UNIVERSITY OF BRAWIJAYA
FACULTY OF ANIMAL SCIENCE
DEPARTMENT OF ANIMAL SCIENCE
UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE
LESSON PLAN – FORAGE SCIENCES

Course	Code	Weight (credits)	Semester	Compilation Date
Forage Sciences	PEN60002	3 (2-1)	2	January 14, 2020

Authorization	Supervising Lecturer	Head of Undergraduate Study Program of Animal Science	Vice Dean 1
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Learning Outcomes (LO)

LO

1. LO 3: Demonstrate attitudes of friendly and caring about animal welfare and permissible (halal) consumption.
2. LO 6: Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science
3. LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis
4. LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way

CLO

1. Able to identify types, adaptation, and potential for forage crop production. (CLO 3, CLO 6)
2. Able to evaluate the factors that affect the production and utilization of forage crops (CLO 10,11)

	3. Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops (CLO 10, CLO 11)	
Brief Course Description	This course describes the types of forage crops, adaptation, production potential, determinants of production, and production management and their use in animals.	
Topics	1. Functions, roles, and types of forage crops 2. Factors affecting the production of forage crops (crop factors, soil, climate, management) 3. Production and Quality of Forage Crops 4. Strategy and Utilization of Forage Crops	
References	1. www.tropicalforages.info 2. Crowder, L.V and H.R. Chheda, 1982. Tropical Grassland Husbandry. Longman Group Limited. Essex. UK 3. Subagiyo, I and Kusmartono, 2017, Ilmu Kultur Padangan, UB Press, Malang 4. Soepardi, G.,1983. Sifat dan Ciri Tanah, Departemen Tanah, Fakultas Pertanian IPB,Bogor. 5.	
Learning Media	Software	Hardware
	www.tropicalforages.info plantsnap	
Teaching Team	1. Prof. Dr. Ir. Ifar Subagiyo, M.Agr.St 2. Prof.Dr. Ir. Hendrawan S.,M.Rur.Sc 3. Dr.Ir. Siti Nurul Kamaliyah,MP 4. Ir. Hanief Eko Sulistyo,MP 5. Artharini Irsyammawati,S.Pt.MP 6. Asri Nurul Huda, S.Pt.,M.Sc.MP	

Prerequisite course	Biology					
Week (s)	Sub-Course Learning Outcomes (SCLO)	Indicators	Learning Materials/ Topics	Learning Methods	Criteria & Form of Assessment	Weighted Scores (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Able to understand the meaning, function, and role of forage crops as well as the situation and condition of animal production technology(TPT) in Indonesia	Able to explain the meaning, function, and role of forage crops	INTRODUCTION Definition, course description, and lecture contract The situation and condition of animal production technology (TPT) in Indonesia The function and role of animal production technology(TPT)	Lectures	Midterm Exam	
2	Able to understand plant factors (morphology, growth)	Able to explain and differentiate the morphology and growth of forage crops (grass and legume)	PLANT FACTORS Morphology and growth of forage crops	Lectures and Discussion	Midterm Exam	
3	Able to identify types, adaptations, and the potential of grass and pasture	Able to explain the types, adaptations, and the potential of grass and pasture	PLANT FACTORS Adaptation and potential of grass and pasture (types, adaptation, and potential)	Lectures and Discussion	Structured Assignment and Midterm Exam	
4	Able to identify the types, the	Able to explain the types, the adaptation, and the potential of tree and shrub legumes	PLANT FACTORS	Lectures and Discussion	Midterm Exam	

	adaptation, and the potential of tree and shrub legumes		Adaptation and potential of tree and shrub legumes (types, adaptation, and potential)			
5	Able to understand climate factors (solar radiation, photoperiod, temperature, and rainfall) that affect production and quality	Able to explain climate factors on the production of forage crops	CLIMATE FACTORS ● Solar radiation (Photosynthesis of C3 and C4 plants and Photoperiod) ● Temperature Rainfall	Lectures and Discussion	Midterm Exam	
6	Able to understand soil factors in terms of chemistry (nutrients and acidity) that affect production and quality	Able to explain soil factors in terms of chemistry (nutrients and acidity) that affect the production of forage crops	SOIL FACTORS Chemistry: nutrients & acidity	Lectures and Discussion	Quizzes and Midterm Exam	
7	Able to understand soil factors in terms of physical and biological that affect the production and	Able to explain the soil factors in terms of physical and biological that affect the production of forage crops	SOIL FACTOR Physical: texture, structure, air, and water Biology: BO, m.o and biological processes	Lectures and Discussion	Midterm Exam	

	quality of forage (HPT)					
8	MIDTERM EXAM					
9	Able to understand the factors of cultivation management, especially planting preparation (land and planting material), that affects production and quality	Able to explain and make planting preparations (especially seed preparation)	CULTIVATION MANAGEMENT Planting preparation : ● Land ● Planting material	Lectures and Discussion	Final Exam	
10	Able to understand cultivation management related to maintenance (fertilizing, replanting, and thinning) that affects production and quality	Able to explain maintenance (fertilizing, replanting, thinning, irrigation, eradicating pests and diseases) on the production and quality of forage	CULTIVATION MANAGEMENT Maintenance : ● Fertilizing ● replanting, thinning, irrigation, eradicating pests and diseases)	Lectures and Discussion	Final Exam	
11	Able to understand cultivation management	Able to explain the effect of harvesting (age and intensity) on the production and quality of forage	CULTIVATION MANAGEMENT Harvesting : ● Age/interval of defoliation Intensity of defoliation	Lectures and Discussion	Structured Assignment and Final Exam	

	related to harvesting (age and intensity of defoliation)					
12	Able to understand the definition and quality of forage production as well as the factors that affect forage production and quality as well as an introduction to preservation	Able to explain the production and quality of forage, Able to explain the factors that affect production and forage	PRODUCTION AND QUALITY OF FORAGE ● Definition and quality of production ● Factors that affect production and quality	Lectures and Discussion	Final Exam	
13	Able to understand indicators and measurements of forage production and quality	Able to explain the indicators of production and quality Able to estimate the measurement of forage production.	PRODUCTION AND QUALITY OF FORAGE ● Indicators of production and quality ● Measurement of production and quality	Lectures and Discussion	Final Exam	
14	Able to understand the strategy of using forage crops (cut and carry system)	Able to explain and give examples of the strategy of using animal production technology (cut and carry system)	ANIMAL PRODUCTION TECHNOLOGY (TPT) UTILIZATION STRATEGIES (Pasture) ● Botanical composition ● Stocking rate	Lectures and Discussion	Final Exam	

15	Able to understand the strategy of using forage crops (Grazing).	Able to explain and give examples of the strategy of using animal production technology (grazing)	ANIMAL PRODUCTION TECHNOLOGY (TPT) UTILIZATION STRATEGIES *(cut and carry system)* ● Carrying capacity ● Introduction to preservation	Lectures and Discussion	Quizzes and Final Exam	
16	FINAL EXAM					

RUBRICS FOR ASSESSMENT

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	FORAGE SCIENCES		
Score Level	CLO and PLO	Conversion	PLO score
PLO ….: PLO 3: Demonstrate attitudes of friendly and caring about animal welfare and permissible (halal) consumption. PLO 6: Able to apply biological science, physiology, nutrition science, breeding science, animal raising management to comprehend the concept and implement it in the field of animal science CLO ...: Able to identify types, adaptation, and potential of forage crop production			
Very good (4)	Able to identify types, adaptation, and potential of forage crop production **comprehensively**	80-100	

Good (3)	Able to identify types, adaptation, and potential of forage crop production **properly**	70-79	
Moderate (2)	Able to identify types, adaptation, and potential of forage crop production **quite well**	60-69	
Poor(1)	Able to identify types, adaptation, and potential of forage crop production **poorly**	<60	
Score Level	CLO and PLO	Conversion	PLO score
PLO ….: 1. PLO 10: Able to involve themselves in the learning process and discussion on an ongoing basis 2. PLO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way CLO ...: (CLO 2) Able to evaluate the factors that affect the production and utilization of forage crops			
Very good (4)	Able to identify, analyze, and evaluate the factors that affect the production and utilization of forage crops **comprehensively**	80-100	1

Good (3)	Able to identify, analyze, and evaluate the factors that affect the production and utilization of forage crops **properly**	70-79	0,75
Moderate (2)	Able to identify, analyze, and evaluate the factors that affect the production and utilization of forage crops **quite well**	60-69	0,5
Poor (1)	Able to identify, analyze, and evaluate the factors that affect the production and utilization of forage crops **poorly**	<60	0,25
Score Level	CLO and PLO	Conversion	PLO score
PLO ….: PLO 10: Able to involve themselves in the learning process and discussion on an ongoing basis PLO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way CLO ...: (CLO 3) Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops			
Very good (4)	Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops **comprehensively**	80-100	1

Good (3)	Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops **properly**	70-79	0,75
Moderate (2)	Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops **quite well**	60-69	0,5
Poor (1)	Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops **poorly**	<60	0,25

How to Calculate the PLO Score : $\frac{Score\ Level}{\sum Score\ Level} \times \frac{\sum CLO}{\sum PLO}$

Calculation of CLO Score

Components assessed	Component Weights	CLO Weight against Score		
		CLO 1	CLO 2	CLO 3
Midterm Exam	0.3	0.4	0.6	
Final Exam	0.3		0.5	0.5
Practicum	0.3	0.3	0.3	0.4
Assignments	0.05	0.5	0.5	
Quizzes	0.05		0.5	0.5
CLO WEIGHT				

The orange one must be filled by the supervisory team

Filling Steps:

1. Components of assessment = any components that will be assessed in one course (For example, Midterm exam, Final Exam, Presentation, Quizzes, etc)
2. Component Weights = Determine the weight of each component where the total of all components is 1.
3. CLO Weight against Score
    a. Show the number of CLO in each course (for example, the animal feed industry course has 4 CLO).
    b. Determine the component of assessment aims to achieve any CLO number
    c. The total weight of the CLO score for each component is 1

Calculation of PLO Score

CLO	CLO Score	CLO Weight	PLO			
			PLO 3	PLO 6	PLO 10	PLO 11
CLO 1			0.3	0.7		
CLO 2					0.4	0.6
CLO 3					0.4	0.6

The orange one must be filled by the supervisory team

Filling Steps:

1. CLO= Jot down the number of CLO for each course (refer to the previous table)
2. PLO= Jot down the number of PLO in each course based on the Semester Lesson Plan (RPS)
3. PLO weight
    a. Show the number of PLO in each course (for example, the animal feed industry course has 3 PLO).
    b. Determine the component of assessment aims to achieve any PLO number
    c. The total weight of the PLO score for each component is 1

Lecture Portfolios

	UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**		
Course: Forage Sciences	Code: PEN60002	RMK :	Semester: 2 (Two)
Lecturer	-		

Introduction (Describe the explanation needed about this course, experiences that have been done)

This course describes the types of forage crops, adaptation, production potential, determinants of production and production management, and their use in animals.

1	**Objectives** (Describe the objectives of general and specific course)
	After completing this course students can: 1. Able to identify types, adaptation, and potential for forage crop production. 2. Able to evaluate the factors that affect the production and utilization of forage crops 3. Able to simulate the growing of forage crops in pots by taking into account the factors that affect the production of forage crops
2	**Learning Strategies** (Describe the strategies used to achieve course objectives - CLO)

	Learning strategies of Forage Crop Science course is a combination of *Teacher-Centered Learning* (TCL) and *Student-Centered Learning* (SCL).
3	**Lecture Management** (Describe the management of lectures: lectures, tutorials, practicum, assignments, big assignments, etc)
	The learning methods applied in this Forage Crop Science course is face-to-face learning, student presentations, small group discussions, independent assignments, quizzes, and practicum.
4	**Lecture Contents** (explain their suitability with the applicable curriculum)
	The main topic in this course is: 1. Functions, roles, and types of forage crops 2. Factors affecting the production of forage crops (crop factors, soil, climate, management) 3. Production and Quality of Forage Crops 4. Strategy and Utilization of Forage Crops The lecture content is based on the semester program plan and learning activities.
5	**Lecture Participants** (describe the participants)
	The lecture participants are all students in semester 2 (two) of the Faculty of Animal Science, Universitas Brawijaya who have taken the Biology course.
6	**Percentage of Attendance** (% attendance of lecturers;% attendance of students)
	Lectures are consist of: - 16 meetings and minimum student attendance 80%.
7	**Evaluation System** (explain homework, quizzes, group assignments, practicum, etc.)

	The evaluation system for this course is face-to-face learning, group assignments, student presentations, small group discussions, independent assignments, and practicum.
8	**Class Observation** (explain important and interesting things encountered during the lecture)
9	**Learning Outcomes** (explain the achievement of the objectives that have been set and include the learning outcomes that can be explained)
	Learning outcomes include: 1. Group Assignment 2. Midterm Exam 3. Final Exam 4. Practicum
10	**Obstacles** (describe the main barriers to learning)
11	**Distribution of score** (provide the distribution of score following the learning outcomes of this course)
12	**Conclusion**
13	**Recommended Improvement**
	Appendices:

	1. 2. Etc.