UNIVERSITY OF NORTH SUMATRA (USU)
FACULTY OF AGRICULTURE
ANIMAL HUSBANDRY STUDY PROGRAM

Document Code

SEMESTER LEARNING PLAN (RPS)

COURSE (Course)	CODE	MK Group	WEIGHT (credits)		SEMESTER	Date of Compilation
NUTRITIONAL MICROBIOLOGY	PTN 3102 MK34	Exact	**Theory** =2	**Practice** =1	V(FIVE)	**October 23, 2024**

AUTHORIZATION / APPROVAL	RPS Developer Lecturer	Vice Dean I	Chairman of LINK-UP USU
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Learning Outcomes	LO Charged Course Learning	
	LO03	Able to identify, formulate, and find solutions to problems related to the livestock sector
	LO09	Able to manage and implement aspects of efficient feed provision and technology
	LO11	Able to develop, understand and apply a variety of the best techniques and methods that combine theory and practice relevant to livestock expertise.

Course Learning Outcomes (CLO)	CLO Weight
CLO0314: Able to explain the concept of probiotics and prebiotics, microbial interactions, and rumen ecosystems aimed at improving livestock performance.	7.69%
CLO0905: Able to analyze the best methods in the selection of beneficial microbial strains, and various measurements of livestock nutrient utilization performance.	61.54%
CLO1113: Able to apply various microbial isolation methods and their use in livestock feed	30.77%

Final Ability of Each Learning Stage (Sub-CLO)	
Sub-CLO1	After taking this lecture, students will be able to formulate a nutritional microbiology concept map.

	Sub-CLO2	After taking this lecture, students will be able to formulate the rumen and rumen ecosystem.
	Sub-CLO3	After taking this lecture, students will be able to formulate rumen bacteria.
	Sub-CLO4	After taking this lecture, students will be able to formulate other rumen microorganisms.
	Sub-CLO5	After taking this lecture, students will be able to formulate microbial interactions.
	Sub-CLO6	After taking this lecture, students will be able to formulate rumen activities.
	Sub-CLO7	After taking this course, students will be able to formulate in vitro digestibility measurements.
	Sub-CLO8	After taking this lecture, students will be able to formulate the use of probiotics in livestock.

Correlation of CLO with Sub-CLO

	Sub-CLO 1	Sub-CLO 2	Sub-CLO 3	Sub-CLO 4	Sub-CLO 5	Sub-CLO 6	Sub-CLO 7	Sub-CLO 8
CLO 0314	√							
CLO 0905	√	√	√	√	√	√	√	√
CLO 1113			√			√	√	√

Brief Description of Course

After completing the Nutritional Microbiology course, fifth semester students of the Animal Husbandry Study Program will be able to explain about the rumen and the ecosystem within it and will be able to explain about in vitro digestion measurements and also the use of probiotics and prebiotics.

Study Material:

Learning materials

BK04 Animal Nutrition and Feed Science

1. Scope of nutritional microbiology
2. Rumen and rumen ecosystem
3. Rumen bacteria
4. Microbial Interactions
5. Rumen activity
6. In vitro digestibility measurement
7. Use of Probiotics in Livestock

Library

Main:

1. Nur Hidayat, Irene meitianti, Neti Yuliana. 2018. Microorganisms and Their Utilization. UB Press: Malang

Supporters:

	1. Ahmad Syauqi. 2017. Environmental Microbiology The Role of Microorganisms and Life. Andi Publisher: Yogyakarta 2. Nur Hidayat, Irene meitianti, Neti Yuliana. 2018. Microorganisms and Their Utilization. UB Press: Malang 3. 2019. Basic Microbiology of Livestock Products. UB Press: Malang 4. 2018. Agricultural Industrial Microbiology. UB Press: Malang
Supporting lecturer	
Required Courses	-

Week 2-	**Final ability of each learning stage (Sub-CLO)**	**Evaluation**		**Form of Learning; Learning methods; Student Assignments; [Estimated Time]**		**Study Materials (Learning materials)**	**Assessment Weight (%)**
		Indicator	**Criteria and Techniques**				
(1)	**(2)**	**(3)**	**(4)**	**Asynchronous (5)**	**Synchronous (6)**	**(7)**	**(8)**
1	**Sub-CLO1:** Students can formulate general overview of the eye nutritional microbiology lecture in supporting knowledge in the field of animal husbandry	Accuracy in explaining the importance of nutritional microbiology	**Criteria:** - **Technique:** Non-Test	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. **Learning methods:** *Self-Paced Learning* **Mode (Learning Management System):** elearning@usu.ac.id	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* *2. Discussion* *3. Self-Paced*	**Subject:** 1. Study Contract 2. Scope of nutritional microbiology	5%

2-3	**Sub-CLO 2:** Students can formulate about rumen and ecosystem rumen	1. Accuracy in formulating rumen 2. Accuracy in formulating the rumen ecosystem 3. Accuracy in formulating rumen ecosystem factors 4. Accuracy in formulating rumen ecosystem management	**Criteria:** Assessment rubric. **Technique:** *Non-Test*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question **Mode (Learning Management System):** elearning@usu.ac.id	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* *2. Discussion* 3. *Self-Paced*	**Subject:** 1. Definition and function of the rumen 2. Components of the rumen ecosystem 3. Rumen microorganism interactions 4. Factors that influence the rumen ecosystem 5. Rumen ecosystem management	10%
4-6	**Sub-CLO 3:** After taking this lecture, students will be able to formulate rumen bacteria.	1. Accuracy in explainingrumen bacteria 2. Accuracy in formulating rumen bacterial diversity 3. Accuracy in formulating rumen fermentation 4. Accuracy in formulating factors influencing the population and activity of rumen bacteria	**Criteria:** Assessment rubric. **Technique:** *Test:* *1. Case method*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question ***Case Method 1:*** 1. Divide the groups evenly (the lecturer divides)	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* *2. Discussion* *3. Self-Paced*	**Subject:** 1. Definition and role of rumen bacteria 2. Diversity of rumen bacteria 3. Rumen fermentation mechanism 4. Population factors and activity of rumen bacteria	Case Method 1: 12.5%

				2. Making a paper on fat as a food substance needed by poultry, maximum 15 pages from the table of contents to the bibliography, TMR font size 12, 1.5 spacing, sent in PDF format. 3. Group presentation **Mode (Learning Management System):** elearning@usu.ac.id			
7	**Sub-CLO 4:** After taking this lecture, students will be able to formulate other rumen microorganisms.	1. Accuracy in explainingmicro organisms 2. Accuracy in explainingbacteri a 3. Accuracy in explainingprotoz oa 4. Accuracy in explainingrole	**Criteria:** Assessment rubric. **Technique:** *Test:* *1. Quiz*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question ***Quiz 1:*** *Quiz to measure students' understanding of protein as a nutrient needed by poultry*	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* *2. Discussion* *3. Self-Paced*	**Subject:** **1.** Other microorganisms **2.** Definition **3.** Type **4.** Role and benefits of the rumen	Quiz 1: 5%

				Mode (Learning Management System): elearning@usu.ac.id			
8	MID EXAMINATION						15%
9	**Sub-CLO 6:** After taking this lecture, students will be able to formulate microbial interactions.	1. Accuracy in explaining microbial interactions 2. Accuracy in explaining the types of microbial interactions 3. Accuracy in explaining the role of microbial interactions 4. Accuracy in explaining microbial interaction factors	**Criteria:** Assessment rubric. **Technique:** *Test:* *1. Case method*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question ***Case Method 3:*** 1. Divide the groups evenly (the lecturer divides) 2. Making a paper on vitamins as a food substance needed by poultry livestock, 15 pages from the table of contents to the bibliography, TMR font size 12, 1.5 spacing, sent in PDF format.	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* *2. Discussion* *3. Self-Paced*	**Subject:** *1.* Classification of microbial interactions *2.* Types of microbial interactions *3.* The role of microbial interactions *4.* Microbial interaction factors	Case Method 2: 12.5%

				Mode (Learning Management System): elearning@usu.ac.id			
10-11	**Sub-CLO 7:** After taking this lecture, students will be able to formulate rumen activities.	1. Accuracy in explaining rumen activities 2.Accuracy in explaining the types of anatomy and functions of the rumen 3. accuracy of formulating rumen microbial population 4. accuracy of formulating the rumen fermentation process 5. accuracy of formulating VFA 6. Accuracy in formulating rumen activity disorders	**Criteria:** Assessment rubric. **Technique:** *Test:* *1. Case method*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 4. Attendance absence 5. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 6. Responding to the opening question ***Case Method 3:*** 3. Divide the groups evenly (the lecturer divides) 4. Create a paper for each group on rumen activity, 15 pages from the table of contents to the bibliography, TMR font size 12, 1.5 spacing, sent in PDF format. **Mode (Learning Management System):**	TM (1 week x 2 credits x 50 minutes) **Activity:** *4. Offline Learning* *5. Class Discussion* *6. Note Taking* **Media:** *3. Power Point Presentation* *4. Text Book* **Learning methods**: *4. Lecturer* *5. Discussion* *Self-Paced*	**Subject:** 1. Rumen activity 2. Anatomy and function of the rumen 3. rumen microbial population 4. rumen fermentation process 5. VFA 6. rumen activity disorders	Case Method 3: 10%

				elearning@usu.ac.id			
12	**Sub-CLO 8:** After taking this course, students will be able to formulate in vitro digestibility measurements.	1. Accuracy in explainingin vitro 2. Accuracy in explaining digestibility 3. Accuracy in relating digestibility to in vitro 4. Accuracy in in vitro digestion procedures 5. Accuracy in relating digestibility to in vitro	**Criteria:** Assessment rubric. **Technique:** *Non-Test:*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question **Mode (Learning Management System):** elearning@usu.ac.id	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* 2. *Discussion* 3. *Self-Paced*	**Subject:** *1.* In vitro *2.* Digestibility *3.* In vitro digestibility factors *4.* Digestibility measurement procedure =	5%
13-15	**Sub-CLO 9**: After taking this lecture, students will be able to formulate the use of probiotics in livestock.	1. Accuracy in explainingprobiotics 2. Accuracy in explainingtypes of probiotics 3. Accuracy in explainingconstraints on the use of probuiotics 4. Accuracy in explainingprobiotic mechanism	**Criteria:** Assessment rubric. **Technique:** *Test:* 1. *Case method*	KM+PT (1 week x 2 credits x 120 minutes) **Activity:** 1. Attendance absence 2. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials. 3. Responding to the opening question ***Case Method 4:***	TM (1 week x 2 credits x 50 minutes) **Activity:** *1. Offline Learning* *2. Class Discussion* *3. Note Taking* **Media:** *1. Power Point Presentation* *2. Text Book* **Learning methods**: *1. Lecturer* 2. *Discussion*	**Subject:** 1. Definition of probiotics 2. Types and ingredients of probiotics 3. Mechanism of action of probiotics 4. Factors of probiotic use	Case Method 4: 10%

				1. Divide the groups evenly (the lecturer divides) 2. Create a 15-page probiotic paper from the table of contents to the bibliography, TMR font size 12, 1.5 spacing, sent in PDF format. **Mode (Learning Management System):** elearning@usu.ac.id	3. *Self-Paced*		
16	FINAL EXAMINATION						15%

Assessment Design:

CLO Code and Percentage	Sub-CLO Code	Evaluation Form	Percentage (%)	Total	Implementation of Evaluation
CLO0314 (7,69%)	Sub-CLO1	Mid Therm Exam	7,69	7,69%	Week 8
CLO0905 (61,54%)	Sub-CLO1	Mid Therm Exam	5.5	61,54%	Week 8
	Sub-CLO2	Mid Therm Exam	5.5		Week 8
	Sub-CLO3	Case Method	5		Week 3
	Sub-CLO4	Quis	5		Week 4

	Sub-CLO5	Case Method	5		Week 6
	Sub-CLO6	Case Method	5		Week 9
	Sub-CLO7	Final Exam	6		Week 10
	Sub-CLO8	Case Method	5		Week 12
CLO1113 (30,77%)	Sub-CLO3	Case method	5	30,77%	Week 3
	Sub-CLO6	Case method	5		Week 9
	Sub-CLO7	Final Exam	5		Week 10
Total			100%	100%	

Assessment Plan:

Evaluation Form	Sub-CLO	Assessment Instrument [Frequency]		Invoice (proof)	Assessment Credit (%)
		Formative	**Summative**		
Quiz/Q&A	Sub-CLO3 and Sub-CLO8	Assessment rubric [2 times]	-	Quiz answers uploaded to kelas.usu.ac.id	10
Case Methode	Sub-CLO4 and Sub-CLO9	Feedback results case analysis [5 times]	Assessment rubric [2 times]	Logbook/worksheet/slides uploaded to kelas.usu.ac.id	50
Written exam 1 (UTS)	Sub-CLO1, Sub-CLO2, Sub-CLO3, Sub-CLO4, Sub-CLO5, Sub-CLO6 and Sub-CLO7	-	Assessment rubric [1 time]	Written exam result sheet	20
Written exam 2 (UAS)	Sub-CLO8, Sub-CLO9, Sub-CLO10, Sub-CLO11, Sub-CLO12, Sub-CLO13 and Sub-CLO14	-	Assessment rubric [1 time]	Written exam result sheet	20
Total					**100%**

Explanation:

a) Quiz 10%

During the semester there will be 2 quizzes held in class. The quizzes will be conducted via e-learning and have been scheduled in advance. The material being tested is announced by the lecturer and written in the RPS.

b) *Case Method*50%
During the semester there will be a case method, each student will make a paper and report from each case method in groups. The case method in this course is done 5 times. The paper that has been made will be presented by students. Students will be assessed according to their participation in the presentation and accuracy in the presentation, as well as their participation in the question and answer session when other groups are presenting.

c) Midterm Exam 20%
The midterm exam covers all the materials that have been discussed since the beginning of the semester until the 7th meeting, both reading and lecture. This exam is conducted in class with multiple choice questions, short answers, and essays.

d) Final Exam 20%
The final semester exam covers all the material that has been discussed since the 9th to 15th meeting, both reading and lecture. This exam is conducted in class in the form of multiple choice questions, short answers, and essays.

ASSESSMENT RUBRIC

Post Test Quiz Assessment Rubric (10%)

The Pre/Post test questions consist of 5 essay questions done on one sheet of paper (done 4 times during 1 semester)

Value per question item	Criteria
20	Can answer questions correctly, complete the steps correctly, and completely correct
15	The steps for completing the questions are correct, there are a few errors.
10	Most of the steps in completing the questions are correct, there are many errors.
5	The steps for completing the question are not correct, the question cannot be completed

***Maximum score = 100 (5 questions x 20 points)**

Minimum score = 25 (5 questions x 5 points)

Quiz score 1: (maximum score is 100)$20 \times \sum nilai\ per\ butir\ soal$

Quiz score 2: (maximum score is 100)$20 \times \sum nilai\ per\ butir\ soal$

Total score if you take all post-test quizzes with a perfect score is 200 x 10%[quiz percentage] = 20

Assessment Rubric for Group Presentation Assignment Case Method Knowledge of Livestock Products

Matter	Evaluation criteria				
Contents	Complete, with additional good material (20)	Complete (18)	Same as text book (16)	Not complete, but most of the material is covered (14)	Substantially incomplete (12)
Answering Discussion Questions	Able to answer all questions correctly (20)	Can answer most of the questions correctly but there are some questions that are not answered (18)	Able to answer some questions correctly, some others did not reach the target and there were questions that were not answered (16)	Most of the answers did not reach the target and there were unanswered questions (14)	Can't answer all questions (12)
Presentation	Clear, concise with good flow (20)	Clear, concise with sometimes poor flow (18)	Moderate presentation skills (16)	Presentation stutters (14)	Presentation not working (12)
Group organization	Very good organization, supporting each other's presentations (20)	Good organization (18)	Medium organization, some people are less organized (16)	Lack of organization often results in communication errors (14)	The organization was chaotic so the presentation was very disrupted (12)
Creativity	Very creative without going off target (20)	Creative creates enthusiasm (18)	Occasionally attracts attention (15)	Occasionally attracts attention (13)	Boring, makes you sleepy (11)
TOTAL	**100 (Very Good)**	**90-80 (Very well)**	**79-70 (Good)**	**69-50 (Pretty good)**	**59-40 (Not good)**

Information :

The total maximum score is 100. The numbers in brackets are the scores for each criterion. The number 100 will later be accumulated with the percentage of the Presentation Assignment (PjBL) value of 50%.

100 x 50% = 50 points
There are 4 presentation implementations (case method), so the percentage of the Case Method Group Assignment score for each implementation is: 50% : 4 = 12.5%. Points for each implementation of the Case Method Group Assignment: 100 x 12.5% = 12.5 points.

Essay Exam Assessment Rubric:

Assessment criteria	4 Very good	3 Good	2 Enough	1 Not enough
Understanding the Questions	Understand the question exactly once (25)	Understanding the questions (20)	Not understanding the question fully and correctly (15)	Don't understand the question (10)
Contents	Answers show understanding in-depth understanding of the material being asked and participants integrate the information that has been studied and/or assigned to be read during the lecture well and appropriately (25)	The answers demonstrate understanding of the material being asked and integrate some of the information that has been studied and/or assigned to be read during the lecture. (20)	The answer shows a lack of understanding of the material being asked and only integrates a small portion of information that has been studied and/or assigned to be read during lectures. (15)	The answer shows a lack of understanding of the material being asked so it is unclear and not integrated. information that has been studied and/or assigned to be read during lectures. (10)
Clarity of Writing	All written ideas are conveyed well and clearly. (25)	Most of the ideas in the writing are well and clearly conveyed. (20)	Some of the ideas in the writing are conveyed well and clearly. (15)	The ideas in the writing are not conveyed well and clearly. (10)
Clarity of Language	Uses foreign/Indonesian languages well and correctly with minimal grammatical errors and word choices that do not	Uses foreign/Indonesian languages well and correctly with minimal grammatical errors and word choices that interfere with understanding.	Uses foreign/Indonesian language quite well and correctly with some grammatical errors and word choices	Does not use foreign/Indonesian language properly and correctly because the writing contains many

	interfere with understanding (25)	(20)	(15)	grammatical errors and word choices (10)
Total	**81-100** **(Very well)**	**61-80** **(Pretty good)**	**41-60** **(Enough)**	**0-40** **(Not enough)**

Multiple Choice Exam Scoring Rubric:

Value per question item	**Criteria**
100/ many questions	Can answer questions correctly
0	The answer is not quite right/does not match the answer key provided.