

Course Specification

Name of Institution Mahidol University
 Campus/Faculty/Department Faculty of Veterinary Science

Section 1 General Information

1. Course Code and Title

VSID 747 Current Topics in Applied Veterinary Biomedical Science
 สพคร ๗๔๗ หัวข้อปัจจุบันในชีวเวชศาสตร์ทางการสัตวแพทย์

2. Number of Credits

1 (1-0-2) Credits (lecture – laboratory – self-study)

3. Curriculum and Course Type

Program of Study Master of Science Program in Veterinary Biomedical Sciences
 Course Type Core Required Electives

4. Faculty Member in Charge of this Course and Advisor of Internship

4.1 Faculty Member in Charge of this Course

1. Asst.Prof.Dr.Waraphan Toniti (WT)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1512 e-mail: waraphan.ton@mahidol.edu

2. Asst.Prof.Dr.Nlin Arya (NAr)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1523 e-mail: nlin.arya@mahidol.edu

3. Dr.Apsit Pornthummawat (AP)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1551 e-mail: apsit.por@mahidol.edu

4.2 Instructors

1. Asst.Prof.Dr.Nathita Phumthanakorn (NP)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1553 e-mail: nathita.phu@mahidol.edu

2. Assoc.Prof.Dr.Charoonluk Jirapattharasate (CJ)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1535 e-mail: charoonluk.jir@mahidol.edu

3. Dr.Kripitch Sutummaporn (KS)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1513 e-mail: kripitch.sut@mahidol.edu

4. Dr.Prarom Sriphavatsarakom (PS)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1527 e-mail: prarom.sri@mahidol.edu

5. Assoc.Prof.Dr. Sivapong Sungpradit (SS)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1525 e-mail: sivapong.sun@mahidol.edu

6. Acting Capt. Dr.Varit Intrama (VI)

Department Director, Industry and Investment Strategy

phone number 02 644 5499 ext.149 e-mail: varit@tcels.or.th

7. Asst.Prof.Dr.Nlin Arya (NAr)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1523 e-mail: nlin.arya@mahidol.edu

8. Dr.Sekkarin Ploypetch (SP)

Department of Clinical Science and Public Health

phone number 02-4415242 ext.2233 e-mail: sekkarin.plo@mahidol.edu

9. Dr.Nuttapat Anuwongcharoen (NAn)

Department of Community Medical Technology, Faculty of Medical Technology

phone number 02-4414371 ext.2726 e-mail: nuttapat.anu@mahidol.edu

10. Assoc.Prof.Dr.Jitkamol Thanasak (JT)

Department of Clinical Science and Public Health

phone number 02-4415242 ext.1528 e-mail: jitkamol.tha@mahidol.edu

11. Assoc.Prof.Dr.Sookruetai Boonmasawai (SB)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1533 e-mail: sookruetai.boo@mahidol.edu

12. Asst.Prof.Dr.Arpron Leesombun (AL)

Department of Pre-clinic and Applied Animal Science

phone number 02-4415242 ext.1535 e-mail: arpron.lee@mahidol.edu

13. Dr.Manatsanan Kansai (MK)

National Vaccine Institute

phone number 02-5809729-31 e-mail: manatsanan.k@nvi.go.th

5. Semester/The training experience required in the curriculum

Semester 2 / Class Level or year 1

6. Pre-requisite

None

7. Co-requisite

None

8. Venue of Study

1. Seminar room #2, Library, 3rd Fl., Faculty of Veterinary Science, Mahidol University

2. Online format (Webex) : <https://mahidol.webex.com/meet/waraphan.ton>

9. Date of Latest Revision

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*New course

Section 2 Goals and Objectives

1. Course Goals

This course aims to provide knowledge and abilities as follows:

1) Update research trends in Applied Veterinary Biomedical Science.

2) Expressing idea through questioning, answering, and presentation.

3) Develop research topic, conceptual framework, and concept proposal based on

research of interest.

2. Objectives of Course Development/Revision Field Experience Course

Update research trends in Applied Veterinary Biomedical Science.

3. Course-level Learning Outcomes: CLOs

This course aims to provide knowledge and abilities as follows:

- 1) CLO1 Summarize recent Veterinary Biomedical techniques and technologies.
- 2) CLO2 Develop concept proposal relating to Current Topics in Applied Veterinary Biomedical Science Research.

Section 3 Course Management

1. Course Description

(Thai) หัวข้อที่ทันสมัยและน่าสนใจในปัจจุบันที่เกี่ยวข้องกับงานวิจัยและพัฒนาทางด้านวิทยาศาสตร์ชีวการแพทย์ เช่น สเต็มเซลล์ เซลล์มะเร็ง การรักษาแบบแม่นยำและจำเพาะ เวชศาสตร์ปริวรรต วิศวกรรมเนื้อเยื่อ ชีวสารสนเทศทางการแพทย์ การพัฒนายาและวัคซีน

(English) Up to date and interesting topics about research and development in biomedical science such as stem cells, cancer cells, precision medicine, translation medicine, tissue engineering, medical bioinformatic, vaccine and drug development

2. Credit Hours per Semester

Lecture	16	Hour
Laboratory/Field Trip/Internship	0	Hour
Laboratory	0	Hour
Self Study	30	Hour

3. Number of hours that lecturers provide counseling and guidance to individual student

1-2 hours per week

Section 4 Development of Students' Learning Outcome

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:

Express their idea through questioning, answering, and group discussion. Students are encouraged to develop and assigned to present concept proposal to instructors.

CLO1 Summarize recent Biomedical techniques and technologies.

CLO2 Develop concept proposal relating to Current Topics in Applied Veterinary Biomedical Science Research.

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 discussion	Assignment	Class participation	Concept proposal development	Presentation
CLO1	X	X	X	-	-
CLO2	X	X	X	X	X

Section 5 Teaching and Evaluation Plans

1. Teaching Plan

Week or No.	Topic	Hours	Teaching Methods / Media	CLOs	Instructors
		Group Discussion			
1	Class Orientation	1	Assignment	-	WT, NAr, AP
2	Bacterial Whole Genome Sequencing	1	Group Discussion	CLO1	NP
3	Recent Trends in Serological Diagnostics for <i>Toxoplasma gondii</i> infection	1	Group Discussion	CLO1	CJ
4	Emerging Trends in Immunoassay-based Diagnostics in Veterinary Biomedicine	1	Group Discussion	CLO1	KS
5	Current Topics in Animal Behavior Research	1	Group Discussion	CLO1	PS
6	Assignment: Topic and Conceptual Framework Drafting	1	Group Discussion and Assignment	CLO1, CLO2	WT, NAr, AP
7	Design Thinking for COVID-19 and Soil-transmitted Helminths Control and Prevention: From Pain Points to the Pre-prototype Development	1	Group Discussion	CLO1	SS
8*	Trends in Biomedical Science Business Development	2	Group Discussion	CLO1	VI
9	Anticarcinogenic Effect of Cruciferous Vegetables	1	Group Discussion	CLO1	NAr

10	Trends in Proteomics within Your Field of Interest	1	Group Discussion	CLO1	SP
11	Applications of Bioinformatics and Machine Learning Drug Discovery	1	Group Discussion	CLO1	NAn
12	Research Experience in Wildlife vs Livestock	1	Group Discussion	CLO1	JT
13	The Prototype Development from Herbal Origin	1	Group Discussion	CLO1	SB, AL
14	Trends in Vaccine Development	1	Group Discussion	CLO1	MK
15	Concept Proposal Presentation & Discussion	1	Presentation and Discussion	CLO1, CLO2	Staffs
Total		16			

2. Evaluation Plan

Learning Outcomes	Evaluation Method			Weight (Percentage)
	Class participation	Concept proposal development	Presentation	
CLO1 Summarize recent Biomedical techniques and technologies.	50	-	-	50
CLO2 Develop concept proposal relating to Current Topics in Applied Veterinary Biomedical Science Research.	10	30	10	50
Total	60	30	10	100

3. Measurement and evaluation

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.

4. 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 Materials and Resources

1. Textbooks and Main Documents

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2. Documents and Important Information

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3. Documents and Recommended Information

1. Soonthornsit, J., Pimwaraluck, K., Kongmuang, N., Praty, P. & Phumthanakorn, N. (2023). Molecular epidemiology of antimicrobial-resistant *Pseudomonas aeruginosa* in a veterinary teaching hospital environment. *Vet Res Commun* 47, 73–86.

2. Liu, Q., Wang, ZD., Huang, SY. & Zhu, ZQ. (2015). Diagnosis of toxoplasmosis and typing of *Toxoplasma gondii* . *Parasites Vectors* 8, 292.

3. Ahmed, S., Ning, J., Peng, D., Chen, T., Ahmad, I., Ali, A., Lei, Z., Shabbir, M.A.B., Cheng, G. & Yuan, Z. (2020). Current advances in immunoassays for the detection of antibiotics residues: A review. *Food and Agricultural Immunology*, 31(1), 268-290.

4. Huang, L., Wang, G., Wu, Y., Wang, Z., Ding, Y., Liang, H., & Hua, X. (2024). Development of competitive and noncompetitive lateral flow immunoassays for pendimethalin using synthetic peptides. *Microchimica Acta*, 191(1), 68.

5. Moreira, N.S., Baldo, T. A., Duarte, L.C., Lopes-Luz, L., Oliveira, K. A., Estrela, P. F., Simões, A.M., Bühner-Sékula, S., Duarte, G.R.M. & Coltro, W.K. (2024). Direct immunoassay on a polyester microwell plate for colorimetric detection of the spike protein in swab and saliva samples. *Analytical Methods*.

6. Zhang, Y., Gu, H., & Xu, H. (2024). Recent progress on digital immunoassay: how to achieve ultrasensitive, multiplex and clinical accessible detection?. *Sensors & Diagnostics*.

7. Darwish, I. A. (2006). Immunoassay methods and their applications in pharmaceutical analysis: basic methodology and recent advances. *International journal of biomedical science: IJBS*, 2(3), 217

Section 7 Evaluation and Improvement of Course Management

1. Strategies for Evaluation of Course Effectiveness 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. Strategies for Evaluation of Teaching Methods

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. Improvement of Teaching Methods

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 Students' Learning Outcome

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.

5. Review and Plan to Improve Course Effectiveness

After the course evaluation and verification, the course effectiveness will be improved through the following:

- (1) The course is revised every year according to the evaluation and verification.

Appendix

Relations between the course and the program

Table 1 Relations between the course and the PLOs

	PLOs					
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
VSID 747 Current Topics in Applied Veterinary Biomedical Science 1 (1-0-2)	R	R	R	R	R	R

Program Learning Outcomes (TQF.2)

PLO 1 Manage ethical and moral problems in field practice with evidence-base approaches and leadership together with appropriate logic and value.

PLO 2 Prioritize scientific information in biomedical veterinary science and apply the beneficial output to develop laboratory practice and research study.

PLO 3 Integrate the theory and experiences together with scientific evidences to develop the new knowledge in veterinary science through research study.

PLO 4 Communicate efficiently with multidisciplinary academic colleagues and staff by using the communicate appropriately with the individual groups, both in academic and professional

PLO 5 Utilize digital and information technology (IT) to encourage working network communication, data analysis together with presentation and research publication.

PLO 6 Evaluate principles, purposes, strong critical-thinking with problem-solving skills, to utilizing veterinary science literacy as integral part of the thought process.

Table 2 Relations between CLOs and PLOs

CLOs	PLOs					
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1 Summarize recent Veterinary Biomedical techniques and technologies		R	R	R	R	
CLO2 Develop concept proposal relating to Current Topics in Applied Veterinary Biomedical Science Research.	R	R	R	R	R	R

Week	Date	Time	Topic	Instructor
1	10-Jan-2024	10.00 - 11.00 AM	Class Orientation	WT, NAr, AP
2	17-Jan-2024	01.00 - 02.00 PM	Bacterial Whole Genome Sequencing	NP
3	24-Jan-2024	10.00 - 11.00 AM	Recent Trends in Serological Diagnostics for <i>Toxoplasma gondii</i> infection	CJ
4	31-Jan-2024	10.00 - 11.00 AM	Emerging Trends in Immunoassay-based Diagnostics in Veterinary Biomedicine	KS
5	7-Feb-2024	10.00 - 11.00 AM	Current Topics in Animal Behaviour Research	PS
6	14-Feb-2024	10.00 - 11.00 AM	Assignment: Topic and Conceptual Framework Drafting	WT, NAr, AP
7	21-Feb-2024	10.00 - 11.00 AM	Design Thinking for COVID-19 and Soil-transmitted Helminths Control and Prevention: From Pain Points to the Pre-prototype Development	SS
8*	28-Feb-2024	10.00 - 12.00 AM	Trends in Biomedical Science Business Development	VI
9	6-Mar-2024	10.00 - 11.00 AM	Anticarcinogenic Effect of Cruciferous Vegetables	Nar
10	13-Mar-2024	10.00 - 11.00 AM	Trends in Proteomics within Your Field of Interest	SP
11	20-Mar-2024	10.00 - 11.00 AM	Applications of Bioinformatics and Machine Learning Drug Discovery	Nan
12	27-Mar-2024	10.00 - 11.00 AM	Research Experience in Wildlife vs Livestock	JT
13	3-Apr-2024	10.00 - 11.00 AM	The Prototype Development from Herbal Origin	SB, AL
14	3-Apr-2024	11.00 - 12.00 AM	Knowledge Gaps in Vaccine Development	MK
15	24-Apr-2024	10.00 - 11.00 AM	Concept Proposal Presentation&Discussion	Staffs

Evaluation Criteria

- **Class Participation (60%)**

Express their idea through questioning, answering, and group discussion.

- **Excellence (5):** Able to respond with rational question(s), answer(s) and sharing thoughts during debates with integrated basic and advanced knowledge through clear and intelligible explanation.

- **Good (4):** Able to respond with rational question(s), answer(s) and sharing thoughts during discussion sessions with clear and intelligible explanation.

- **Slightly good (3):** Able to respond with question(s), answer(s) and sharing thoughts during discussion sessions with understandable explanation.

-* **Fair (2) with comment:** Able to respond with question(s) or answer(s) during discussion sessions with ambiguous explanation.

-* **Poor (1) with comment:** Unable to express any idea(s).

- **Concept proposal (30%)**

Develop concept proposal relating to Current Topics in Applied Veterinary Biomedical Science Research

-**Excellence (5):** The work ship consists of main component of formal proposal which are introduction, literature review, method, and expected outcomes. The contents are easily understandable and make more comprehensive idea to readers. The work ship itself is potentially available for full proposal development.

-**Good (4):** The work ship lacks some part(s) of main component of formal proposal which are introduction, literature review, method, and expected outcomes. The contents are easily understandable and make more comprehensive idea to readers.

-**Slightly good (3):** The work ship consists of main component of formal proposal which are introduction, literature review, method, and expected outcomes.

-**Fair (2):** The work ship lacks some part(s) of main component of formal proposal which are introduction, literature review, method, and expected outcomes.

-**Poor (1):** The complete work ship is not established.

- **Presentation (10%)**

Students are encouraged to develop and assigned to present concept proposal to instructors.

-**Excellence (5):** Student present in a loud, clear voice and does not read from script. The student sound credible.

-**Good (4):** Student present in a loud, clear voice but turn to the script occasionally. The student sound somewhat credible.

-**Slightly good (3)**: Student present in a voice that is sometimes clear but constantly refers to the script.

-**Fair (2)**: Student present in sometimes loud or clear voice and reads simply from the script.

-**Poor (1)**: Student present with indistinct enunciation and reads simply from the script.