SEMESTER COURSE PLAN (SCP)

Forage Crop Science
(23I01111002)

TEACHING TEAM :

Prof. Dr. Ir. Syamsuddin Hasan, M.Sc.

Prof. Dr. Ir. Budiman, MP.

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BACHELOR PROGRAMME IN ANIMAL HUSBANDRY
FACULTY OF ANIMAL SCIENCE
HASANUDDIN UNIVERSITY
MAKASSAR

2025

BACHELOR PROGRAMME IN ANIMAL HUSBANDRY
FACULTY OF ANIMAL SCIENCE
HASANUDDIN UNIVERSITY

Vision

Vision of the study program :
Becoming an international standard in livestock education provider based on the Indonesian Maritime Continent

Visi Strategi

In accordance with the vision, mission, and objectives that have been set, the Animal Husbandry Study Program of the Faculty of Animal Science sets the following objectives to be achieved:

a. Improving the quality of learning implementation that is in line with the needs of industry and society based on research and international standards;
b. Creating networks and partnerships in the development of Animal Husbandry science and technology and its utilization in the implementation of learning;
c. Producing graduates who have character, vision, creativity and innovation in the field of animal husbandry science and technology with an entrepreneurial perspective.

Mission

The mission carried out in the implementation of the Bachelor of Animal Husbandry Study Program, Faculty of Animal Husbandry, Hasanuddin University is

1) Organizing quality learning to produce independent and globally competitive Animal Husbandry scholars.
2) Developing animal husbandry science for the benefit of the nation.
3) Providing a conducive academic climate for implementing education with an entrepreneurial perspective.

Graduate Profiles

No	Profile	Description
1	Manager	Graduates who apply concepts and techniques in managing livestock farming and institutions related to livestock businesses such as financial institutions
2	Young Researcher	Graduates who able to apply scientific concepts and methods in solving problems in the development of the field of Animal Husbandry
3	Planners	Graduates who able to prepare potential and problem analysis, as well as formulate plans and strategies for the development of the livestock and related industries
4	Educators	Graduates who have the ability and skills to transfer science and technology to students in the field of animal husbandry
5	Entrepreneur	Graduates who able to apply business in the field of Animal Husbandry as their main business, or business development to support livestock business
6	Bureaucrat	Graduates who are able to organize government duties, especially in the affairs of livestock development

Learning Outcomes imposed on the Course

ILO-2 (KU2) - 1) Mastering the concepts, theories, and methods of devSLOping effective, efficient, and sustainable livestock (K-01).

ILO-7 (KK1) - 7)Able to apply livestock science and technology that is oriented towards increasing production, efficiency, quality, and sustainability (SS-01)

Course Learning Outcomes (CLO)

CLO-1: Able to explain and compare terminology, classification, morphology, and systematics of forage plants ()
CLO-2: Able to apply cultivation processes, growth, and devSLOpment of various types of forage plants ()

CLO-3: Able to explain the physiology and compare the nutritional value of forage plants () CLO- 4: Able to plan land use and devSLOpment models for forage plants ()

Sub-CLO

Sub CLO-1: Students are able to explain the terminology of forage plants, forage plant science, and the classification of forage plants (1 time) ()

Sub CLO-2: Students are able to explain the systematics and distinguish the morphology of grasses from legumes (1 time) ()

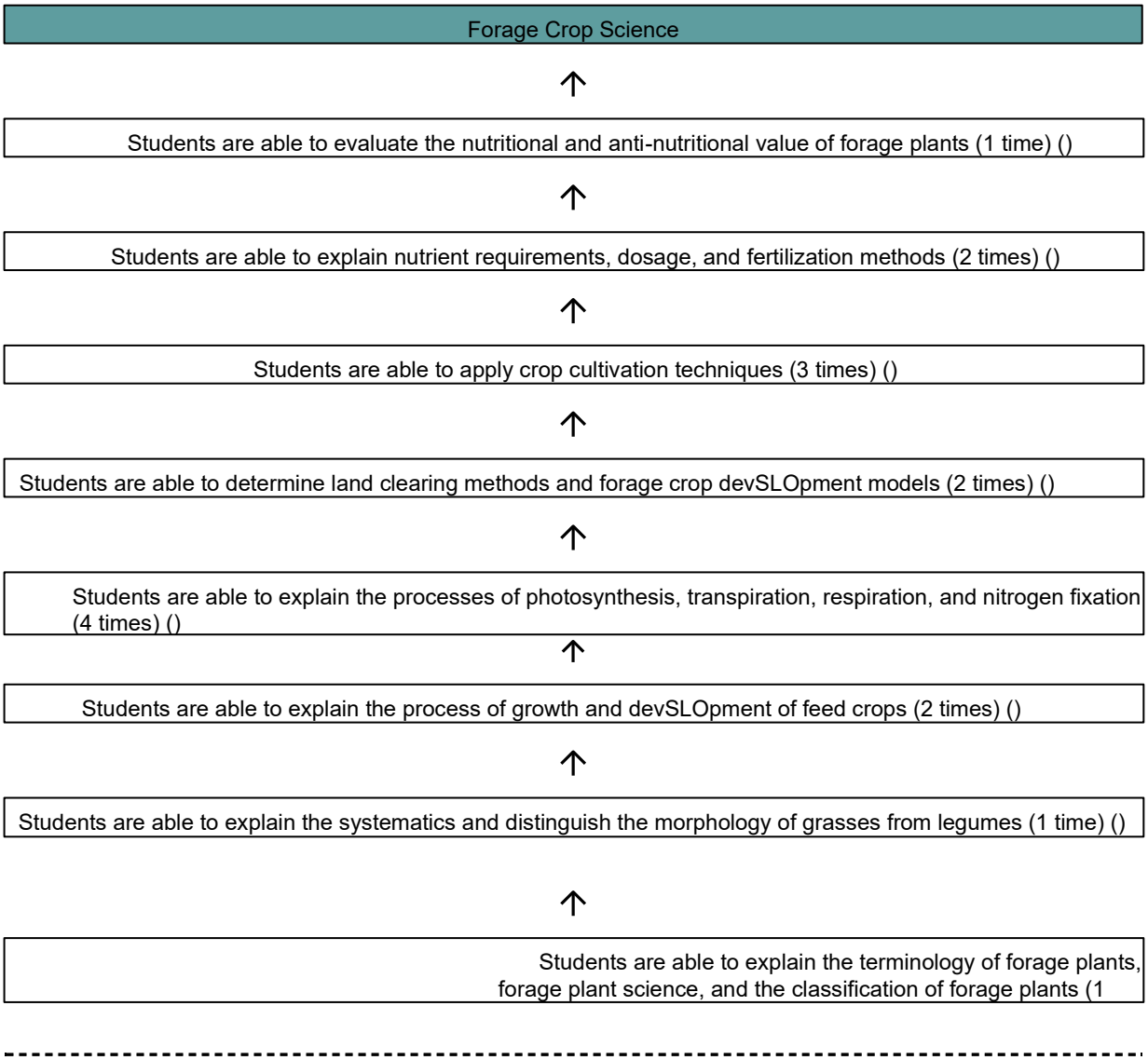
Sub CLO-3: Students are able to explain the growth and devSLOpment processes of forage plants (2 times) ()

Sub CLO-4: Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()

Sub CLO-5: Students are able to determine land clearing methods and crop devSLOpment models (2 times) () Sub CLO-6: Students are able to apply crop cultivation techniques (3 times) ()

Sub CLO-7: Students are able to explain nutrient requirements, dosage, and fertilization methods (2 times) () Sub CLO-8: Students are able to evaluate the nutritional and anti-nutritional value of feed crops (1 time) ()

Learning Analysis



HASANUDDIN UNIVERSITY
FACULTY OF ANIMAL SCIENCE
BACHELOR PROGRAMME IN ANIMAL HUSBANDRY
SEMESTER COURSE PLAN

Course	Code	Course Group	Credits	Semester	Date of Preparation
Forage Crop Science	23I01111002	Nutrition	2	2	None
Authority	**Developer Lecturer**	**Course Coordinator**	**Head of study Program**		
	Prof. Dr. Ir. Syamsuddin Hasan, M.Sc., Prof. Dr. Ir. Budiman, MP., Dr. Rinduwati, S.Pt.,MP., Marhamah Nadir, SP.,M.Si., Ph.D.	Prof. Dr. Ir. Budiman, MP	Dr. Agr. Ir. Renny Fatmyah Utamy, S. Pt., M. Agr., IPM		

Course Learning Outcomes	**ILOs that are imposed on the course**	
	ILO-2	Mastering the concepts, theories, and methods of devSLOping effective, efficient, and sustainable livestock (K-01).
	ILO-7	Able to apply livestock science and technology that is oriented towards increasing production, efficiency, quality, and sustainability (SS-01).
	ILO-	
	ILO⇒ Course Learning Outcomes (CLO)	
	Upon completion of this course, it is expected that:	
	CLO-1	Able to explain and compare terminology, classification, morphology, and systematics of forage plants ()
	CLO-2	Able to apply cultivation processes, growth, and devSLOpment of various types of forage plants ()
	CLO-3	Able to explain the physiology and compare the nutritional value of forage plants () CLO- 4: Able to plan land use and devSLOpment models for forage plants ()

	CLO⇒ Sub-CLOs	
		sub CLO-1 Students are able to explain the terminology of forage plants, forage plant science, and the classification of forage plants (1 time) ()
		Sub CLO-2: Students are able to explain the systematics and distinguish the morphology of grasses from legumes (1 time) ()
		Sub CLO-3: Students are able to explain the growth and devSLOpment processes of forage plants (2 times) ()
		Sub CLO-4: Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()

Correlation between ILOs/CLOs to Sub-CLOs

ILOs that are imposed on the course	ILO	SUB CLO	Form Assessment+						Weight	Value	Student Score
			Formative	Summative							
				Practice/Field	Quiz	Interactive Lecture	Case Study	Individual Paper Assignment			
SLO-	CLO-	SUB-CLO-1		5	5	5	0	0	15		
SLO-	CLO-	SUB-CLO-2		0	2	5	4	0	11		
SLO-	CLO-	SUB-CLO-3		0	0	5	0	2	7		
SLO-	CLO-	SUB-CLO-4		10	5	5	5	0	25		
SLO-	CLO-	SUB-CLO-5		0	5	5	0	0	10		
SLO-	CLO-	SUB-CLO-6		7	3	2	0	0	12		
SLO-	CLO-	SUB-CLO-7		5	5	0	0	0	10		
SLO-	CLO-	SUB-CLO-8		0	10	0	0	0	10		

Course Description	
Learning Materials / Subject Matter	
Reference	**Key Reference**
	1. Hawolambani, Y. U., Nastiti, H. P. dan Manggol, Y. H. (2015). Produksi hijauan makanan ternak dan komposisi botani padang penggembalaan alam pada musim hujan di Kecamatan Amarasi Barat Kabupaten Kupang. Jurnal Nukleus Peternakan, 2(1), 59-65. 2. Heryani, N. dan Rejekiningrum, P. (2019). Pengembangan pertanian lahan kering iklim kering melalui implementasi panca kelola lahan. Jurnal Sumberdaya Lahan, 13(2), 63-71. 3. Holik, Y. L. A., Abdullah, L. dan Karti, P. D. M. H. (2019). Evaluasi nutrisi silase kultivar baru tanaman sorgum (Sorghum bicolor) dengan penambahan legum Indigofera sp. pada taraf berbeda. Jurnal Ilmu Nutrisi dan Teknologi Pakan, 17(2), 38-46. 4. Kusmana, C. (2015). Makalah utama: keanekaragaman hayati (biodiversitas) sebagai elemen kunci ekosistem kota hijau. Pros Sem Nas Masy Biodiv Indon, 1(8), 1747-1755. 5. Nauroh, I. dan Faturrizky, I. (2022). Teknologi Industri Pertanian: Analisa Kualitatif Menghadapi Tantangan Global Menuju Pertanian Berkelanjutan di Indonesia. Change Think Journal, 1(03), 227-243. 6. Nurlaha, N., Setiana, A. dan Asminaya, N. S. (2014). Identifikasi jenis hijauan makanan ternak di lahan persawahan desa babakan kecamatan Dramaga Kabupaten Bogor. Jurnal Ilmu dan Teknologi Peternakan Tropis, 1(1), 54-62.
	Additional Reference
	1. Adlan, Z. U., dan Setiawan, B. D. (2023). Identifikasi Potensi Hijauan Pakan Ternak Kerbau Rawa Pada Daerah Basis Di Kabupaten Musi Rawas Utara. Jurnal Stock Peternakan, 5(2), 164-170. 2. Aminah, M., Musa H., Widiatmakac dan Hari W. (2018). Hambatan partisipasi petani dalam pengembangan padi organik di Kabupaten Tasikmalaya. Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan (Journal of Natural Resources and Environmental Management), 8(3), 330-338. 3. Andriani, O. A., Hamzari, H., Misrah, M. dan Hamka, H. Pendugaan Volume, Biomassa dan Cadangan Karbon di Atas Permukaan Tanah Pada Kawasan Hutan Desa Lampo Kecamatan Banawa Tengah Kabupaten Donggala. Jurnal Warta Rimba, 9(1), 55-63. 4. Arief, A. M. dan Midarti, W. (2022). Evaluasi Kemampuan Kesuburan Tanah di Kecamatan Tutur Pasuruan. Folium: Jurnal Ilmu Pertanian, 6(2), 71-89.

Teaching Team	Prof. Dr. Ir. Syamsuddin Hasan, M.Sc., Prof. Dr. Ir. Budiman, MP., Dr. Rinduwati, S.Pt.,MP., Marhamah Nadir, SP.,M.Si., Ph.D.
Course requirements	

Week	Sub CLO (End ability of each learning stage)	Assesment		Forms and Methods of Learning [time estimate]		Content	Weight of Assesment (%)
		Indicator	Technique & Criteria	Offline	Online		
1	2	3	4	5	6	7	8
1	Students are able to explain the terminology of forage plants, forage plant science, and the classification of forage plants (1 time) ()	Formative: Summative: Accuracy in classifying types of grasses and legumes that are forage plants based on morphology	Formative Criteria: Summative Criteria: Practical/Field Practice (5) Quiz (5) Interactive Lectures (5) Assessment Techniques: None	Lectures: Small Group Discussion, Other Methods 1 session of 2 hours		1. Understanding forage plants, plant science, requirements for good plants, objectives of studying forage plants, types of forage plants (forage, browse, herbage, forb, legume, grass, etc.) 2. Classification of forage plants	1
11	Students are able to explain the systematics and distinguish the morphology of grasses from legumes (1 time) ()	Fomative: Summative: Accuracy in distinguishing the morphology and systematics of grass plants and legumes	Formative Criteria: Summative Criteria: Interactive Lecture (5) Quizzes (2) Case Study (4) Assessment Techniques: None	Lecture: Small Group Discussion, Other Methods 2 x 2 x 50		1.Plant Morphology Above-ground parts (Aerial Parts) Leaves, stems, stolons, flowers/fruits 2.Subterranean parts Roots, rhizomes 3. Growth characteristics of grass plants	11

						Legume plant morphology 1. Above-ground parts (Aerial parts) Leaves, • stems, flowers/fruits 2. Subterranean parts • Roots, nodules Growth characteristics of legume plants	
3-4	Students are able to explain the growth and devSLOpment process of forage plants (2 times) ()	Formative Summative: Accuracy in summarizing the germination of forage plant seeds	Formative Criteria: Summative Criteria: Assessment Techniques: None	Lecture: Group Discussion (Small Group Discussion), Other Methods 2 sessions of 2 hours each		Seed germination and dormancy 1. Seed structure 2. Epicotyl and hypocotyl 3. Type of germination 4. Stages of seed germination 5. Conditions required for seed germination 6. Seed dormancy MGrowth Regulators	7
5	Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()	Formative Summative: Accuracy in explaining photosynthesis, light reactions, and dark reactions Accuracy in distinguishing the photosynthetic metabolism of C3 and C4 plants	Formative Criteria: Summative Criteria: Quiz (5) Case Study (5) Interactive Lecture (5) Laboratory/Field Practice (10) Assessment Techniques: None	Lecture: Small Group Discussion 3 sessions of 2 hours each		1. Understanding photosynthesis 2. Light reactions 3. Dark reactions 4. Apparatus photosynthesis 5. Photosynthetic metabolism of C3 and C4	25

5	Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()	Formative Summative: Accuracy in distinguishing between respiration and transpiration processes in plants	Formative Criteria: Summative Criteria: Assessment Techniques: None			1. Definition of respiration 2. Respiration Aerobic respiration anaerobic Definition of transpiration Types of transpiration 3. Factors affecting respiration	0
5-	Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()	Formative Summative: Accuracy in explaining the process of plant adaptation	Formative Criteria: Summative Criteria: Assessment Techniques: None			Plant adaptation to: ·Drought ·Salinity ·Nutrient deficienc Grazing and Cutting	0
5	Students are able to explain the processes of photosynthesis, transpiration, respiration, and nitrogen fixation (4 times) ()	Formative Summative: Accuracy in explaining the nitrogen fixation process	Formative Criteria: Summative Criteria: Assessment Techniques: None			Nitrogen cycle Nitrogen fixation - Fixation process - Nitrification process - Ammonification process - Denitrification process	10

9	Students are able to determine land clearing methods and crop devSLOpment models (2 times) ()	Formative Summative: Accuracy in summarizing the material on land use planning and utilization for forage crop cultivation	Formative Criteria: Summative Criteria: Interactive Lecture (5) Quiz (5) Assessment Technique: None	Lecture: Group discussion (Small Group Discussion), Other methods 2 x 2 x 50”		1. Land use planning 2. Models of forage crop devSLOpment · General grazing pastures · Silvopasture · Three-stratified system · Alley cropping · Living fence Grass strips Terrace reinforcement plants	10
11-13	Students are able to apply crop cultivation techniques (3 times) ()	Formative: Summative: Accuracy in presenting grass and legume cultivation techniques	Formative Criteria: Sumative Criteria: Practical/Field Practice (7) Interactive Lectures (2) Quizzes (3) Assessment Techniques: None	Lecture: Small Group Discussion, Other Methods 2 x 2 x 50”		1. Land preparation 2. Soil preparation 3. Seedling provision 4. Planting 6. Fertilization 7. Maintenance 8. Weeding/sugar removal 9. Harvesting/defoliation Storage/preservation	12

14	Students are able to explain nutrient requirements, dosage, and fertilization methods (2 times) ()	Formative: Summative: Accuracy in calculating dosage	Formative Criteria: Sumative Criteria: Quiz (5) Practical/Field Practice (5) Assessment Techniques: None	Lecture: Small Group Discussion, Other Methods 2 x 2 x 50		1. Macro and micro nutrients 2. Functions of Nutrients and Nutrient Deficiency 3. Types of fertilizers 4. How to calculate fertilizer dosage Fertilization techniques/methods for forage crops	10
16	Students are able to evaluate the nutritional and anti-nutritional value of forage crops (1 time) ()	Formative: - Summative: Accuracy in analyzing the quality and nutritional value of feed crops	Formative Criteria: Summative Criteria: Quiz (5) Quiz (5) Assessment Techniques: None	Lecture Other methods 1 x 2 x 50”		1. Visual assessment of forage quality a) Maturity level b) Leaf-to-stem ratio c) Color d) Foreign objects e) Touch f) Odor 2. Chemical testing a) Dry material b) Neutral detergent fiber (NDF) c) Acid detergent fiber (ADF) d) Crude protein 3. Factors Affecting Forage Quality 4. Forage quality standards 5. Antinutrients in feed crops	1

Matrix ILO, CLO, and Assessment Method

ILO / CLO	CLO-1

Evaluation Type and Assessment Weight

Type	Assessment Weight
Practical/Field Practice	2
Quiz	35
Interactive Lectures	27
Case Study	9
Individual Paper Assignments	2
Total	10

Assessment and Evaluation of Student Achievement of CLO

ILOs imposed on the Course	CLO	SUB CLO	Form of Assessment*						Weight	Value	Student Score
			Formative	Sumative							
				Interactive Lecture	Interactive Lecture	Problem Base Learning	Practicum/Field Practice	Case Study			
ILO-	CLO-	SUB-CLO- 1		5	5	0	5	0	15		
ILO-	CLO-	SUB-CLO- 1		5	2	0	0	4	11		
ILO-	CLO-	SUB-CLO- 1		5	0	2	0	0	7		
ILO-	CLO-	SUB-CLO- 1		5	5	0	10	5	25		
ILO-	CLO-	SUB-CLO- 1		5	5	0	0	0	10		
ILO-	CLO-	SUB-CLO- 1		2	3	0	7	0	12		
ILO-	CLO-	SUB-CLO- 1		0	5	0	5	0	10		
ILO-	CLO-	SUB-CLO- 1		0	10	0	0	0	10		

	HASANUDDIN UNIVERSITY **FACULTY OF ANIMAL SCIENCE** **BACHELOR PROGRAMME IN ANIMAL HUSBANDRY**

STUDENT STRUCTURED ASSIGNMENT PLAN

Course	Forage Crop Science				
Code	23I01111002	**Credits**	2	**Semester**	2 (two)
Developer Lecturer	Prof. Dr. Ir. Budiman, MP				

Task Form	**Task Time**
Documents/Magazines	2 weeks

Task Title

Cultivation process, growth, development of feed crop types

Course Learning Outcomes

Sub-CLO-2: Able to explain the process of growth and development of feed plants according to planned specifications (CLO-2)

Task Description

The student's assignment is a group assignment to make a Paper Task 'Processes of Growth and Development of Feed Plants'. The preparation of the paper follows the following procedure:

1. Each group chooses 1 of the sub-topics: Types of feed crops 1 group.
2. Discuss among the group members to identify the process stages for each of the selected sub-topics. Information related to the selected sub-topic can be obtained from textbooks and journals.
3. Write a paper with the following systematics:
   I. Introduction
   II. Discussion
   III. Conclusion
   IV. Literature
4. Group presentation

Assignment Method

1. Conducted in groups using the Small Group Discussion (SGD) learning method.

Form and Format of Output

a. Objective: Growth and development of feed crops
b. Form of Output: Paper

Indicators, Criteria and Assessment Weight

Indicators:

1. Systematicity: 10%
2. Accuracy of analysis: 25%
3. Depth of material: 30%
4. Novelty and reputation of library materials: 10%
5. Team cohesiveness: 10%
6. Mastery of the material: 15%

Implementation Schedule

2 weeks	

Other

-

Reference List
1. Heryani, N. dan Rejekiningrum, P. (2019). Pengembangan pertanian lahan kering iklim kering melalui implementasi panca kelola lahan. Jurnal Sumberdaya Lahan, 13(2), 63-71. 2. Holik, Y. L. A., Abdullah, L. dan Karti, P. D. M. H. (2019). Evaluasi nutrisi silase kultivar baru tanaman sorgum (Sorghum bicolor) dengan penambahan legum Indigofera sp. pada taraf berbeda. Jurnal Ilmu Nutrisi dan Teknologi Pakan, 17(2), 38-46. 3. Kusmana, C. (2015). Makalah utama: keanekaragaman hayati (biodiversitas) sebagai elemen kunci ekosistem kota hijau. Pros Sem Nas Masy Biodiv Indon, 1(8), 1747-1755. 4. Nauroh, I. dan Faturrizky, I. (2022). Teknologi Industri Pertanian: Analisa Kualitatif Menghadapi Tantangan Global Menuju Pertanian Berkelanjutan di Indonesia. Change Think Journal, 1(03), 227-243. 5. Nurlaha, N., Setiana, A. dan Asminaya, N. S. (2014). Identifikasi jenis hijauan makanan ternak di lahan persawahan desa babakan kecamatan Dramaga Kabupaten Bogor. Jurnal Ilmu dan Teknologi Peternakan Tropis, 1(1), 54-62.

DEFINITION OF 1 CREDIT IN LEARNING FORM				hours
A	Lecture, Reception, Tutorial			
	Face to Face	Structured Assignment	Independent Learning	
	50 minutes/week/semester	60 minutes/week/semester	60 minutes/week/semester	2,83
B	Seminars or other similar forms of learning			
	Face to Face		Independent Learning	
	100 minutes/week/semester		70 minutes/week/semester	2,83
C	Practicum, studio practice, workshop practice, field practice, research, community service, and/or other equivalent forms of learning			
	170 minutes/week/semester			2,83

No	Student Learning Methods	code
1	Small Group Discussion	SGD
2	Role-Play & Simulation	RPS
3	Discovery Learning	DL
4	Self-Directed Learning	SDL
5	Cooperative Learning	CoL
6	Collaborative Learning	CbL
7	Contextual Learning	CtL
8	Project Based Learning	PjBL
9	Problem Based Learning & Inquiry	PBL
10	Or other learning methods, which can effectively facilitate the fulfilment of graduate learning outcomes.	