Course syllabus
Second Semester, Academic Year 2025 (Special Program)

1. Faculty of Veterinary Technology **Department: Veterinary Nursing**
Special program student: Section 230

2. Course code: 01603222 **Course title:** Animal Waste Examination and Management

Credits: 1 Credit (1-0-2)

Foundation courses -
Lecture section 230: Friday, 01:00 PM – 02:00 PM at room 1-403, 4th floor, Faculty of Veterinary Technology

3. Instructors

Lecture

Assoc. Prof. Dr. Chainarong Sakulthaew **Course Coordinator and Lecture Instructors**
Assoc. Prof. Dr. Chanat Chokejaroenrat **Special instructor from the Faculty of Environment, Kasetsart University**
eccnc@ku.ac.th

4. Office hours and student consultation

Assoc. Prof. Dr. Chainarong Sakulthaew Email: cvtcns@ku.ac.th

** Students may consult with the instructors during official working hours by prior appointment.

5. Course objectives

5.1 To enable students to explain and classify different types of animal waste from various sources, such as livestock farms, slaughterhouses, processing plants, and veterinary hospitals.

5.2 To enable students to correctly collect specimens and animal waste, including animal carcasses and wastewater, for physical, chemical, biological, and animal disease testing.

5.3 To enable students to manage, monitor treatment systems, and effectively treat animal waste and residues.

6. Mapping of CLOs with Sub-PLOs

CLOs	Course learning outcomes: CLOs	Related Sub-PLOs (100%)				
		1	2	3	4	5
1.	Explain the fundamental principles, concepts, and standard processes of animal waste management in veterinary nursing (60%)	1				
2.	Explain biosafety protocols and public health regulations regarding animal waste disposal for disease prevention and zoonoses control.(20%)				0.5	
3.	Analyze waste-related risk factors to design appropriate prevention protocols for zoonotic diseases and environmental contamination. (20%)				0.5	

Remark: Program learning outcome: PLOs and SubPLOs

PLO1 Graduates capable performing veterinary nursing practices through the integration of professional nursing knowledge and clinical analytical reasoning

SubPLO1. Apply the fundamental principles, concepts, and processes of veterinary nursing and related animal health sciences.

SubPLO2. Perform veterinary nursing procedures with technical accuracy and safety.

SubPLO3. Perform veterinary nursing practices with ethical standards, responsibility, communication, and collaborative teamwork in accordance with relevant laws.

PLO2 Graduate perform duties in animal nutrition, rehabilitation, disease control and prevention

SubPLO4. Apply the principles of animal nutrition, immunology, and epidemiology to manage disease prevention, zoonoses control, and post-nursing care protocols.

PLO3 Graduate use and maintain veterinary nursing equipment and tools correctly according to academic principles

SubPLO5. Handle veterinary drugs, instruments, equipment, and medical supplies safely and accurately.

7. Course description

Sources, types and characteristics of animal waste. Wastewater problems and management systems in animal farms, slaughterhouses, animal product plants, and animal hospitals. Animal specimen collection, wastewater collection, and sample preparation for physical, chemical, and biological analysis. Control, monitoring and discarding of both normal and bioharzard waste. Treatment technologies of wastewater and toxic residues from animal farms and animal hospitals.

8. Learner-centered teaching methods

Classroom lectures and self-directed research from books and various reference sources.

9. Instructional media and equipment

Computer, LCD Projector, course handouts/materials, and video clips.

10. Learning achievement assessment

Learning outcome	Assessment methods	Evaluation week	Proportion / percentage
Knowledge	Midterm examination	According to University Announcement	50%
	Final examination	According to University Announcement	50%
	Total		**100 %**

Note: 1. Students must have an overall attendance rate of no less than 80% for both lectures and laboratory sessions to be eligible to take examinations.

2. Students must dress appropriately and in accordance with regulations for both lectures and laboratory sessions in order to be permitted into the classroom and to sign the attendance sheet.

3. Students are allowed to enter the classroom up to 15 minutes late; arrival after this period will be marked as Late. Accumulating 3 late arrivals will be counted as 1 absence. Students arriving more than 30 minutes late will be marked as Absent for that class hour.

11. Learning evaluation

11.1 Evaluation is based on examinations for both lectures and laboratory sessions, quizzes, and assigned tasks.

11.2 Criterion-referenced grading criteria based on score ranges are as follows:

A	80-100 (Grade point 4)
B+	75-79 (Grade point 3.50)
B	70-74 (Grade point 3.00)
C+	65-69 (Grade point 2.50)
C	60-65 (Grade point 2.00)
D+	55-59 (Grade point 1.50)
D	50-54 (Grade point 1.00)
F	00-49 (Grade point 0.00)

12. Reference

Moolphruk, P. (1998). *Environmental health* [Anamai singwaetlom]. NSL Printing.

Chokejaroenrat, C., Satchasataporn, Sakulthaew, C., K., Snow, D., Ali, T., Assiri, M., Watcharenwong, A., Imman, S., Suriyachai, N., Kreetachat, T. (2022) Enrofloxacin and Sulfamethoxazole Sorption on Carbonized Leonardite: Kinetics, Isotherms, Influential Effects, and Antibacterial Activity toward S. aureus ATCC 25923. Antibiotics 2022, 11(9), 1261. (Impact Factor 5.52).

Angkaew, A., Sakulthaew, C., Nimtim, M., Imman, S., Satapanajaru T. , Suriyachai, N., Kreetachat, T., Comfort, S., Chokejaroenrat, C. (2022) Enhanced Photo-Fenton Activity

Using Magnetic Cu0.5Mn0.5Fe2O4 Nanoparticles as a Recoverable Catalyst for Degrading Organic Contaminants. Water, 14(22), 3717 (Impact Factor 3.57).

Pattanateeradetch, A., Sakulthaew, C., Angkaew, A., Sutjarit, S., Poompoung, T., Lin, Y-T., Harris, C., Comfort, S., Chokejaroenrat, C. (2022) Fabrication of Ternary Nanoparticles for Catalytic Ozonation to Treat Parabens: Mechanisms, Efficiency, and Effects on Ceratophyllum demersum L. and Eker Leiomyoma Tumor-3 Cells. Nanomaterials, 12(20), 3573. (Impact Factor 5.57).

Irshad, A., Zulfiqar, A., Ali, H.M., Shahzadi, N., Abd El-Gawad, H.H., Chokejaroenrat, C., Sakulthaew, C., Anjum, F., Suleman, M. (2022) Co-substituted Mg–Zn spinel nanocrystalline ferrites: Synthesis, characterization and evaluation of catalytic degradation efficiency for colored and colorless compounds. Ceramics International. 48 (20), 29805-29815. (Impact Factor 5.52).

Khongchamnan, P., Suriyachai, N., Kreetachat, T., Laosiripojana, N., Weerasai, K., Champreda, V., Suwannahong, K., Sakulthaew, C., Chokejaroenrat, C., Imman, S. (2022) Optimization of Liquid Hot Water Pretreatment and Fermentation for Ethanol Production from Sugarcane Bagasse Using Saccharomyces cerevisiae. Catalyst. 12(5), 463; https://doi.org/10.3390/catal12050463. (Impact Factor 4.146).

Imman, S., Kreetachat, T, Khongchamnan, P., Laosiripojana , N, Champreda, V, Suwannahong, K, Sakulthaew, C., Chokejaroenrat, C., Suriyachai, N. (2021) Optimization of sugar recovery from pineapple leaves by acid-catalyzed liquid hot water pretreatment for bioethanol production. Energy Reports, 7 :6945-6954. (Impact Factor 6.87).

Imman, S., Khongchamnan, P., Wanmolee, W., Laosiripojana, N., Champreda, V., Suriyachai, N., Kreetachat, T., Sakulthaew, C., Chokejaroenrat, C. (2021) Solvothermal-based lignin fractionation from corn stover: process optimization and product characteristics. Frontiers in Chemistry, doi:10.3389/fchem.2021.697237. (Impact Factor 5.545).

Sakulthaew, C., Watcharenwong, A., Chokejaroenrat, C., Rittirat, A. (2021) Leonardite-derived biochar suitability for effective sorption of herbicides. Water, Air, and Soil Pollution 232, 36. (Impact Factor 2.52).

13. Course Contents

Week	Date	Topic	Lecturer	Lesson learning outcomes (LLO)	Course learning outcomes (CLO)	Teaching and learning activities	Evaluation methods
1	28 Nov 25	Course introduction - Sources, types, and characteristics of animal waste from livestock farms, slaughterhouses, animal product processing plants, and veterinary hospitals.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)
2	**5 ธันวาคม 2568 วันหยุด**						
3	12 Dec 25	Problems and impacts of animal waste and residues from livestock farms, slaughterhouses, animal product processing plants, and veterinary hospitals.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)
4	19 Dec 25	Characteristics of animal waste and wastewater, and chemical characterization.	Assoc. Prof. Dr. Chanat	Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)

5	26 Dec 25	Characteristics of animal waste and wastewater, and physical characterization.	Assoc. Prof. Dr. Chanat	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)
6	**Jan 2, 2026 – Holiday**						
7	9 Jan 26	Characteristics of animal waste and wastewater, biological characterization, and infectious waste.	Assoc. Prof. Dr. Chanat	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)
8	**10 - 18 ม.ค. 69 สอบกลางภาค (40%)**						
9	23 Jan 26	Methods for waste sample collection and preparation for analysis.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
10	30 Jan 26	Principles of analytical instruments for animal waste and wastewater analysis.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
February 6 – 14, 2026: Kasetsart Fair							
11	6 Feb 26	Waste and infectious waste management in	Assoc. Prof. Dr.	2 Ability to control and prevent zoonotic	**CLO1, CLO 4-5**	Online lecture due to Kasetsart	1. Multiple-choice

		livestock farms and veterinary hospitals.	Chainarong	diseases, animal infectious diseases, and environmental-borne infections.		Fair (February 6 – 14, 2026)	examination (8%)
12	13 Feb 26	Hygiene and safety in veterinary hospitals.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	Online lecture due to Kasetsart Fair (February 6 – 14, 2026)	1. Multiple-choice examination (8%)
13	20 Feb 26	Surveillance and system establishment for animal waste and wastewater management.	Assoc. Prof. Dr. Chainarong	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
15	27 Feb 26	Wastewater management in livestock farms, slaughterhouses, animal product processing plants, and veterinary hospitals Part 1.	Assoc. Prof. Dr. Chanat	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
16	6 Mar 26	Wastewater management in livestock farms, slaughterhouses, animal product	Assoc. Prof. Dr. Chanat	2 Ability to control and prevent zoonotic diseases, animal infectious diseases,	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)

		processing plants, and veterinary hospitals Part 2.		and environmental-borne infections.			
17	13 Mar 26	Management technologies for residues from livestock farms and veterinary hospitals	Assoc. Prof. Dr. Chanat	2 Ability to control and prevent zoonotic diseases, animal infectious diseases, and environmental-borne infections.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (8%)
18-19	March 17 – 28, 2025: Final Examination (60%)						

(Assoc. Prof. Dr. Chainarong Sakulthaew)
Course Coordinator
November 10, 2025