



Program: Doctor of Veterinary Medicine
Course title.... Aquatic Animal Medicine.....
Course code..... VSCL 554.....

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 ๕๕๔	เวชศาสตร์สัตว์น้ำ
In English	VSCL 554	Aquatic Animal Medicine

2. Number of Credits

4 (3 – 3 - 7)
(Theory 3 hrs. Practice 3 hrs. Self-Study 7 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

Asst.Prof.Dr.Wanna Sirimanapong 02-4415242 ext.1520 wanna.sir@mahidol.ac.th
Dr.Prawporn Thaijongrak 02-4415242 prawporn.tha@mahidol.ac.th

4.2 Lecturers

Asst.Prof.Dr.Wanna Sirimanapong
Dr.Prawporn Thaijongrak
Dr.Kan Kledmanee
Asst.Prof.Dr.Prapansak Srisapoome
Dr.Watchara Sakornwimon
Dr.Komsin Sahatrakul
Mr.Pornpun Yuthraksanukul

5. Semester/Class Level

5.1 Semester 1 / Class Level 5

5.2 Number of Students Allowed Approximately 80 Students

6. Pre-requisite

VSPA 223, VSPA 315, VSPA 436



Program: Doctor of Veterinary Medicine
Course title.... Aquatic Animal Medicine.....
Course code..... VSCL 554.....

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

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

Day.....22.....Month.....February.....Year...2020.....

Section 2 Aims and Objectives

1. Course Goals

1. Explain water quantity management systems, aquatic production and aquatic diseases related to mismanagement that impacts on animal health and the environment.
2. Explain pathogenesis, diagnosis, treatment, and prevention of common diseases in various aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians, and marine mammals.
3. Explain diagnosis, medication, nutrition, immunology Toxicology in aquatic animals
4. Explain ethics and veterinary jurisprudence in aquatic animal medicine

2. Objectives of Course Development/Revision

2.1 Course Objectives

This course aims to provide knowledge and abilities as follows:

To provide the students with an understanding of aquatic diseases caused by pathogens, poor water quality and mismanagement leading to diagnosis, treatment, and control of diseases in aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians, and marine mammals. as well as legal issues related to business, conservation, and ethics in working in aquatic animals.

2.2 Course-level Learning Outcomes: CLOs

On completion of the course, the students will be able to 6 CLOs

1. CLO1 Explain the anatomy, physiology, histology, pathology, and histology of aquatic diseases.
2. CLO2 Analyze and interpret results of water quality related to management
3. CLO3 Explain life support system in aquatic animal
4. CLO4 Explain pathogenesis of common diseases in aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians, and marine mammals.



Program: Doctor of Veterinary Medicine
 Course title.... Aquatic Animal Medicine.....
 Course code..... VSCL 554.....

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

5. CLO5 Explain diagnosis, treatment, and control of aquatic diseases
- 6 CLO6 Veterinary skill practice in aquatic animals; diagnosis and treatment in aquatic medicine and techniques in basis surgery in aquatic animals.

Section 3 Course Description and Implementation

1. Course Description

(Thai) การจัดการคุณภาพดินและน้ำ ระบบพียงชีวิต ระบบภูมิคุ้มกัน การวินิจฉัย รักษาและควบคุม โรคปรสิต โรคติดเชื้อ และไม่ติดเชื้อ ปัญหาโภชนาการในปลา กุ้ง หอย เต่า และสัตว์ครึ่งบกครึ่งน้ำ พิษวิทยาของสัตว์น้ำ เทคนิคการบริหารยา การวางยาสลบและ ศัลยกรรมในปลา คุณธรรมและจริยธรรมในการประกอบวิชาชีพสัตวแพทย์

(English)

Soil and water quality management, life support system, immunology, diagnosis, treatment and control of parasitic disease, infectious and non-infectious diseases, nutritional disorder in fish, shrimp, shellfish, turtle and amphibian, toxicology, drug administration, general anesthesia and surgery in fish, ethics, and veterinary jurisprudence

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)
45 (15x3)	45 (15x3)	45 (15x3)

3. Number of Hours per Week for Individual Advice

5 hours per week

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



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

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

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 Explain the anatomy, physiology, histology, pathology, and histology of aquatic diseases.
2. CLO2 Analyze and interpret results of water quality related to management
3. CLO3 Explain life support system in aquatic animal
4. CLO4 Explain pathogenesis of common diseases in aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians, and marine mammals.
5. CLO5 Explain diagnosis, treatment, and control of aquatic diseases
6. CLO6 Veterinary skill practice in aquatic animals; diagnosis and treatment in aquatic medicine and techniques in basis surgery in aquatic animals.

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	Laboratory Practice	Group discussion	Farm practice	Case assignment	MCQ	Behavior assessment in group work	Group and/or individual Reports	Group presentation
CLO1	x	x				x	x		
CLO2	x	x	x	x		x	x	x	x
CLO3	x			x		x	x		x
CLO4	x	x				x	x	x	x
CLO5	x	x	x	x	x	x	x	x	x
CLO6	x	x	x	x	x	x	x	x	x



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

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

SECTION 5 LESSON PLAN AND EVALUATION

1. Lesson Plan

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
1	Disease, diagnosis, treatment, and prevention of infectious diseases in fish	3	3	Lecture: ppt Demonstration and Laboratory practice/Form practice/Case assignment	Wanna Sirimanapong
2	Disease, diagnosis, treatment, and prevention of parasite diseases in fish	3	3	Lecture: ppt Demonstration and Laboratory practice/Farm practice/Case assignment	Wanna Sirimanapong
3	Disease, diagnosis, treatment, and prevention of non-infectious diseases in fish	3	3	Lecture: ppt Demonstration and Laboratory practice/Farm practice/Case assignment	Wanna Sirimanapong
4	Anesthesia and surgery in fish	3	3	Lecture: ppt Laboratory practice	Wanna Sirimanapong
5	water quality management in aquatic animal	3	3	Lecture: ppt Laboratory practice/Farm practice	Pornpun Yuthraksanukul
6	The role of veterinarians in aquatic animal	3	3	Lecture: ppt Group discussion/Case assignment	Wanna Sirimanapong
7	Life support system in aquatic animal	3	3	Lecture: ppt Farm practice	Komsin Sahatrakul
8	Diagnosis, treatment, and prevention of shrimp diseases; Shrimp Biology, Anatomy and Histology for Pathology	3	3	Lecture: ppt Laboratory practice/Case assignment	Prawporn Thaijongrak
9	Diseases, diagnosis,	3	3	Lecture: ppt	Prapansak Srisapoom



Academic degree level ☒ Bachelor ☐ Graduate Diploma ☐ Master

☐ Higher Graduate Diploma ☐ Doctor

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

Faculty / College / Institute: Faculty of Veterinary Science

Department of Clinical Sciences and Public Health

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
	treatment and prevention of prawn (<i>Macrobrachium spp.</i>) diseases			Laboratory practice/Case assignment	
10	Diagnosis, treatment, and prevention of shrimp diseases	3	3	Lecture: ppt Laboratory practice/Farm practice	Prawporn Thajongrak
11	Anatomy and histology of shrimp diseases	3	3	Lecture: ppt Laboratory practice	Prawporn Thajongrak
12	Diseases, diagnosis, treatment, and prevention of mollusk diseases	3	3	Lecture: ppt Laboratory practice	Wanna Sirimanapong
13	Diseases, diagnosis, treatment, and prevention of chelonians diseases	3	3	Lecture: ppt Group discussion	Wanna Sirimanapong
14	Diseases, diagnosis, treatment, and prevention of amphibian diseases	3	3	Lecture: ppt Group discussion	Wanna Sirimanapong
15	Diseases, diagnosis, treatment, and prevention of marine mammal diseases	3	3	Lecture: ppt Group discussion	Watchara Sakornwimon
	Total hours of the entire semester	45	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.



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

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

B. Summative Assessment

(1) Tool and weight for measurement and evaluation

Learning Outcomes	Evaluation Method*				Weight (Percentage)
	MCQ	Behavior assessment in group work	Group and/or indi- vidual Reports	Group presentation	
CLO1 Explain the anatomy, physiology, histology, pathology, and histology of aquatic diseases.	10	1	5	4	20
CLO2 Analyze and interpret results of water quality related to management	5	1	2	2	10
CLO3 Explain life support system in aquatic animal	5	1		4	10
CLO4 Explain pathogenesis of common diseases in aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians, and marine mammals.	15	1	5	4	25
CLO5 Explain diagnosis, treatment, and control of aquatic diseases	15	1	5	4	25
CLO6 Veterinary skill practice in aquatic animals; diagnosis and treatment in aquatic medicine and techniques in basic surgery in aquatic animals.	5	1	2	2	10
รวม	55	6	19	20	100



Program: Doctor of Veterinary Medicine
Course title.... Aquatic Animal Medicine.....
Course code..... VSCL 554.....

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

(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.



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

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

Section 6 Teaching Resources

1. Required Texts

- 1) Albert GJ. Tacon. Standard methods for the nutrition and feeding of farmed fish and shrimp. Vol. 1. Redmond: Argent Laboratory Press; 1990.
- 2) Bell TA, Lightner DV. A Handbook of Normal Shrimp Histology. Kansas: World Aquaculture Society; 1988.
- 3) Bell TA, Lightner DV. Chemotherapy in aquaculture today-current practice in shrimp culture: available treatments and their efficacy. In: Michel C, Alderman DJ, editors. Chemotherapy in aquaculture: from theory to reality. Paris: Office International des Epizooties; 1992. p. 45-57.
- 4) Boyd CD. Water quality management for pond fish culture. New York: Elsevier; 1982.
- 5) Brettelin M. Immunity in invertebrates. Berlin: Springer-Verlag; 1986.
- 6) Brown L. Aquaculture for veterinarians, fish husbandry and medicine. New York: Pergamon Press; 1993.
- 7) Dierauf LA, Gullend FMD, editors. Marine Mammal Medicine. 2nd ed. USA: CRC Press; 2001.
- 8) Goldstein R. Disease of aquarium fishes. New Jersey: TFH Publications; 1971.
- 9) Johnson SK. Handbook of shrimp diseases. Texas: Texas A&M University; 1990.
- 10) Mader DR. Reptile medicine and surgery. Philadelphia: Saunders; 2005.
- 11) McArthur S. Veterinary management of tortoises and turtles. USA: Blackwell Science; 1996.
- 12) Noga EJ. Fish diseases diagnosis and treatment. St. Louis: Mosby Year Book; 1996.
- 13) Plumb DC. Veterinary drug handbook. Minnesota: Pharma Vet. Publications; 1991.
- 14) Robert RJ. Fish pathology. New York: Macmillan Publishing; 1978.
- 15) Stickney RR. Encyclopedia of aquaculture. Texas: Wiley-Interscience Publication; 2000.
- 16) Stoskopf MK. Fish medicine. Pennsylvania: W.B.Saunders; 1993.
- 17) Wildgoose WH. BSAVA manual of ornamental fish. 2nd ed. Gloucester: BSAVA Press; 2001.

2. Suggested Materials

- 1) Handout fish disease
- 2) Handout fish anesthesia and surgery
- 3) Handout fish diagnosis and treatment
- 4) Handout shrimp disease
- 5) Handout shrimp diagnosis and treatment



Program: Doctor of Veterinary Medicine
Course title.... Aquatic Animal Medicine.....
Course code..... VSCL 554.....

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

6) Aquatic Animal Medicine Laboratory handout

3. Other Resources (if any)

-

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



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

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

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 Aquatic Animal Medicine	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
(Course Code) VSCL 554	R/P	P	P/R					

Table 2 Relations between CLOs and PLOs

(Course Code) VSCL554	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1 Explain the anatomy, physiology, histology, pathology, and histology of aquatic diseases	1.2							



Academic degree level ☒ Bachelor ☐ Graduate Diploma ☐ Master

☐ Higher Graduate Diploma ☐ Doctor

Program: Doctor of Veterinary Medicine

Course title.... Aquatic Animal Medicine.....

Course code..... VSCL 554.....

Faculty / College / Institute: Faculty of Veterinary Science

Department of Clinical Sciences and Public Health

CLO2 Analyze and interpret results of water quality related to management			3.1					
CLO3 Explain life support system in aquatic animal			3.1					
CLO4 Explain pathogenesis of common diseases in aquatic animals such as fish, crustaceans, turtles, crocodiles, amphibians and marine mammals.			3.1					
CLO5 Explain diagnosis, treatment and control of aquatic diseases	1.2							
CLO6 Veterinary skill practice in aquatic animals; diagnosis and treatment in aquatic medicine and techniques in basic surgery in aquatic animals.		2.1-2.3						