Course syllabus

First Semester, Academic Year 2025 (Special Program)

1. **Faculty of Veterinary Technology** **Department: Veterinary Nursing**
2. **Course code** 01603215-65 **Course title** Basic Biochemistry for Veterinary Nursing
3. **Course credit** 2(2-0-4)

Prerequisite: None

Sec 230 (Lecture) **Date/Time/Location**

Lecture Saturday 8.00 – 10.00

Room 1-403 Veterinary technology teaching and laboratory Building

4. **Instructors**

Assoc. Prof. Dr. Chainarong Sakulthaew (Course coordinator)

Assoc. Prof. Dr. Wuttinun Raksajit

Assoc. Prof. Dr. Sarawan Kaewmongkol

Availability: By appointment via email in advance **Email:** cvtcns@ku.ac.th

5. Course Objectives

5.1 To enable learners to understand and explain the structures and functions of biomolecules, as well as enzymes and their mechanisms of action.

5.2 To enable learners to understand and explain buffer systems in living organisms, along with metabolic regulation mechanisms at both cellular and molecular levels.

To enable learners to understand and explain the principles of gene expression and regulation.

6. Course learning outcomes: CLOs

CLOs	Course learning outcomes: CLOs	Related PLOs 100%				
		1	2	3	4	5
1.	Explain the structures, functions, and metabolic pathways of major biomolecules within the animal body. (40%)	0.5				
2.	Explain biochemical parameters and alterations in blood or body fluids with clinical signs and veterinary nursing care.(60%)	1				

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

Water and buffer systems in living organism. Chemical structures and role of carbohydrates, lipids, nucleic acids, amino acids, proteins, enzymes, vitamins, and minerals. Metabolism, metabolic regulation of biomolecules, metabolic interrelationship. Gene expressions and gene regulations

8. Curriculum Mapping: Distribution of Responsibility for Program Learning Outcomes

· Major Responsibility ⚉ Minor Responsibility

Course Number		1. Morals and Ethics		2. Knowledge	3. Cognitive Skills		4. Interpersonal Skills and Responsibility		5. Numerical Analysis, Communication, and Information Technology Skills	
		1	2	1	1	2	1	2	1	2
0160321 5-65	Basic Biochemistry for Veterinary Nursing		⚉	●	●		⚉			⚉

1. Morals and Ethics
   1.1 Ability to resolve problems with empathy and consideration for others' feelings.
   1.2 Possess public consciousness, unity, discipline, honesty, social responsibility, and respect for rules and regulati
2. Knowledge
   2.1 Possess knowledge of fundamental principles and theories.
3. Cognitive Skills

3.1 Ability to apply knowledge from diverse data sources to solve problems creatively, accurately, and appropriately.

3.2 Ability to think critically, rationally, and systematically.

4. Interpersonal Skills and Responsibility

4.1 Demonstrate leadership traits and the ability to collaborate effectively with others.

4.2 Demonstrate personal responsibility and a commitment to continuous self-development.

5. Numerical Analysis, Communication, and Information Technology Skills

5.1 Ability to utilize information technology for effective presentation and communication tailored to diverse audiences.

5.2 Ability to apply statistical and mathematical knowledge for research, investigation, and problem-solving.

9. Course Outline

9.1 Lecture: 30 Hours

9.1.1 Importance of Water and Buffers in Living Organisms
9.1.2 Chemical Structure and Function of Carbohydrates
9.1.3 Chemical Structure and Function of Lipids
9.1.4 Chemical Structure and Function of Nucleic Acids
9.1.5 Chemical Structure and Function of Amino Acids and Proteins
9.1.6 Chemical Structure and Function of Enzymes
9.1.7 Chemical Structure and Function of Vitamins and Minerals
9.1.8 Carbohydrate Metabolism and Its Regulation (Glycolysis and Gluconeogenesis)
9.1.9 Carbohydrate Metabolism and Its Regulation (Krebs Cycle, Electron Transport Chain, and Pentose Phosphate Pathway)
9.1.10 Carbohydrate Metabolism and Its Regulation (Glycogen Synthesis and Degradation)
9.1.11 Lipid Metabolism and Its Regulation
9.1.12 Amino Acid and Protein Metabolism and Its Regulation
9.1.13 Purine and Pyrimidine Metabolism and Its Regulation
9.1.14 Interrelationships Between Metabolic Pathways
9.1.15 Gene Expression and Its Regulation

10. Student-Centered Teaching Strategies

Interactive lectures utilizing PowerPoint presentations and comprehensive course materials. Engagement of learners through in-class Q&A sessions and open discussions to stimulate critical thinking.

11. Instructional Media

Computer, Google Meet, LINE, Facebook Live, Course Materials and Textbooks

12. Assessment and Evaluation

		(%)
12.1	Lecture Assessment	95
12.2	Regular class attendance and attentiveness	5
	Total	100

13. Course Evaluation

Score 100-80	Grade A	Score 64-60	Grade C
Score 79-75	Grade B+	Score 59-55	Grade D+
Score 74-70	Grade B	Score 54-50	Grade D
Score 69-67	Grade C+	Score 0-49	Grade F

Students must maintain a minimum attendance of 80% to be eligible for the final examination.

14. Recommended Readings

14.1 Thai Textbooks

14.1.1 พัชรา วีระกะลัส. พลังงานและเมแทบอลิซึม. พิมพ์ครั้งที่ 2 ปรับปรุง. กรุงเทพฯ : สำนักพิมพ์แห่ง จุฬาลงกรณ์มหาวิทยาลัย, 2549

14.1.2 พัชรา วีระกะลัส. เอนไซม์. พิมพ์ครั้งที่ 2. กรุงเทพฯ : สำนักพิมพ์แห่งจุฬาลงกรณ์มหาวิทยาลัย, 2543

14.1.3 สุกัญญา สุนทรส, วิเชียร ริมพณิชยกิจ. ชีวโมเลกุล. พิมพ์ครั้งที่ 2 ฉบับปรับปรุงแก้ไข. กรุงเทพฯ : สำนักพิมพ์แห่งจุฬาลงกรณ์มหาวิทยาลัย, 2551

14.1.4 อาภัสสรา ชูเทศ. ชีวเคมี: ชีวโมเลกุล. กรุงเทพฯ: โครงการตำราคณะสัตวแพทยศาสตร์ มหาวิทยาลัยเกษตรศาสตร์, 2551

14.1.5 อาภัสสรา ชูเทศะ และ วิราช นิมิตสันติวงศ์. ชีวเคมี: เมตาบอลิซึม. กรุงเทพฯ: โครงการตำราคณะ สัตวแพทยศาสตร์ มหาวิทยาลัยเกษตรศาสตร์, 2552

14.2 Foreign Textbooks and Literature

14.2.1 Berg, J.M., Tymoczko, J.L. and Stryer, L., Biochemistry, 6th ed., W.H. Freeman and Company, New York, 2007.

14.2.2 Lewin, B., Gene, 10th ed., Jones and Bartlett Publishers, Massachusetts, 2011.

14.2.3 Cox, M.M. and Nelson, D.L., Lehninger's Principles of Biochemistry, 7th ed., W.H. Freeman and Company, New York, 2017.

14.2.4 Voet, D. and Voet, J.G., Biochemistry, 4th ed., John Wiley & Sons, Inc., New York, 2010.

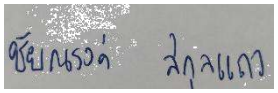
15. Course Contents

Week	Date	Topic / Lecture Content	Instructor	Lesson Learning Outcomes (LLOs)	Course Learning Outcomes (CLOs)	Teaching & Learning Activities	Assessment & Evaluation Methods
1	28 Jun 2025	Course Introduction & Evaluation; Importance of Water and Buffers in Living Organisms	Assoc. Prof. Dr. Chainarong	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
2	5 Jul 2025	Chemical Structure and Function of Carbohydrates	Assoc. Prof. Dr. Chainarong	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
3	12 Jul 2025	Chemical Structure and Function of Lipids	Assoc. Prof. Dr. Chainarong	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct,	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination

				and laws related to veterinary nursing.			(6%)
4	19 Jul 2025	Chemical Structure and Function of Amino Acids and Proteins	Assoc. Prof. Dr. Chainarong	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
5	26 Jul 2025	Chemical Structure and Function of Vitamins and Minerals	Assoc. Prof. Dr. Chainarong	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
6	2 Aug 2025	Chemical Structure and Function of Nucleic Acids	Assoc. Prof. Dr. Sarawan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (3.5%)
7	**9-17 Aug 2025 Midterm Exam (37%)**						
8	23 Aug 2025	Chemical Structure and Function of Enzymes	Assoc. Prof. Dr. Sarawan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)

9	30 Aug 2025	Interrelationships Between Metabolic Pathways	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
10	6 Sep 2025	Carbohydrate Metabolism and Its Regulation (Glycolysis and Gluconeogenesis)	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
11	13 Sep 2025	Carbohydrate Metabolism and Its Regulation (Krebs Cycle, Electron Transport Chain, and Pentose Phosphate Pathway)	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
12	20 Sep 2025	Carbohydrate Metabolism and Its Regulation (Glycogen Synthesis and Degradation)	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (6%)
13	27 Sep 2025	Lipid Metabolism and Metabolic Regulation	Assoc. Prof. Dr. Wuthinan	1.Able to demonstrate awareness of morals, ethics, professional codes of conduct, and	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination

				laws related to veterinary nursing.			(6%)
14	4 Oct 2025	Metabolism of Amino Acids and Proteins and Its Regulation	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
15	**6- 9 Oct 2025 Kasetsart University Commencement Ceremony**						
16	11 Oct 2025	Purine and Pyrimidine Metabolism and Its Regulation (Online Session due to Commencement Rehearsal)	Assoc. Prof. Dr. Wuthinan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
17	18 Oct 2025	Regulation of Gene Expression	Assoc. Prof. Dr. Sarawan	1. Able to demonstrate awareness of morals, ethics, professional codes of conduct, and laws related to veterinary nursing.	**CLO1, CLO 4-5**	1. Lecture	1. Multiple-choice examination (7%)
18-19	**20 - 31 Oct 2025 Final Examination (58%)**						



(Assoc. Prof. Dr. Chainarong Sakulthaew)
Course coordinator
Jun 26, 2025