



Program: Doctor of Veterinary Medicine
Course title: Veterinary Systemic Pharmacology....
Course code: VSPA 328

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

TQF 3 Course Specification

Section 1 General Information

1. Course Code and Title

In Thai: สปส ๓๒๘ เกษัตริย์วิทยาตามระบบทางการสัตวแพทย์
In English: VSPA 328 Veterinary Systemic Pharmacology

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

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4.2 Lecturers

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4.3 Staff	
4.3.1. Miss. Arunee Jangsangthong	Department of Pre-Clinic and Applied Animal Science
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4.3.2. Mr. Paladorn Donphaw	Department of Pre-Clinic and Applied Animal Science
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5. Semester/Class Level

5.1 Semester 2 / Class Level 3

5.2 Number of Students Allowed Approximately 80 Students

6. Pre-requisite

VSPA 327 Principles of Veterinary Pharmacology

VSPA 334 Veterinary General Pathology

7. Co-requisites

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

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

Day 1 Month April Year 2022

Section 2 Aims and Objectives

1. Course Goals

This course aims to provide knowledge and broad perspective of principles of veterinary pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, terminology and drug calculation, Good Manufacturing Practice (GMP), drug management in animal hospital, principles of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, immune modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy antimicrobial resistance problem and rationale drug use and current topics in pharmacology

2. Objectives of Course Development/Revision

2.1 Course Objectives

This course aims to provide knowledge and abilities as follows:

1. The principle of terminology in pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, drug calculation, Good Manufacturing Practice (GMP) and drug management in animal hospital

2. The basic drug preparation and extemporaneous preparation in veterinary medicine
3. The principle of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, immuno-modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy, antimicrobial resistance problem and rationale drug use and current topics in pharmacology
4. The experimental toxicology, drug residue test, Oxidative stress and antioxidant test
5. The antimicrobial susceptibility testing

2.2 Course-level Learning Outcomes: CLOs

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

1. CLO1 Explain the principle of terminology in pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, drug calculation, Good Manufacturing Practice (GMP) and drug management in animal hospital
2. CLO2 Practice the basic drug preparation and extemporaneous preparation in veterinary medicine
3. CLO3 Explain the principle of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, immuno-modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy, antimicrobial resistance problem and rationale drug use and current topics in pharmacology
4. CLO4 Practice the experimental toxicology, drug residue test, Oxidative stress and antioxidant test
5. CLO5 Practice the antimicrobial susceptibility testing, AST

Section 3 Course Description and Implementation

1. Course Description

เภสัชวิทยาทางสัตวแพทย์ของยาที่ออกฤทธิ์ตามระบบประสาทอัตโนมัติ ประสาทส่วนกลาง หัวใจและหลอดเลือด ทางเดินหายใจ ทางเดินอาหาร ต่อมไร้ท่อ ยาออกฤทธิ์ต่อผิวหนังและดวงตา ยาต้านจุลชีพ หลักเกณฑ์การเลือกใช้ การตอบสนองและดื้อยา ยาต้านเชื้อรา ไวรัส และปรสิต ยาเคมีบำบัด ยาออกฤทธิ์ต่อระบบภูมิคุ้มกัน ยาปรับพฤติกรรมสัตว์ สารน้ำ และสมุนไพรทางสัตวแพทย์

Veterinary pharmacology of systemic drugs including the autonomic and central nervous, cardiovascular, respiratory, gastrointestinal, endocrine systems; the dermatologic and ophthalmic drugs, antimicrobial agents, rationale use, susceptibility and resistance of antimicrobials; the antifungal, antiviral, anti-parasitic drugs, chemotherapy, immune-modulating agents; the animal behavior-modifying drugs, fluid therapy and the veterinary herbal medicine

2. Number of hours per semester

Theory	Practice	Self-study
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(hours)	(hours)	(hours)
45	45	105

3. Number of Hours per Week for Individual Advice

1 hour per week

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 principle of terminology in pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, drug calculation, Good Manufacturing Practice (GMP) and drug management in animal hospital
2. CLO2 Practice the basic drug preparation and extemporaneous preparation in veterinary medicine
3. CLO3 Explain the principle of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, immuno-modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy, antimicrobial resistance problem and rationale drug use and current topics in pharmacology
4. CLO4 Practice the experimental toxicology, drug residue test, Oxidative stress and antioxidant test
5. CLO5 Practice the antimicrobial susceptibility testing

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	Assignment	Presentation	Demonstration	Practice	Role model	Attention	Behavior assessment	Group work	Individual work	Presentation	Paper exam	Practice exam
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	Lab1:Terminology and drug calculation		3	ppt and lab handout, demonstration	AL et al
2	Lab 2:Drug administration and dosage forms		3	ppt and lab handout, demonstration	AL et al
3	Lab 3:Good Manufacturing Practice (GMP)		6	ppt and lab handout, study trip	AL et al
4	Introduction to antimicrobial agents	1		Lecture: ppt and handout	BC
5	Antibiotics I (penicillins, cephalosporins)	2		Lecture: ppt and handout	SB

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
	Antibiotics II (aminoglycosides, quinolones)				
6	Antibiotics II (aminoglycosides, quinolones)	2		Lecture: ppt and handout	SB
7	Antibiotics III (sulfonamides and tetracyclines, macrolides and lincosamides, miscellaneous)	2		Lecture: ppt and handout	AL
8	Antimicrobial resistance problem	1		Lecture: ppt and handout	SB
9	Anti-parasitic drug	3		Lecture: ppt and handout	AL
10	Antiviral drug	1		Lecture: ppt and handout	AL
11	Lab 4: Antibiotic susceptibility test		3	ppt and lab handout, Laboratory practice	SB et al
12	Antifungal drugs	1		Lecture: ppt and handout	AL
13	Rationale Drug Use	1		Lecture: ppt and handout	SB
14	Lab 5: Drug preparations I		3	ppt and lab handout, Laboratory practice	SB et al
15	Drug affecting CNS I	1		Lecture: ppt and handout	BC
16	Drug affecting CNS II	3		Lecture: ppt and handout	BC, DC
17	Drug affecting ANS	2		Lecture: ppt and handout	AL
18	Lab 6: Drug preparations II		3	ppt and lab handout, Laboratory practice	SB et al
19	Drugs affecting endocrine system I	2		Lecture: ppt and handout	BC, SK
20	Drugs affecting endocrine system II	2		Lecture: ppt and handout	PY, SM

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
21	Lab 7: Drug residue test		3	ppt and lab handout Laboratory practice	BC et al
22	Immuno-modulating agents	2		Lecture: ppt and handout	SB
23	Dermatologic drugs	2		Lecture: ppt and handout	AL
24	GI drug	2		Lecture: ppt and handout	PY
25	Ophthalmic drugs	1		Lecture: ppt and handout	AL
26	Veterinary herbal medicine	2		Lecture: ppt and handout	SB
27	Cancer chemotherapy in veterinary medicine	2		Lecture: ppt and handout	BC, PS
28	Lab 8: Pharmacokinetics & Pharmacodynamics		3	ppt and lab handout, Group discussion	PY et al
29	Cardiovascular drugs	3		Lecture: ppt and handout	PY, WS
30	Lab 9: Extemporaneous preparation in veterinary medicine		3	ppt and lab handout, Laboratory practice	BC et al
31	Current topics in pharmacology	2		Lecture: ppt and handout	SB et al
32	Lab 10: Oxidative stress and antioxidant		3	ppt and lab handout, Laboratory practice	PY et al
33	Lab 11: Veterinary herbal medicine		6	ppt and lab handout, Laboratory practice, study trip	BC et al
34	Drug affecting respiratory system	2		Lecture: ppt and handout	AL
35	Behavior-modifying agents	1		Lecture: ppt and handout	SB
36	Lab 12: Experimental toxicology		3	ppt and lab handout, Laboratory practice	BC et al
37	Fluid therapy	2		Lecture: ppt and handout	PY

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
38	Lab 13: Drug management in animal hospital		3	ppt and lab handout, Laboratory practice, Group discussion	GW et al

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)
	Attention & Behavior assessment	Group work	Individual work	Paper exam	Practice exam	
CLO1 Explain the principle of terminology in pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, drug calculation, Good Manufacturing Practice (GMP) and drug management in animal hospital	0.2	2	3	-	1.1	6.3
CLO2 Practice the basic drug preparation and extemporaneous preparation in veterinary medicine	0.1	3	-		0.9	4
CLO3 Explain the principle of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, im-	2	-	1	81	0.3	84.3

muno-modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy, antimicrobial resistance problem and rationale drug use and current topics in pharmacology						
CLO4 Practice the experimental toxicology, drug residue test, Oxidative stress and antioxidant test	0.1	3	-	-	0.9	4
CLO5 Practice the antimicrobial susceptibility testing	0.1	-	1	-	0.3	1.4
รวม	2.5	8	5	81	3.5	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 processed 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) Jim E. Riviere, Mark G. Papich . Veterinary Pharmacology and Therapeutics, 9th Edition. Wiley-Blackwell, USA. 2009. ISBN: 978-0-8138-2061-3.
- 2) Maddison JE, Page SW, Church D. Small animal clinical pharmacology. 2nd ed. Saunders WB., London; 2008.
- 3) Rang HP, Dale MM, Ritter JM. Pharmacology. 5th ed. Churchill Livingstone, Edinburgh, 2003
- 4) Carruthers SG, Hoffman BB, MelmonKL,etal. Melmon and Morrelli' s Clinical Pharmacology Basic Principles in Therapeutics. 4th ed. Boston, McGraw – Hill, 2000.
- 5) Hardman JG, Goodman Gilman A, Limbird LE. Goodman & Gilman' s The pharmacological basis of therapeutics. 12th ed. New York: The McGraw-Hill, 2011.
- 6) Hacker M, Bachman K, Messer W. Pharmacology principle and practice. Elsevier Inc., California, USA. 2009.
- 7) Katzung BG. Basic and clinical pharmacology. 11th ed McGraw-Hill Companies Inc., Singapore; 2009.
- 8) Luca G, Lars BJ, Hilde K. Guide to Antimicrobial Use in Animals. Blackwell Publishing Ltd, USA. 2008.
- 9) Michelle AC, Richard AH, Richard F, Jose AR, Karen W. Lippincott's Illustrated Reviews: Pharmacology, 5th ed. Lippincott Williams & Wilkins, USA. 2012.
- 10) Heinz L, Klaus M, Lutz H, Detlef B. Color Atlas of Pharmacology. 3rd ed. Georg Thieme Stuttgart, Germany. 2005.

2. Suggested Materials

- 1) Equipment for drug administration, dosage forms, drug label, leaflet
- 2) Herbal drug and plant samples
- 3) video clip

3. Other Resources (if any)

Journal and published paper, Research online database such as pubmed, ScienceDirect etc.

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 Veterinary Systemic Pharmacology	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
(Course Code) VSPA 328	R, P	R	-	-	-	-	--	-

Table 2 Relations between CLOs and PLOs

(Course Code)	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1 Explain the principle of terminology in pharmacology, pharmacokinetics & pharmacodynamics, drug administration, dosage forms, drug label, leaflet, drug calculation, Good Manufacturing Practice	R, P	R	-	-	-	-	-	-

(GMP) and drug management in animal hospital								
CLO2 Practice the basic drug preparation and extemporaneous preparation in veterinary medicine	R, P	R	-	-	-	-	-	-
CLO3 Explain the principle of antimicrobial agents, antifungal drugs, antiviral drug, anti-parasitic drug, drug affecting autonomic nervous system and central nervous system, immuno-modulating agents, cardiovascular drugs, drugs affecting endocrine system, fluid therapy antimicrobial resistance problem and rationale drug use and current topics in pharmacology	R	R	-	-	-	-	-	-
CLO4 Practice the experimental toxicology, drug residue test, Oxidative stress and antioxidant test	R, P	R	-	-	-	-	-	-
CLO5 Practice the antimicrobial susceptibility testing	R, P	R	-	-	-	-	-	-