COURSE LEARNING PLAN

UNIVERSITY OF BRAWIJAYA

FACULTY OF ANIMAL SCIENCE

DEPARTMENT OF ANIMAL SCIENCE

UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE

LEARNING PLAN: Advanced Ruminant Animal Nutrition

Course	Code	Weight (credits)	Semester	Compilation Date
Advanced Ruminant Animal Nutrition	PEN60007	3	6	July 27, 2020

Authorization	Course Coordinator	Ka PS S1	Vice Dean 1
	Prof. Dr. Ir. Kusmartono	Dr. Herly Evanuarini, S.Pt., MP.	Dr. M. Halim Natsir, S.Pt., MP., IPM., ASEAN Eng

Learning Outcomes (LO)

PLO

1. LO 2: Able to design and conduct experiments, analyze and interpret data to make appropriate decisions in solving problems in the field of animal science
2. LO 4: Able to apply animal technology that is oriented to the animal industry, production (quality and quantity), efficiently and sustainably
3. LO 7: Able to provide alternative solutions to problems related to ruminant animal nutrition to various problems that arise in the community, nation, country, and world

CLO

After taking this course, the students are able to:

1. Calculate and meet the nutritional needs of ruminant animals by considering the following factors:
   - Types of animals (sheep, goats, beef cattle, and dairy cows)
   - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding)
   - Raising purposes (breeding, fattening, working)
2. Implement the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes

Brief Course Description

This course discusses steps to calculate the nutritional needs of ruminant animals by considering factors, such as type of animals, physiological status, and raising purposes (breeding, fattening, working) and strategies to meet and ensure the fulfillment of nutritional needs throughout the year. To reach the target above, the **feed budgeting** concept will be developed to optimize supply and demand models for the potential of feed resources in a particular area

Topics

1. Methods for determining the nutritional needs of ruminant animals

<table>
<tr><td></td><td colspan="2">2. Introduction to feeding systems accompanied by examples
3. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for sheep
4. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for goats
5. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for beef cattle
6. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfill nutritional needs for dairy cattle
7. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for working animals
8. Development of the concept of Feed Budgeting in allocating feed resources
9. Feed supply and demand model
10. Feeding strategy for defined production targets
11. Simple cost and benefits calculation</td></tr>
<tr><td>References</td><td colspan="2">Ministry of Agriculture, Fisheries and Food & Great Britain. Department of Agriculture and Fisheries for Scotland & Northern Ireland. Dept. of Agriculture (1975). Energy allowances and feeding systems for ruminants. H.M.S.O, London
Preston T R and Leng R A 1987 Matching Ruminant Production Systems with Available Resources in the Tropics and Subtropics. PENAMBUL Books Ltd: Armidale NSW, Australia
INRA feeding system for ruminants. 2018. France
Haresign, W., and Cole, D.J. (Editors). 1990.Recent Advances in Animal Nutrition. Butterworth
National Research Council. 2007. Nutrient Requirements of Small Ruminants: Sheep, Goats, Cervids, and New World Camelids. Washington, DC: The National Academies Press. https://doi.org/10.17226/11654.
National Research Council. 2001. Nutrient Requirements of Dairy Cattle: Seventh Revised Edition, 2001. Washington, DC: The National Academies Press. https://doi.org/10.17226/9825.
National Research Council. 2016. Nutrient Requirements of Beef Cattle: Eighth Revised Edition. Washington, DC: The National Academies Press.</td></tr>
<tr><td rowspan="2">Learning Media</td><td>Software</td><td>Hardware</td></tr>
<tr><td>Video
PowerPoint
E-Book</td><td>Laptop
Reference books</td></tr>
<tr><td>Teaching Team</td><td colspan="2">1. Prof. Dr. Ir. Siti Chuzaemi, MS., IPU., ASEAN Eng</td></tr>
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	2. Prof. Dr. Ir. Hendrawan Soetanto, M. Rur. Sc 3. Prof. Dr. Ir. Kusmartono 4. Prof. Dr. Ir. Hartutik, S.Pt., MP., IPU., ASEAN Eng 5. Dr. Ir. Mashudi, M.Agr.Sc., IPM, ASEAN Eng 6. Dr. Ir. Marjuki, M.Sc 7. Asri Nurul Huda, S.Pt., MP., M.Sc 8. Poespitasari Hazanah Ndaru, S.Pt., MP.
Prerequisite Courses	1. Introduction to Animal Nutrition and Forage 2. Ruminant Animal Nutrition Science

Week	Sub-CLO	Indicator	Learning Materials / Topics	Learning Methods	Criteria & Form of Assessment	Weighted Score (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Able to understand the scope/structure of the Ruminant Animal Nutrition Science II course	Able to explain the scope/structure of the Ruminant Animal Nutrition Science II course correctly	Introduction: - RPS - Lecture contract	Lectures and Discussions	Pre-test	
2	Able to understand several feeding systems for tropical and subtropical areas	Able to explain several feeding systems for tropical and subtropical areas correctly	Feeding systems and general nutritional requirements for ruminants	Lectures and Discussions		
3	Able to explain the steps to calculate the nutritional requirements for sheep and goats	Able to explain the steps to calculate the nutritional requirements for sheep and goats correctly	- Calculation of nutritional requirements for sheep and goats	Lectures and Discussions	Structured Assignment	
4	Able to explain the steps to calculate the nutritional requirements for beef cattle	Able to explain the steps to calculate the nutritional requirements for beef cattle correctly	- Calculation of nutritional requirements for beef cattle	Lectures and Discussions		

5	Able to explain the steps to calculate the nutritional requirements for dairy cows	Able to explain the steps to calculate the nutritional requirements for dairy cows correctly	- Calculation of nutritional requirements for dairy cows	Lectures and Discussions		
6	Able to explain the steps to calculate the nutritional requirements for working animals	Able to explain the steps to calculate the nutritional requirements for working animals correctly	- Calculation of nutritional requirements for working animals	Lectures and Discussions	Quiz	
7	Able to explain the steps to calculate the nutritional requirements for sheep	Able to explain the steps to calculate the nutritional requirements for sheep correctly	- Calculation of nutritional requirements for sheep	Lectures and Discussions		
8	Midterm Exam					
9	Able to explain the steps to calculate the nutritional requirements for goats and dairy goats	Able to explain the steps to calculate the nutritional requirements for goats and dairy goats correctly	- Calculation of nutritional requirements for goats and dairy goats	Lectures and Discussions		
10	Able to explain the steps to calculate the nutritional requirements for beef cattle and dairy cows	Able to explain the steps to calculate the nutritional requirements for beef cattle and dairy cows correctly	- Calculation of nutritional requirements for beef cattle and dairy cows	Lectures and Discussions		
11	Able to explain the steps to calculate the nutritional requirements for working animals (cows and buffalos)	Able to explain the steps to calculate the nutritional requirements for working animals (cows and buffalos) correctly	- Calculation of nutritional requirements for working animals (cows and buffalos)	Lectures and Discussions	Structured Assignment	
12	Able to explain the concept of	Able to explain the concept of	- Concept of feed budgeting for			

	feed budgeting in meeting nutritional needs	feed budgeting in meeting nutritional needs correctly	ruminant animal feed			
13	Able to explain the application of the concept of feed budgeting in the supply and demand models in a particular area	Able to explain the application of the concept of feed budgeting in the supply and demand models in a particular area correctly	- The application of the concept of feed budgeting in the supply and demand models in a particular area			
14	Able to explain feeding strategies for ruminant animals by utilizing available feed resources	Able to explain feeding strategies for ruminant animals by utilizing available feed resources correctly	- Feeding strategies for ruminant animals	Lectures and Discussions		
15	Able to calculate the price, cost, and benefits of rations that are compiled with production targets	Able to calculate the price, cost, and benefits of rations that are compiled with production targets correctly	- Calculating the B/C ratio of the ration for the specified production target	Lectures and Discussions	Quiz	
16	Final Exam					

ASSESSMENT RUBRIC

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	Advanced Ruminant Animal Nutrition		
Score Level	CLO and PLO	Conversion	PLO Score
Program Learning Outcomes-S1: Able to design and conduct experiments, analyze and interpret data to make appropriate decisions in solving problems in the field of animal science (LO 2) Course Learning Outcomes 1: Calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding) - Raising purposes (breeding, fattening, working)			
Very Good (4)	Have **comprehensive** abilities to calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding) - Raising purposes (breeding, fattening, working)	80-100	1
Good (3)	Have **good** abilities to calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding)	70-79	0.75

	- Raising purposes (breeding, fattening, working)		
Moderate (2)	Have **moderate** abilities to calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding) - Raising purposes (breeding, fattening, working)	60-69	0.5
Poor (1)	Have **poor** abilities to calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding) - Raising purposes (breeding, fattening, working)	<60	0.25

Score Level	CLO and PLO	Conversion	PLO Score
Program Learning Outcomes-S1: - Able to apply animal technology that is oriented to the animal industry, production (quality and quantity), efficiently and sustainably (LO 4) - Able to provide alternative solutions to problems related to ruminant animal nutrition to various problems that arise in the community, nation, country, and world (LO 7). Course Learning Outcomes 2: Implement the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes			
Very Good (4)	Have **comprehensive** abilities in implementing the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and	80-100	0.5

	achieving the production target of ruminant animals based on their raising purposes		
Good (3)	Have **good** abilities in implementing the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes	70-79	0.375
Moderate (2)	Have **moderate** abilities in implementing the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes	60-69	0.25
Poor (1)	Have **poor** abilities in implementing the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes	<60	0.125

Formula to Calculate PLO Score: $\frac{Level\ Skor}{\sum level\ skor} \times \frac{\sum CLO}{\sum PLO}$

CLO Score Calculation

Assessed components	Component Weights	CLO Weight on the Score	
		CLO 1	CLO 2
Practicum	0.3	0.6	0.4
Midterm Exam	0.3	1	
Final Exam	0.3	0.3	0.7
Assignment	0.05	0.6	0.4
Quiz	0.05	0.6	0.4
CLO WEIGHT			

PLO Score Calculation

CLO	CLO Score	CLO Weight	PLO		
			PLO 2	PLO 4	PLO 7
CLO 1			1		
CLO 2				0.4	0.6

Basic Format for the Lecture Portfolio

	UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**		
Course: Advanced Ruminant Animal Nutrition	Code: PEN60007	RMK:	Semester: 6
Lecturers	1. Prof. Dr. Ir. Siti Chuzaemi, MS., IPU., ASEAN Eng 2. Prof. Dr. Ir. Hendrawan Soetanto, M. Rur. Sc 3. Prof. Dr. Ir. Kusmartono 4. Prof. Dr. Ir. Hartutik, S.Pt., MP., IPU., ASEAN Eng 5. Dr. Ir. Mashudi, M.Agr.Sc., IPM, ASEAN Eng 6. Dr. Ir. Marjuki, M.Sc 7. Asri Nurul Huda, S.Pt., MP., M.Sc 8. Poespitasari Hazanah Ndaru, S.Pt., MP.		

Introduction

This course discusses steps to calculate the nutritional needs of ruminant animals by considering factors, such as type of animals, physiological status, and raising purposes (breeding, fattening, working) and strategies to meet and ensure the fulfillment of nutritional needs throughout the year. To reach the target above, the **feed budgeting** concept will be developed to optimize supply and demand models for the potential of feed resources in a particular area

1	**Objectives** (describe general and specific course objectives)
	1. The students can calculate and meet the nutritional needs of ruminant animals by considering the following factors: - Types of animals (sheep, goats, beef cattle, and dairy cows) - Physiological status (newborn ruminants, post-weaning, virgin, pregnant, dry, and breastfeeding) - Raising purposes (breeding, fattening, working) 2. Implement the concept of **feed budgeting** in managing the potential of feed resources to ensure the fulfillment of nutritional needs throughout the year and achieving the production target of ruminant animals based on their raising purposes
2	**Learning Strategies** (describe the strategy used to achieve the course objective - CLO)
	The learning strategies carried out in lectures include: 1. providing lectures,

	2. discussions, 3. structured assignments, 4. quiz, and by using the concepts of SCL (Student Center Learning) and TCL (Teacher Center Learning).
3	**Lecture Management** (describe the lecture management: lectures, tutorials, practicum, assignments, major assignments, etc.)
	1) Lecture: 100 minutes/meeting (14 meetings) 2) Practicum of 50 minutes/meeting (14 meetings) 3) Structured assignments/quizzes/group presentation 4) Attendance: 80% of total attendance
4	**Lecture Contents** (explain its suitability with the applicable curriculum)
	This lecture material consists of: 1. Methods for determining the nutritional needs of ruminant animals 2. Introduction to feeding systems accompanied by examples 3. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for sheep 4. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for goats 5. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for beef cattle 6. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfill nutritional needs for dairy cattle 7. Steps to calculate nutritional needs (energy, protein, and fiber content) and fulfillment of nutritional needs for working animals 8. Development of the concept of **Feed Budgeting** in allocating feed resources 9. Feed supply and demand model 10. Feeding strategy for defined production targets 11. Simple cost and benefits calculation
5	**Lecture Participants** (provide an overview of the lecture participants)
	The lecture participants of the Ruminant Animal Nutrition Science course are 6th semester students
6	**Attendance Percentage** (% lecturer attendance; % student attendance)
	The lecturers are required to be present 100% in the lecture process, while the students have a maximum tolerance for the absence of 20% to be able to take the Final Exam.

7	**Evaluation System** (explain the homework, quizzes, group assignments, practicum, etc.)
	The evaluation is carried out by giving: 1. Quiz (5%), with the weighted score of CLO 1: 60%; CLO 2: 40% 2. Structured assignments (5%) with the weighted score of CLO 1: 60%; CLO 2: 40% 3. Practicum (30%) with the weighted score of CLO 1: 60%; CLO 2: 40% 4. Midterm Exam (30%) with the weighted score of CLO 1: 100% 5. Final Exam (30%) with the weighted score of CLO 1: 60%; CLO 2: 40%;
8	**Class Observation** (explain important and interesting things that were encountered during the lecture)
9	**Learning Outcomes** (explain the achievement of the objectives that have been set, also include the learning achievements that can be explained)
	1. Able to design and conduct experiments, analyze and interpret data to make appropriate decisions in solving problems in the field of animal science (LO 2) 2. Able to apply animal technology that is oriented to the animal industry, production (quality and quantity), efficiently and sustainably (LO 4) 3. Able to provide alternative solutions to problems related to ruminant animal nutrition to various problems that arise in the community, nation, country, and world (LO 7)
10	**Obstacles** (provide an overview of the main obstacles in the learning process)
11	**Score Distribution** (provide the score distribution following the learning achievements of this course)
	1. Quiz (5%) with the weighted score of CLO 1: 60%; CLO 2: 40% 2. Structured assignments (5%) with the weighted score of CLO 1: 60%; CLO 2: 40% 3. Practicum (30%) with the weighted score of CLO 1: 60%; CLO 2: 40% 4. Midterm Exam (30%) with the weighted score of CLO 1: 100% 2. Final Exam (30%) with the weighted score of CLO 1: 60%; CLO 2: 40%;
12	**Conclusion**
13	**Improvement Recommendations**
	Appendices:
	1. 2. etc.