

Course: Comparative Nutrition

1. **Type** : Specialization's Compulsory
2. **Code** : PTN 6101
3. **Credit** : 1/1
4. **Semester** : Odd
5. **Description** :

The course equips students to discover more about comparative aspects of digestive physiology and nutrient metabolism from various types of livestock, so that students will be able to apply their knowledge in conducting research in the animal nutrition and feed science. This course contains different aspects of digestive physiology including feed digestion, absorption, nutrient metabolism, and their use in ruminants, poultry and non-ruminants, practice on the anatomy of the digestive organs of the above-mentioned livestock.

6. Course Outcomes (CO)

- CO 1 : Understand the definition of nutrients and the relationship between nutrients form one another.
- CO 2 : Understand and able to compare determination of nutritional value of feed between ruminants, poultry and non-ruminant by using feed chemical analysis.
- CO 3 : Understand and able to evaluate comparatively feed and nutrients between ruminant, poultry, and non-ruminant.
- CO 4 : Understand and able to evaluate comparatively for digestive physiology and digestive enzyme profiles between ruminant, poultry, and non-ruminant.
- CO 5 : Understand and able to evaluate comparatively the metabolism of carbohydrates, lipids, and N-compounds between ruminant, poultry, and non-ruminant.

7. The Alignment Between CO and ELO

CO*	ELO**																
	A				B			C				D					
	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4	5	6
CO 1	✓				✓												
CO 2					✓				✓					✓			
CO 3						✓					✓		✓				
CO 4			✓				✓			✓						✓	
CO 5				✓			✓				✓						✓

*CO refers to point 6.

**Expected Learning Outcomes (ELO) are written below,

A. Attitudes and Behaviors

The graduates are able to behave well, correctly, and culturally as the result of internalization and actualization of values and norms, which is reflected in a spiritual and social life through learning process, experience, research, and/or community development in the animal husbandry.

1	Piety to God and be able to show religious attitude and maintain the humanity values in carrying the task, which is based on religion, moral, and ethics.
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2	Be proud and love the homeland show nationalism, and contribute to the improvement of the life quality in the community, nation and country, and the advancement of civilization according to Pancasila.
3	Showing the social sensitivity and attention to the community and environment by respecting the culture diversity, view, religious, beliefs, and other people's opinion, and also obey the rules.
4	Be accountable in carrying the professional practice that includes ability to accept accountability towards decision and professional action. It shall be according to the scope of the practice under their responsibility and laws.
B. Mastery in Sciences	
Master the theory of the current science in the animal husbandry and its application.	
1	Able to master the current animal science and its application theory.
2	Able to master the livestock production science, animal nutrition and fed science, animal products technology, and the livestock social economics in relation to food security and environment.
3	Able to master the design, management, and development of livestock research.
C. Special Skills	
The graduates are able to develop science, technology, and arts in the animal husbandry through interdisciplinary/multidisciplinary innovative and tested research.	
1	Able to make innovation in the animal husbandry based on the development of science and technology.
2	Able to design interdisciplinary and multidisciplinary research in the animal husbandry.
3	Able to formulate and solve problems in the national development especially in terms of animal husbandry.
4	Able to solve problems and anticipate issues in the development of animal science and industry.
D. General Skills	
The graduates are able to manage resources by utilizing science, technology, and arts to solve problems in the animal husbandry with current science and also conduct research with accountability and full responsibility.	
1	Able to develop logical, critical, systematic, and creative thought through scientific research, creation of design in the science and technology, which pays attention and applies humanity values according to their expertise. The graduates are able to arrange scientific concept and the study result based on the principles, procedures, and scientific ethics.
2	Able to identify the science that becomes their research object and position it to a research map by using information technology in the context of science development and expertise implementation developed through interdisciplinary or multidisciplinary approaches.
3	Able to make a decision in the context of solving problems in the development of science and technology, which pays attention and applies humanity values based on analysis study or experiment towards information and data.
4	Able to communicate the result of reasoning and scientific research in form of thesis and scientific writing responsibly based on academic ethics in the accredited national journal.
5	Able to maintain the academic integrity generally and avoid the plagiarism practice.
6	Able to communicate spoken and written English effectively by using the information technology for the development of animal science and its implementation.

8. Course Content

Week	CO	Topic/Subtopic	Learning Activity	Assessment Tools	Allocated Time	Lecturer
1	CO 1	Intoduction: <ul style="list-style-type: none"> Learning contract; syllabus 	Classical lecture; discussion	Midterm	1 x 55 minutes	Prof. Dr. Ir. Zuprizal, DEA.

		<ul style="list-style-type: none"> Definition of nutrient and its association with other nutrients: carbohydrate; protein; lipid 				
2	CO 1	Nutrient: Comparative aspects between poultry and non-poultry feed	Classical lecture; discussion	Midterm	1 x 55 minutes	Ir Nanung Danar Dono, S.Pt., M.P., Ph.D., IPM.
3	CO 1	Feed and nutrient: Comparative aspect: ruminant feed	Classical lecture; discussion	Midterm	1 x 55 minutes	Prof. Dr Ir. Kustantinah, DEA.
4	CO 2	Feed and nutrient: Proximate and Van Soest analysis	Classical lecture; discussion	Midterm	1 x 55 minutes	Ir Nanung Danar Dono, S.Pt., M.P., Ph.D., IPM.
5	CO 3	Nutrient definition and its association with other nutrients: mineral	Classical lecture; discussion	Midterm	1 x 55 minutes	BIO
6	CO 3	Nutrient definition and its association with other nutrients: vitamin	Classical lecture; discussion	Midterm	1 x 55 minutes	Dr. Ir. Chusunul Hanim, M.Si., IPM.
7	CO 4	Digestive physiology and enzyme profile of poultry and non-ruminant digestive system: carbohydrate	Classical lecture; discussion	Midterm	1 x 55 minutes	Prof. Dr. Ir. ZUprixal, DEA., IPU.
Midterm Examination						
8	CO 4	Digestive physiology and enzyme profile of	Classical lecture; discussion	Final Exam	1 x 55 minutes	BIO

		poultry and non-ruminant digestive system: protein and lipid				
9	CO 4	Digestive physiology and enzyme profile of ruminant digestive system: carbohydrate	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Kustantinah, DEA
10	CO 4	Digestive physiology and enzyme profile of ruminant digestive system: protein	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Kustantinah, DEA
11	CO 4	Digestive physiology and enzyme profile of ruminant digestive system: lipid	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Kustantinah, DEA
12	CO 5	Comparative metabolism on ruminant and non-ruminant : carbohydrate	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Lies Mira Yusiati, SU., IPU
13	CO 5	Comparative metabolism on ruminant and non-ruminant : lipid	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Lies Mira Yusiati, SU., IPU
14	CO 5	Comparative metabolism on ruminant and non-ruminant : N-compounds	Classical lecture; discussion	Final Exam	1 x 55 minutes	Prof. Dr. Ir. Lies Mira Yusiati, SU
Final Examination						

9. Practicum

Week	Activity	Methods	Total Hours
1	Assistance	Explanatory	2 x 22 hours

2	Laboratory practicum	Comparing digestive tracts: <ul style="list-style-type: none"> • Pre-ruminant • Small and large ruminant • Poultry (laying hen) • Rabbit 	2 x 8 hours
3	Report	Writing and submission	2 x 8 hours

10. Assessment

Component	CO	Percentage (%) for final grade	Minimum Satisfactory Level
Midterm	CO 1-4	35	70
Final Exam	CO 4-5	35	70
Practicum		30	70
Total		100	

11. Lecturer

1. Prof. Dr. Ir. Zuprizal, DEA., IPU.
2. Prof. Dr. Ir. Kustantinah, DEA.
3. Prof. Dr. Ir. Lies Mira Yusiati, SU., IPU.
4. Dr. Ir. Chusnul Hanim, M.Si., IPM.
5. Ir. Nanung Danar Dono, S.Pt., M.P., Ph.D., IPM.

12. Reference

1. Larbier, M. and Leclercq, B. 1994. Nutrition and Feeding of Poultry. INRA. Nottingham University Press. UK.
2. Mc Donald, P., Edwards, R.A., Greenhalgh, J.F.D., and Morgan, C.A. 2002. Animal nutrition. Sixth Ed. Prentice Hall, Pearson Education, Edinburgh Gate, , Harlow, Essex CM20 2JE, UK.
3. Richard, O. K. and Church, D.C. 1998. Livestock feeds and feeding. 4th Ed. Prentice Hall, New Jersey, USA.