate differences in diseases biology and pathology in laboratory animals.

3. CLO3 To opt methods of anesthesia and pain management in laboratory animals appropriately.
4. CLO4 To perform basic procedures in laboratory animals humanely.
5. CLO5 To assess the risk associated with operations involving laboratory animals.
6. CLO6 To design animal care and use protocol for research appropriately.

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		
	Lecture	Practice	Individual work	Group work	MCQ	Practice exams	Presentation
CLO1	/	x	/	x	/	x	x
CLO2	/	x	x	x	/	x	x
CLO3	/	/	x	x	/	x	x
CLO4	/	/	x	x	/	/	x
CLO5	/	/	x	/	/	x	/
CLO6	/	/	x	/	x	x	/

SECTION 5 LESSON PLAN AND EVALUATION

1. Lesson Plan

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
1	- Course orientation - Laws, regulations, guidelines, and ethics - IACUC functions & protocol reviews	2	0	Lecture: ppt	Wantanee Rat-tanasak, DVM
2	- Animal models - Occupational Health and Zoonoses	2	0	Lecture: ppt	Yada Akkhawat-tanangkul, DVM
3	Animal protocol writing	2	0	Lecture: ppt and practice in animal protocol writing	Yada Akkhawattanangkul, DVM

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
4	Veterinary medical care program I & II	3	0	Lecture: ppt	Yada Akkha-wattanangkul, DVM
5	Lab animal seminar	3	0	Group discussion	All lecturers
6	- Lab animal diseases I (rodents and lagomorphs) - Lab animal diseases I (rodents and lagomorphs)	4	0	Lecture: ppt	Yada Akkhawat-tanangkul, DVM
7	Lab animal diseases III (cont'd)	2	0	Group discussion with animal protocol writing group advisor	Yada Akkha-wattanangkul, DVM
8	NHPs (Biology and diseases)	2	0	Lecture: ppt Group discussion Practice in experimental methods	Yada Akkhawat-tanangkul, DVM
9	- Lab animal diseases IV (carnivores, swine, ruminants) - Aquatic lab animals in research	4	0	Lecture: ppt	Yada Akkhawat-tanangkul, DVM
10	Laboratory mice/rats receiving and husbandry	0	6	Demonstration and Laboratory practice	All lecturers
11	Animal husbandry and daily care in laboratory mice and rats	0	6	Demonstration and Laboratory practice	All lecturers
12	Basic techniques: restraint, sample collection, fluid and drug administration in mouse/rat models	0	6	Demonstration and Laboratory practice	All lecturers
13	- Pain management - Anesthesia and euthanasia	3	0	Lecture: ppt	Yada Akkhawat-tanangkul, DVM

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
14	Basic techniques: restraint, sample collection, fluid, and drug administration in mice (lived)	0	6	Demonstration and Laboratory practice	All lecturers
15	Basic techniques: restraint, sample collection, fluid, and drug administration in rats (lived)	0	6	Demonstration and Laboratory practice	All lecturers
16	Anesthesia (induction, anesthetic monitoring), euthanasia, and necropsy in mice (lived)	0	6	Demonstration and Laboratory practice	All lecturers
17	Anesthesia (induction, anesthetic monitoring), euthanasia, and necropsy in rats (lived)	0	6	Demonstration and Laboratory practice	All lecturers
18	Facility tour	0	3	Lecture: group work	Yada Akkhawat-tanangkul, DVM
19	Animal protocol presentation	3:00	0	Group discussion: ppt	All lecturers
	Total hours of the entire semester	30:00	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 presenta- tion	Individual work presentation	Practice exams	
CLO1 To explain international standard in laboratory animal care and use ethically, relevant laws and regulations, and disease prevention and surveillance in laboratory animal facilities.	14	-	4	-	18
CLO2 To illustrate differences in diseases biology and pathology in laboratory animals.	42	6	-	-	48
CLO3 To opt methods of anesthesia and pain management in laboratory animals appropriately.	7	-	2	-	9
CLO4 To perform basic procedures in laboratory animals humanely.	-	-	-	10	10
CLO5 To assess the risk associated with operations involving laboratory animals.	7	-	-	-	7
CLO6 To design animal care and use protocol for research appropriately.	-	8	-	-	8
รวม	70	14	6	10	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) Institute of Laboratory Animal Resources (ILAR), Guide for the Care and Use of Laboratory Animals. 8th ed. National Research Council: National Academy Press; 2011.
- 2) Clough G. Quality in laboratory animals. In: Tuffery AA, editors. Laboratory Animals: An introduction for new experimenters. Chichester: Wiley-Interscience; 1987. p79-97.

- 3) Lynn C. Anderson, Glen Otto, Kathleen R. Pritchett-Corning, Mark T. Whary and James G. Fox. Laboratory animal medicine. 3rd ed. Elsevier Inc; 2015
- 4) Olfert ED, Gross BM, McWilliam AA. Guide to the care and use of experimental animal. Canadian Council on Animal Care.1993
- 5) Wilson MS. Principles of animal husbandry. In: Tuffery AA, editors. Laboratory Animals: An introduction for new experimenters. Chichester: Wiley-Interscience; 1987. p99-116.
- 6) Barnett SW, editors. Manual of animal technology. Oxford, UK: Blackwell Publishing; 2007.
- 7) Svendsen P, Hau J. Handbook of laboratory animal science. Vol. 1. Boca Raton, FL: CRC press; 1994.
- 8) Stephen W. Barthold, Stephen M. Griffey, Dean H. Percy. Pathology of Laboratory Rodents and Rabbits, 4th Edition. Wiley-Blackwell; 2016.
- 9) Centers for disease control and prevention, National institutes of health. Biosafety in microbiological and biomedical laboratory. 5th edition. HHS Publication No. (CDC) 21-1112; 2009.
- 10) Paul F. Laboratory animal anaesthesia. Fourth edition. Elsevier Inc; 2016.
- 11) Cholawat P, Jennifer C.M. Handbook of laboratory animal anesthesia and pain management: rodents. Taylor&Francis Group. 2017.

2. Suggested Materials

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3. Other Resources (if any)

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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	PLOs							
Lab animal medicine	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
(Course Code) VSCL458	P	P		R	P		R	R

Remarks: Show the level of the course management with the symbols I, R, P, and M. This must correspond to the curriculum mapping written in the TQF2

Table 2 Relations between CLOs and PLOs

(Course Code) VSCL458	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1 To explain international standard in laboratory animal care and use ethically, relevant laws and regulations, and disease prevention and surveillance in laboratory animal facilities.	1.1	2.6		4.3			7.1 7.2 7.3	8.1 8.2 8.3
CLO2 To illustrate differences in diseases biology and pathology in laboratory animals.	1.1 1.2	2.5 2.6		4.3			7.1 7.2 7.3	8.1 8.2 8.3
CLO3 To opt methods of anesthesia and pain	1.2	2.2 2.3 2.6		4.3			7.1 7.2 7.3	8.1 8.2 8.3

management in laboratory animals appropriately.								
CLO4 To perform basic procedures in laboratory animals humanely.		2.1 2.2 2.3 2.5 2.6						8.1 8.2 8.3
CLO5 To assess the risk associated with operations involving laboratory animals.				4.3	5.2 5.3 5.4			8.3
CLO6 To design animal care and use protocol for research appropriately.	1.2			4.3	5.2 5.3 5.4		7.1 7.2 7.3	8.3