



Program: Doctor of Veterinary Medicine
Course title Veterinary Research Methodology
Course code VSPA 305.

Academic degree level ☒ Bachelor ☐ Graduate Diploma ☐ Master
☐ Higher Graduate Diploma ☐ Doctor
Faculty / College / Institute: Faculty of Veterinary Science
Department of Preclinic and Applied animal science

TQF 3 Course Specification

Section 1 General Information

1. Course Code and Title

In Thai สพปส ๓๐๕ ระเบียบวิธีวิจัยทางการสัตวแพทย์
In English VSPA 305 Veterinary Research Methodology

2. Number of Credits

2 (2-0-4)
(Theory 2 hrs. Practice 0 hrs. Self-Study 4 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

1. Asst. Prof. Dr. Surasak Jittakhot Department of Preclinic and Applied animal science
Tel. 086-888-9352 E-mail : surasak.jit@mahidol.edu
2. Assistant Lecturer Koramit Jenjirawatn Department of Preclinic and Applied animal science
Tel. 086-330-1115 E-mail : koramit.jen@mahidol.edu

4.2 Lecturers

1. Assoc. Prof. Dr. Kampon Kaewket Department of Clinical Sciences and Public Health
Tel. 081-655-8273 E-mail : kampon.kae@mahidol.edu
2. Assoc. Prof. Dr. Jitkamol Thanasak Department of Clinical Sciences and Public Health
Tel. 081-343-4285 E-mail : jitkamol.tha@mahidol.edu
3. Assistant Lecturer Koramit Jenjirawatn Department of Preclinic and Applied animal science
Tel. 086-330-1115 E-mail : koramit.jen@mahidol.edu
4. Asst. Prof. Dr. Surasak Jittakhot Department of Preclinic and Applied animal science
Tel. 086-888-9352 E-mail : surasak.jit@mahidol.edu

5. Semester/Class Level

5.1 Semester 2 / Class Level 3
5.2 Number of Students Allowed Approximately 80 Students

6. Pre-requisite

SCGE 132 Decision Making using Principles of Statistics

7. Co-requisites

None

8. Study Site Location Faculty of Veterinary Science, Mahidol University**9. Date of Preparation/Latest Revision of the Course Specifications**

24 June 2022

Section 2 Aims and Objectives

1. Course Goals

Course provides the knowledges in concept, logic, and process of research methodology, ethic and research methodology in animal, experimental research statistics, clinical research statistics, statistic data analysis using computerized statistical program, applied information and communication technology (ICT) for searching, citing and referencing for veterinary research articles, scientific reporting and writing in veterinary research, basic preclinical and clinical knowledges for research methodology process according to the standard practice for veterinary professional.

2. Objectives of Course Development/Revision**2.1 Course Objectives**

This course aims to provide knowledge and abilities as follows:

Students are able to

1. Explain in concept, logic, process, and ethic in veterinary research.
2. Reveal the principles of biostatistics for veterinary research.
3. Describe the principles of hypothesis testing, statistic model, experimental study, clinical trial and calculating an appropriate sample size for veterinary research.
4. Perform statistical analysis using the SPSS program for selected experimental and clinical study in veterinary science.
5. Execute searching, citing and referencing for veterinary research articles using the Endnote program.
6. Carry out the principles of reporting and writing for veterinary research articles.

2.2 Course-level Learning Outcomes: CLOs

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

CLO1 Explain in concept, logic, process, and ethic in veterinary research.

CLO2 Reveal the principles of biostatistics for veterinary research.

CLO3 Describe the principles of hypothesis testing, statistic model, experimental study, clinical trial and calculating an appropriate sample size for veterinary research.

CLO4 Perform statistical analysis using SPSS program for selecting appropriate research model and clinical research in veterinary

CLO5 Execute searching, citing and referencing for veterinary research articles using the Endnote program.

CLO6 Carry out the principles of reporting and writing for veterinary research articles.

Section 3 Course Description and Implementation

1. Course Description

แนวความคิด ตรรกวิทยา และจรรยาบรรณด้านระเบียบวิธีวิจัย การตั้งสมมุติฐานงานวิจัย การใช้สัตว์ทดลองเพื่อการวิจัย เครื่องมือที่ใช้ในการวิจัย เทคนิคการสุ่มตัวอย่าง ชีวสถิติ การศึกษาวิจัยเชิงสังเกต การวางแผนการทดลอง การศึกษาวิจัยทางคลินิก หลักการวิเคราะห์ข้อมูลทางสถิติ การใช้เทคโนโลยีสารสนเทศในการวิเคราะห์และสืบค้นข้อมูล การรายงานและการเขียนรายงานวิจัยทางการสัตวแพทย์

Concepts, logics and ethics of research methodology, research hypothesis, animal use for research, materials for research, sampling techniques, biostatistics, observational study, experimental design, clinical research study, principles of data analysis, information technology for data analysis and searching, veterinary research reporting and writing.

2. Number of hours per semester

Theory (hours)	Practice (hours)	Self-study (hours)
30	0	60

3. Number of Hours per Week for Individual Advice

Students are anticipated to contact via course responsible lecturer for advised 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 in concept, logic, process, and ethic in veterinary research.
2. CLO2 Reveal the principles of biostatistics for veterinary research.
3. CLO3 Describe the principles of hypothesis testing, statistic model, experimental study, clinical trial and calculating an appropriate sample size for veterinary research.
4. CLO4 Perform statistical analysis using the SPSS program for selected experimental and clinical study in veterinary science.
5. CLO5 Execute searching, citing and referencing for veterinary research articles using the Endnote program.
6. CLO6 Carry out the principles of reporting and writing for veterinary research articles.

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	Individual work	Group work	MCQ	MEQ	Group reports	Individual reports
CLO1	/			/			
CLO2	/			/	/		
CLO3	/	/		/	/		/
CLO4	/	/		/	/		/
CLO5	/		/			/	
CLO6	/			/			

SECTION 5 LESSON PLAN AND EVALUATION

1. Lesson Plan

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
1	- Introduction to veterinary research - Meaning and importance of research - Philosophy of research; concept, logic and ethic - Tool and principle of ethical using laboratory animal in research - Trend of veterinary research	2:00		Lecture/ Slide Presentation/ Handout/ Individual reports	Assoc. Prof. Kampon
2	- Basic of biostatistics in research -Descriptive Statistics concept -Inferential Statistics concept -Parametric Statistics -Non Parametric Statistics -Parameter Scales -Normal and Free distribution testing; Shapiro Wilk Test, Kolmogorov Smirnov Test -Homogeneity of variance testing; Levene Test -Application of Microsoft Excel for principle statistics data collecting and process	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
3	- Principle and type of statistics in animal research -One tail hypothesis testing -Two tail hypothesis testing -P value calculation and its implication -Animal research experimental design	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
	-T Test; One sample T Test, Independent T test, Paired T Test -F Test; CRD, RCB, LSD, Cross Over Design, Factorial Arrangement Design and Repeated Measurement Design -Chi Square Test; Chi Square Test, Kolmogorov Smirnov test, Mann Withney Test, Kruskal Wallis Test, Friedman Test - Introduction to SPSS software for statistics analysis				
4	Using SPSS for statistical analysis in animal research (1) - One sample T Test, - Independent T test - Paired T Test - Application of SPSS software for T-test analysis	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
5	Using SPSS for statistical analysis in animal research (2) - Completely Randomized Design (CRD) - Randomized Completely Block Design (RCBD) - Latin Square Design (LSD) - Application of SPSS software for F-test analysis I	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
6	Using SPSS for statistical analysis in animal research (3) - Factorial Arrangement Design - Cross Over Design - Repeated Measurement Design - Application of SPSS software for F-test analysis II	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
7	Using SPSS for statistical analysis in animal research (4) -Chi Square Test - Kolmogorov Smirnov test - Mann Withney Test - Kruskal Wallis Test - Friedman Test	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
8	Using SPSS for statistical analysis in animal research (4) - Pearson 's correlation - Regression Analysis - Application of SPSS software for Chi square-test, correlation and regression analysis	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
9	Using SPSS for statistical analysis in animal research (4) - Cohort Risk Study - Case Control Study - Logistic Analysis	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak
10	Sample size calculating - using G-power to calculate sample size, effect size and sample collection -A priori analysis -Compromise analysis -Criterion analysis -Post Hoc analysis -Sensitivity analysis	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Asst. Prof. Dr. Surasak

Teaching Period	Topics/Details	Number of hours		Methods: Teaching Media	Lecturer
		Theory*	Practice**		
11	Searching scientific paper using Endnote	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Assistant lecturer Koramit
12	Citating and referencing scientific paper using Endnote	2:00		Lecture/ Slide Presentation/ Handout/ Individual report/ Personal computer	Assistant lecturer Koramit
13	Writing research report (1)	2:00		Lecture/ Slide Presentation/ Handout	Assoc. Prof. Dr. Jitkamol
14	Writing research report (2)	2:00		Lecture/ Slide Presentation/ Handout	Assoc. Prof. Dr. Jitkamol
15	Writing research report (3)	2:00		Lecture/ Slide Presentation/ Handout	Assoc. Prof. Dr. Jitkamol
	Total hours of the entire semester	30:00			

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	MEQ	Group re- ports	Individual reports	
CLO1 Explain in concept, logic, process, and ethic in veterinary research.		6			6
CLO2 Reveal the principles of biostatistics for veterinary research.	7	8		5	20
CLO3 Describe the principles of hypothesis testing, statistic model, experimental study, clinical trial and calculating an appropriate sample size for veterinary research.		15		5	20
CLO4 Perform statistical analysis using the SPSS program for selected experimental and clinical study in veterinary science.		20		7	27
CLO5 Execute searching, citing and referencing for veterinary research articles using the Endnote program.			10		10
CLO6 Carry out the principles of reporting and writing for veterinary research articles.	7	10			17
total	14	59	10	17	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. ธวัชชัย วรพงศ์ธร. หลักการวิจัยทางสาธารณสุขศาสตร์. พิมพ์ครั้งที่ 2. กรุงเทพฯ : โรงพิมพ์จุฬาลงกรณ์มหาวิทยาลัย, 2538.
2. มนต์ชัย ดวงจินดา. การใช้โปรแกรม SAS เพื่อการวิเคราะห์งานวิจัยทางสัตว. พิมพ์ครั้งที่ 2. ขอนแก่น : โรงพิมพ์คลังนาโนวิทยา, 2544.
3. Watson P. Statistics for Veterinary and Animal Science. Alexander Hunte Publishing, Blackwell Science Ltd, London, 1999.

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.

Relations between the course and the program

Table 1 Relations between the course and the PLOs

Course Name	PLOs							
Veterinary Research Methodology	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
(Course Code) VSPA 305	R				R	R		

Table 2 Relations between CLOs and PLOs

(Course Code) VSPA 210	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CLO1 Explain in concept, logic, process, and ethic in veterinary research.	R				R			
CLO2 Reveal the principles of biostatistics for veterinary research.	R				R			
CLO3 Describe the principles of hypothesis testing, statistic model, experimental study, clinical trial and calculating an appropriate sample size for veterinary research.	R				R			
CLO4 Perform statistical analysis using the SPSS program for selected experimental and clinical study in veterinary science.	R				R	R		
CLO5 Execute searching, citing and referencing for veterinary research articles using the Endnote program.	R				R	R		

CLO6 Carry out the principles of reporting and writing for veterinary research articles.	R				R			
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