



**UNIVERSITAS SUMATERA UTARA (USU)**  
**FACULTY OF AGRICULTURE**  
**Animal Science Study Programme**

**Document Code**  
(to follow)

**SEMESTER LEARNING PLAN (RPS)**

COURSE	CODE	Course Group	WEIGHT (credits)	SEMESTER	Date of Preparation	
<b>Livestock Waste Treatment Technology</b>	PTN3104	Exact	3	V	22 February 2024	
<b>AUTHORISATION ATTESTATION</b>	<b>Developer Lecturer</b>		<b>Approved Head of Study Programme</b>		<b>Knowing Chairman of LINKUP USU</b>	
	Dr Nurzainah Ginting M.Sc Dr Nurjama'yah Br. Ketaren S.Pt, M.Si Ir. Peni Patriani S.Pt., M.P, IPM, ASEAN Eng. Ir. Achmad Sadeli S.Pt., M.Sc., IPM., ASEAN.Eng		Dr Ir Ma'ruf Tafsin, M.Si., IPM.		Prof. Dr Dwi Suryanto M.Sc.	
<b>Learning Outcomes</b>	<b>LO-Study Programe Charged to Course</b>					
	LO03	Able to identify, formulate, and find solutions to problems related to the field of animal husbandry				
	LO06	Supervise and evaluate the completion of assigned work and be able to manage learning independently throughout life.				
	LO07	Able to disseminate knowledge and application of the latest technology based on TALENTA in the field of animal husbandry				
	LO08	Able to manage integrated and sustainable livestock cultivation based on integration with other agroecosystems and the latest applications in processing livestock products and waste				
	LO11	Able to develop understand and apply a variety of best techniques and methods that combine theory and practice relevant to animal husbandry expertise.				
	LO12	Have coherent and up-to-date knowledge in the field of animal science and by applicable legal regulations and can apply aspects of animal welfare.				
	<b>Course Learning Outcomes (CLO)</b>				<b>CLO Weight</b>	
	CLO1208: Able to explain the management of livestock waste so that it does not pollute the environment and can also process livestock waste into resources that can directly or indirectly increase the efficiency of livestock production.				14.29%	
	CLO1115: Able to develop and understand techniques in livestock waste treatment				21.43%	
CLO0809: Able to manage livestock, agricultural and plantation wastes to create a sustainable integrated agricultural system with the principle of zero waste.				21.43%		

CLO0702: Able to apply the latest technology in livestock waste management		14.29%
CLO0610: Able to explain the basics of sustainable livestock waste management		14.29%
CLO0316: Able to identify types of livestock waste and agricultural/plantation waste that can be utilised		14.29%
<b>End Capability of Each Learning Stage (Sub-CLO)</b>		
Sub-CLO1	After attending this lecture, students can explain the scope and introduction to Livestock Waste Treatment Technology and lecture contracts (Livestock waste control)	
Sub-CLO2	After attending this lecture, students can explain the definition of waste, characteristics, types and identification of livestock waste (Livestock waste control)	
Sub-CLO3	After attending this lecture, students are able to explain the Nature and characteristics of livestock waste, method of handling livestock waste and the method of collecting livestock waste	
Sub-CLO4	After attending this lecture, students can explain Nature and characteristics of livestock waste (physical, chemical and biological waste treatment)	
Sub-CLO5	After attending this lecture, students are able to explain the indicators of good fertiliser quality, composition, and SNI Standards for various fertilisers (Waste impact)	
Sub-CLO6	After attending this lecture, students can explain the process of composting and making a starter (MOL). Air quality and contamination from livestock	
Sub-CLO7	After attending this lecture, students can explain the processing of manure, namely hot fertiliser and cold fertiliser. Air quality and contamination from livestock.	
	Mid Semester Exam	
Sub-CLO8	After attending this lecture, students can explain bokashi fertiliser processing technology (Waste)	
Sub-CLO9	After attending this lecture, students can explain vermi composting processing technology (Solid waste treatment)	
Sub-CLO10	After attending this lecture, students can explain the technology of processing biopesticides from urine and plants (Liquid waste treatment)	
Sub-CLO11	After attending this lecture, students can explain the technology of processing liquid organic fertiliser or biourine.(Liquid waste treatment)	
Sub-CLO12	After attending this lecture, students can explain Biogas Management technology.	
Sub-CLO13	After attending this lecture, students can explain livestock waste as feed ingredients (Solid waste treatment (Advanced))	
Sub-CLO14	After attending this lecture, students can explain the role and application of livestock waste technology. (Fertilizer manufacturing)	
	END-OF-SEMESTER EXAM	

Correlation of CLO with Sub-CLO	Sub-CLO1	Sub-CLO2	Sub-CLO3	Sub-CLO4	Sub-CLO5	Sub-CLO6	Sub-CLO7	Sub-CLO8	Sub-CLO9	Sub-CLO10	Sub-CLO11	Sub-CLO12	Sub-CLO13	Sub-CLO14
	CLO1208			√		√		√	√					
	CLO1115		√		√	√	√	√		√			√	
	CLO0809		√	√	√	√	√	√						
	CLO0702							√	√	√	√			
	CLO0610		√						√				√	√
	CLO0316	√							√	√				√
<b>Brief Course Description</b>	After taking the Animal Husbandry Waste Management Technology course, fifth-semester students of the Animal Husbandry Study Programme will be able to apply aspects of animal husbandry waste management in improving the efficiency of livestock production.													
<b>Study Material:</b>  Learning Materials	<ol style="list-style-type: none"> <li>1. Livestock waste control</li> <li>2. Livestock waste control (Continued)</li> <li>3. Nature and characteristics of livestock waste</li> <li>4. Nature and characteristics of livestock waste (Continued)</li> <li>5. Waste impact</li> <li>6. Air quality and contamination from livestock</li> <li>7. Air quality and contamination from livestock</li> <li>8. Waste</li> <li>9. Liquid waste treatment</li> <li>10. Solid material division</li> <li>11. Solid waste treatment</li> <li>12. Biogas</li> <li>13. Fertilizer manufacturing</li> </ol>													
<b>Library</b>	<b>Main:</b> <ol style="list-style-type: none"> <li>1. Sutaryo, Purnomoadi A. 2019. Livestock Waste Treatment. UT Press:Tangerang</li> <li>2. Safe Yemen. 2020. Technology for Handling, Processing Livestock Waste and Livestock ByProducts. Unsyiah Press: Aceh</li> <li>3. Triatmojo S., Erwanto Y., Fitriyanto N.A. 2021. Handling of Animal science Industry Waste.UGM Press: Yogyakarta</li> <li>4. Hardono A, Widyasmara L. 2023. Waste Handling and Livestock Derivatives. Lakeisha: Klaten</li> <li>5. Sri Kartono. 2019. Livestock Manure Biogas. Alprin: Semarang</li> <li>6. Arnanda Ajisaputra, Anang Latriyanto, Nurtjahja Juniarsa, Helmi Sambora, Dias Agustin Dwi Jayanti. 2024. Efforts to Increase the Economic Value of Livestock Manure Waste through Empowerment of Bumdes and Farmer Groups. CV Idebuku. Klaten: Indonesia</li> <li>7. Sri Wahyuni 2013 Practical Guide to Biogas Niaga Swadaya, Jakarta : Indonesia</li> <li>8. Juan Pratama and Triyanto 2020 Making Liquid Organic Fertiliser with Ease. Alex Media Komputindo, Jakarta, Indonesia</li> <li>9. Mediantie Soenandar and R Heru Tjahjono. 2013. Making Organic Pesticides. Agromedia Pustaka, JakartaL Indonesia</li> <li>10. Ainin Niswati. 2017. Vermicomposting Technology. Aura Publisher, Jakarta: Indonesia</li> <li>11. Adam Footer. 2014. Bokashi Composting Scraps to Soil in Weeks. New Society Publishers: UK</li> </ol>													

	<p>12. Mesak Tombe, MS, Hendra Sipayung, SP, MM. 2010. Bio Compost Pesticide Organic Fertiliser of the Newest Generation. Kanisius. Jogjakarta. Indonesia</p> <p>13. Bertoli M, Terry E, Ramos D (2015) Producción y uso del abono orgánico tipo Bocashi. Una alternativa para la producción de los cultivos y la calidad de los suelos. Ediciones INCA, Mayabeque, 50p.</p> <p>14. Christel DM (2017) The use of bokashi as a soil fertility amendment in organic spinach cultivation. Master thesis, University of Vermont, USA 162p</p> <p>15. Olle, M. 2020. Review: Bokashi technology is a promising technology for crop production in Europe. <i>The Journal of Horticultural Science and Biotechnology</i>, 96(2), 145-152.</p> <p>16. H. Abedini Aboksari, D. Hashemabadi &amp; B. Kaviani. 2018 Application of bio-fertiliser for Pelargonium peltatum growth in new organic substrates. <i>Journal of Plant Nutrition</i> 41:2, pages 137-149.</p>
	<p><b>Supporters:</b></p> <p>1. Patriani P, U Hasanah, E S Nasution, T H Wahyuni 2020 Liquid organic fertiliser application and environmental management in Suka Sipilihen Village, Karo Regency. ABDIMAS TALENTA: Journal of Community Service. Vol. 5 No. 2</p> <p>2. Peni Patriani, Uswatun Hasanah, Eva Syahfitri Nasution. 2021. Application of Liquid Organic Fertiliser from Beef Cattle Feces and Environmental Management in Suka Sipilihen, Karo Regency. Journal of Saintech Transfer, Vol 4. Pp 1-9</p> <p>3. Peni Patriani, Uswatun Hasanah, Tri Hesti Wahyuni. 2022. Bokashi application for organic farming in manuk mulia village, Karo district. Journal of Saintech Transfer Vol 5 (1).</p> <p>4. Rahmawati, Akbari T, Fitriyah F and Nurdianti R 2023, Effect of cow dung waste remaining cow feed and rice husk on compost quality by the vermicomposting method. <i>Journal of Environment and Natural Resources</i> 6(2), 123-135.</p> <p>5. Ilhamiyah, Ari Jumadi Kinardi, Ahmad Yanto, Akhmad Gazali. 2021. The utilisation of cow urine waste as biourine. Al-Ikhlâs Devotion Journal Vol.7 No.1</p> <p>6. Lim SL, Wu TY, Sim EYS, Lim PN and Clarke C. 2012. Biotransformation of rice husk into organic fertiliser through vermicomposting. <i>Ecol Eng</i> 41 pp 60-64.</p> <p>7. Pramanik P, Ghosh GK, Ghosal PK and Banik P. 2007. Changes in organic-C, N, P and K and enzyme activities in vermicompost of biodegradable organic wastes under liming and microbial inoculants. <i>Bioresour Technol</i> 98 pp 2485-2494</p> <p>8. Garg VK and Gupta R. 2011. Optimisation of cow dung spiked pre-consumer processed vegetable waste for vermicomposting using <i>Eisenia fetida</i>. <i>Ecotox Environ Safe</i> 74 pp 19-24.</p>
<b>Lecturer</b>	<p>Dr Nurzainah Ginting M.Sc  Dr Nurjama'yah Br. Ketaren S.Pt, M.Si  Ir. Peni Patriani S.Pt., M.P, IPM, ASEAN Eng.  Ir. Achmad Sadeli S.Pt., M.Sc., IPM., ASEAN.Eng</p>
<b>Conditional Subjects</b>	-

	End ability of each learning stage (Sub-CLO)	Assessment		Form of Learning; Learning Methods; Student Assignment; [Estimated Time]		Study Material (Learning Material)	Assessment Weight (%)
		Indicator	Criteria and Techniques	Asynchronous (5)	Synchronous (6)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Sub-CLO1: After attending this lecture, students will be able to explain the scope and introduction to Animal Waste Treatment Technology and the lecture contract (Livestock waste control)	Accuracy in explaining information about the scope and introduction to Animal Waste Treatment Technology and lecture contracts	Criteria: Using an assessment rubric. Shape: a Read the provided passage (book) b Respond to the opening question given. c Answer questions according to the reading.	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>  <b>Activities:</b> a. Attendance b. Download and read the Syllabus (RPS), Learning Implementation Plan (SAP), Course Agreement, and Learning Materials.  <b>Moda (Learning Management System):</b> <a href="http://Class.usu.ac.id">Class.usu.ac.id</a>	TM (1 week x 2 credits x 50 minutes)  <b>Learning Methods:</b> a. Lecture b. Discussion  <b>Activities:</b> a. Online/offline learning b. Class discussion c. Take notes on learning materials  <b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD c. Textbook	Subject matter: a. Course contract b. Scope and Introduction to Livestock Waste Treatment Technology	This sub-CLO will be assessed during Midterm exams
2	Sub-CLO 2: After attending this lecture, students can explain the definition of waste, characteristics, types and identification of livestock waste (Livestock waste control)	a. Accuracy in expressing the required information about b. Definition of waste, characteristics, types and identification	<b>Criteria:</b> Essay assessment rubric  <b>Techniques:</b> <i>Test:</i> Quiz	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>  <b>Activities:</b> a. <i>Recording attendance</i> b. <i>Completing the quiz</i>	TM (2 weeks x 2 credits x 50 minutes)  <b>Learning Methods:</b> a. Lecture b. Discussion  <b>Activities:</b> a. Online/offline learning	<b>Subject matter:</b> a Definition of waste, b Characteristics, c Types and d Identification of livestock waste	Quiz 2,5%

		<p>of livestock waste</p> <p>c. Correctness of students' answers (Quiz)</p>		<p><b>Quiz 1:</b> Quiz to measure student understanding.</p> <p><b>Moda (Learning Management System):</b> Class.usu.ac.id</p>	<p>b. Class discussion c. Take notes on learning materials</p> <p><b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD a. Textbook</p>		
3	<p>Sub-CLO 3: After attending this lecture, students are able to explain animal husbandry waste handling methods and animal husbandry waste collection methods (Nature and characteristics of livestock waste)</p>	<p>a. Accuracy in explaining farm waste handling methods and farm waste collection methods</p> <p>b. Accuracy in explaining farm waste handling methods and farm waste collection methods</p>	<p><b>Criteria:</b> Paper assessment rubric</p> <p><b>Techniques:</b> <i>Task</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b> <i>Self-Paced Learning</i></p> <p><b>Activities:</b> a. <i>Recording attendance</i> b. <i>Completing assignment</i></p> <p><b>Assignment 1:</b> a Review the previous lesson. Read the added teaching materials. b Recording attendance. c Respond to the opening question. d <i>Moda (Learning Management System):</i> e <i>System):</i> class.usu.ac.id</p>	<p>TM (1 week x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b> a. Lecture b. Discussion</p> <p><b>Activities:</b> a. Online/offline learning b. Class discussion c. Take notes on learning materials d. Task</p> <p><b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD c. Textbook</p>	<p><b>Subject matter:</b> a Methods of handling livestock waste b Collection method of livestock waste</p>	<p>Task 2.5%</p>

4	<p>Sub-CLO 4:</p> <p>After attending this lecture, students can explain physical, chemical and biological waste treatment (Nature and characteristics of livestock waste)</p>	<p>a. Accuracy in explaining physical, chemical and biological waste treatment</p> <p>b. Accuracy in explaining physical, chemical and biological waste treatment</p> <p>c. accuracy in explaining the assessment</p>	<p><b>Criteria:</b></p> <p>a. Worksheet/non test</p> <p>b. Reading a book</p> <p>c. Respond to the opening question given by the Practicum</p> <p><b>Techniques:</b></p> <p><i>Non-test Assignment</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b></p> <p><i>Self-Paced Learning</i></p> <p><b>Activities:</b></p> <p>a. Recording attendance</p> <p>b. Completing assignment</p> <p>c. Practicum</p> <p><b>Problem-Based Learning 1:</b></p> <p>a. The lecturer divides students into groups.</p> <p>b. Conducting a practicum</p> <p>c. Make a practicum report.</p> <p><b>Moda (Learning Management System):</b></p> <p><a href="http://Class.usu.ac.id">Class.usu.ac.id</a></p>	<p>TM (1 week x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <p>a. Lecture</p> <p>b. Discussion</p> <p><b>Activities:</b></p> <p>a. Online/offline learning</p> <p>b. Class discussion</p> <p>c. Take notes on learning materials</p> <p><b>Media:</b></p> <p>a. Slides/ ppt</p> <p>b. Zoom meeting / LCD</p> <p>c. Textbook</p>	<p><b>Subject matter:</b></p> <p>a Physical treatment of waste,</p> <p>b Chemistry and</p> <p>c Biological</p>	<p>This sub-CLO will be assessed during Midterm exams</p>
5	<p>Sub-CLO 5:</p> <p>After attending this lecture, students are able to explain the indicators of good fertiliser quality, composition, and SNI</p>	<p>a. Accuracy in providing the required information on indicators of good fertiliser quality, composition, and SNI Standards for</p>	<p><b>Criteria:</b></p> <p>Use essay and multiple-choice assessment rubrics</p> <p><b>Techniques:</b></p> <p><i>Task</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b></p> <p><i>Self-Paced Learning</i></p> <p><b>Activities:</b></p> <p>a. Recording attendance</p>	<p>TM (1 week x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <p>a. Lecture</p> <p>b. Discussion</p> <p><b>Activities:</b></p> <p>a. Online/offline learning</p>	<p><b>Subject matter:</b></p> <p>a Indicators of good quality fertiliser,</p> <p>b Composition,</p> <p>c SNI standards for various fertilisers</p>	<p>Task 2,5%</p>

	Standards for various fertilisers (Waste impact)	<p>various fertilisers.</p> <p>a. Accuracy in doing assignments</p> <p>b. Correctness of students' answers</p>		<p>b. <i>Practicum</i></p> <p>c. <i>Task</i></p> <p><b>Moda (Learning Management System):</b> Class.usu.ac.id</p>	<p>b. Class discussion</p> <p>c. Take notes on learning materials</p> <p>d. Task</p> <p><b>Media:</b></p> <p>a. Slides/ ppt</p> <p>b. Zoom meeting / LCD</p> <p>c. Textbook</p>		
6	<p>Sub-CLO 6:</p> <p>After attending this lecture, students can explain the process of composting and making a starter (MOL).</p>	<p>a. Accuracy in explaining the composting process and making a starter (MOL)</p> <p>b. Accuracy in explaining the composting process and making a starter (MOL)</p>	<p><i>Criteria:</i> Using an assessment rubric.</p> <p><i>Shape:</i> Read the provided passage (book) Respond to the opening question given. Answer questions according to the reading.</p>	<p>KM+PT (2 weeks x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b> Self-Paced Learning</p> <p><b>Activities:</b></p> <p>c. Recording attendance</p> <p>d. Completing quizzes and assignments</p>	<p>TM (2 weeks x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <p>c. Lecture</p> <p>d. Discussion</p> <p><b>Activities:</b></p> <p>d. Online/offline learning</p> <p>e. Class discussion</p> <p>f. Take notes on learning materials</p> <p><b>Media:</b></p> <p>c. Slides/ ppt</p> <p>d. Zoom meeting/ LCD</p> <p>Textbook</p>	<p>a. Composting process and Starter making (MOL)</p> <p>b. Starter making (MOL)</p> <p>c. Air quality and contamination from livestock</p>	<p>This sub-CLO will be assessed during Midterm exams</p>

7	<p>Sub-CLO 7</p> <p>After attending this lecture, students can explain the processing of manure, namely hot fertiliser and cold fertiliser.</p>	<p>a. Accuracy in explaining the processing of manure, namely hot and cold fertiliser.</p> <p>a Accuracy in explaining the processing of manure, namely hot and cold fertiliser.</p>	<p><i>Criteria:</i></p> <p><i>a. Worksheet/non test</i></p> <p><i>b. Reading a book</i></p> <p><i>c. Respond to the opening question given by the Practicum</i></p> <p><i>Techniques:</i></p> <p><i>Non-test</i></p> <p><i>Assignment</i></p>	<p>KM+PT (2 weeks x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b></p> <p><i>Self-Paced Learning</i></p> <p><b>Activities:</b></p> <p><i>e. Recording attendance</i></p> <p><i>f. Completing quizzes and assignments</i></p> <p><i>g. Deepening the Case</i></p> <p><b>Case Method 1:</b></p> <p>a. Divide the group evenly (lecturer divides)</p> <p>b. Create a case study on tanning</p> <p><b>Quiz 3:</b></p> <p><i>Quiz to measure students' understanding of the prospects of the leather tanning industry</i></p> <p><b>Moda (Learning Management System):</b></p> <p>Class.usu.ac.id</p>	<p>TM (2 weeks x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <p>a. Lecture</p> <p>b. Discussion</p> <p><b>Activities:</b></p> <p>g. Online/offline learning</p> <p>h. Class discussion</p> <p>i. Take notes on learning materials</p> <p><b>Media:</b></p> <p>e. Slides/ ppt</p> <p>f. Zoom meeting/ LCD</p> <p>Textbook</p>	<p>a Manure processing</p> <p>b hot fertiliser and cold fertiliser</p> <p>c Air quality and contamination from livestock</p>	<p>This sub-CLO will be assessed during Midterm exams</p>
MID SEMESTER EXAMINATION (UTS)							20%

8	<p>Sub-CLO 8:</p> <p>After attending this lecture, students will be able to explain bokashi fertiliser processing technology.</p>	<p>a. Accuracy in explaining bokashi fertiliser processing technology</p> <p>b. Accuracy in explaining bokashi fertiliser processing technology</p>	<p><b>Criteria:</b> Paper assessment rubric</p> <p><b>Techniques:</b> <i>Test: Quiz</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b> <i>Self-Paced Learning</i></p> <p><b>Activities:</b></p> <ol style="list-style-type: none"> <li><i>Recording attendance</i></li> <li><i>Completing assignment</i></li> <li><i>Practicum</i></li> </ol> <p><b>Quiz 2:</b> Quiz to measure students' understanding of Hardy-Weinberg probability through calculations on several cases</p> <p><b>Moda (Learning Management System):</b> Class.usu.ac.id</p>	<p>TM (1 week x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <ol style="list-style-type: none"> <li>Lecture</li> <li>Discussion</li> </ol> <p><b>Activities:</b></p> <ol style="list-style-type: none"> <li>Online/offline learning</li> <li>Class discussion</li> <li>Take notes on learning materials</li> </ol> <p><b>Media:</b></p> <ol style="list-style-type: none"> <li>Slides/ ppt</li> <li>Zoom meeting / LCD</li> <li>Textbook</li> </ol>	<p><b>Subject matter:</b></p> <ol style="list-style-type: none"> <li>Bokashi fertiliser processing technology</li> <li>Bokashi quality</li> <li>Waste</li> </ol>	<p>Quiz 2,5%</p>
9	<p>Sub-CLO 9:</p> <p>After attending this lecture, students will be able to explain vermi composting processing technology. (Solid material division)</p>	<p>Accuracy in explaining vermi composting processing technology</p>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li><i>Worksheet/non test</i></li> <li><i>Reading a book</i></li> <li><i>Respond to the opening question given by the Practicum</i></li> </ol> <p><b>Techniques:</b> <i>Assignment</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b> <i>Self-Paced Learning</i></p> <p><b>Activities:</b></p> <ol style="list-style-type: none"> <li><i>Recording attendance</i></li> </ol>	<p>TM (1 week x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <ol style="list-style-type: none"> <li>Lecture</li> <li>Discussion</li> </ol> <p><b>Activities:</b></p> <ol style="list-style-type: none"> <li>Online/offline learning</li> </ol>	<p><b>Subject matter:</b></p> <ol style="list-style-type: none"> <li>Vermicomposting processing technology</li> <li>Vermicomposting quality</li> <li>Use of vermicomposting</li> </ol>	<p>This sub-CLO will be assessed during Final exams</p>

				<b>Moda (Learning Management System):</b> Class.usu.ac.id	b. Class discussion c. Take notes on learning materials  <b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD c. Textbook	4. Solid material division	
10	Sub-CLO 10 (continued)  After attending this lecture, students will be able to explain the technology of processing biopesticides from urine and plants (Liquid waste treatment)	a.Accuracy in explaining the technology of processing biopesticides from urine and plants b.Accuracy in explaining the technology of processing biopesticides from urine and plants	<b>Criteria:</b> a.Worksheet/non test b.Reading a book c.Respond to the opening question given by the Practicum <b>Techniques:</b> <i>Non-test Assignment</i>	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>  <b>Activities:</b> <i>b. Recording attendance</i>  <b>Moda (Learning Management System):</b> Class.usu.ac.id	TM (1 week x 2 credits x 50 minutes)  <b>Learning Methods:</b> a. Lecture b. Discussion  - <b>Activities:</b> a. Online/offline learning b. Class discussion c. Take notes on learning materials  - <b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD c. Textbook	<b>Subject matter:</b> a Biopesticides Processing Technology from urine and plants b Biopesticides quality and use c Liquid waste treatment	This sub-CLO will be assessed during Final exams
11	Sub-CLO 11:  After attending this lecture, students will be able to explain the technology of processing	a. Accuracy in providing the required information about	<b>Criteria:</b> Use presentation and paper assessment rubrics <b>Techniques:</b>	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>	TM (1 week x 2 credits x 50 minutes)  <b>Learning Methods:</b> a. Lecture b. Discussion	<b>Subject matter:</b> 1. Liquid Organic Fertiliser or Biourine	30%

	liquid organic fertiliser or biourine.	<ul style="list-style-type: none"> <li>b. Liquid Organic Fertiliser or Biourine Processing Technology</li> <li>c. Accuracy in doing assignments</li> <li>d. Correctness of students' answers</li> </ul>	<i>Project Base Learning</i>	<p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>a. Recording attendance</li> <li>b. Completing assignment</li> </ul> <p><b>Assignment 2:</b> Resume a journal</p> <p><b>Moda (Learning Management System):</b> Class.usu.ac.id</p>	<ul style="list-style-type: none"> <li>c. Project base learning</li> </ul> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>a. Online/offline learning</li> <li>b. Class discussion</li> <li>c. Take notes on learning materials</li> </ul> <p><b>Media:</b></p> <ul style="list-style-type: none"> <li>a. Slides/ ppt</li> <li>b. Zoom meeting / LCD</li> <li>c. Textbook</li> </ul>	<ul style="list-style-type: none"> <li>Processing Technology</li> <li>2. Quality of POC or Biourine</li> <li>3. Use and benefits of POC or Biourine</li> </ul>	
12	<p>Sub-CLO 12:</p> <p>After attending this lecture, students will be able to explain Biogas Management Technology.</p>	<ul style="list-style-type: none"> <li>a. Accuracy in providing the required information about Biogas Management Technology</li> <li>b. Accuracy in working on Biogas Management Technology</li> </ul>	<p><b>Criteria:</b> Use presentation and paper assessment rubrics</p> <p><b>Techniques:</b> <i>Case Method</i></p>	<p>KM+PT (1 week x 3 credits x 120 minutes)</p> <p><b>Learning Methods:</b> <i>Self-Paced Learning</i></p> <p><b>Activities:</b> Case Method <i>Deepening the Case</i></p> <p><b>Case Method 1:</b></p> <ul style="list-style-type: none"> <li>a. Divide the group evenly (lecturer divides)</li> <li>b. Create a case study on tanning</li> </ul> <p><b>Quiz:</b> <i>Quiz to measure students' understanding of</i></p>	<p>TM (2 weeks x 2 credits x 50 minutes)</p> <p><b>Learning Methods:</b></p> <ul style="list-style-type: none"> <li>a. Lecture</li> <li>b. Discussion</li> <li>c. Case Method</li> </ul> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>a. Online/offline learning</li> <li>b. Class discussion</li> <li>c. Take notes on learning materials</li> </ul> <p><b>Media:</b></p> <ul style="list-style-type: none"> <li>a. Slides/ ppt</li> <li>b. Zoom meeting / LCD</li> <li>c. Textbook</li> </ul>	<p><b>Subject matter:</b></p> <ul style="list-style-type: none"> <li>1. Biogas Management Technology</li> <li>2. Benefits of biogas</li> <li>3. Biogas processing materials and process</li> </ul>	Case Method 20%

				<b>Moda (Learning Management System):</b> class.usu.ac.id			
13	Sub-CLO 13:  After attending this lecture, students will be able to explain the utilisation and processing methods of eggshells.	a. Accuracy in providing the information needed b. Accuracy in doing the quiz c. Correctness of students' answers	Criteria: a. Worksheet/non test b. Reading a book c. Respond to the opening question given by the Practicum Techniques: Non-test Assignment	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>  <b>Activities:</b> a. <i>Recording attendance</i> b. <i>Completing assignment</i> c. <i>Practicum</i> d. <i>Case Method</i>  <b>Moda (Learning Management System):</b> Class.usu.ac.id	TM (1 week x 2 credits x 50 minutes)  <b>Learning Methods:</b> c. Lecture d. Discussion  <b>Activities:</b> a. Online/offline learning b. Class discussion c. Take notes on learning materials  <b>Media:</b> a. Slides/ ppt b. Zoom meeting / LCD c. Textbook	<b>Subject matter:</b> a. Eggshell utilisation and processing methods b. Eggshell meal quality c. Solid waste treatment	This sub-CLO will be assessed during Final exams
14	Sub-CLO14:  After attending this lecture, students will be able to explain livestock waste as feed ingredients ( Fertilizer manufacturing)	a. Accuracy in providing livestock waste as feed ingredients b. Accuracy in doing the quiz c. Correctness of students' answers	Criteria: a. Worksheet/non test b. Reading a book c. Respond to the opening question given by the Practicum Techniques: Non-test Assignment	KM+PT (1 week x 3 credits x 120 minutes)  <b>Learning Methods:</b> <i>Self-Paced Learning</i>  <b>Activities:</b> a. <i>Recording attendance</i> b. <i>Completing assignment</i> c. <i>Practicum</i>	TM (1 week x 2 credits x 50 minutes)  <b>Learning Methods:</b> a. Lecture b. Discussion  <b>Activities:</b> a. Online/offline learning b. Class discussion c. Take notes on learning materials  <b>Media:</b> a. Slides/ ppt	Subject matter: 1. Livestock waste as feed ingredients 2. Processing livestock waste as feed ingredients 3. Quality and use 4. Fertilizer manufacturing	This sub-CLO will be assessed during Final exams

				<b>Moda (Learning Management System):</b> Class.usu.ac.id	b. Zoom meeting / LCD, Textbook		
FINAL SEMESTER EXAMINATION (UAS)							20%

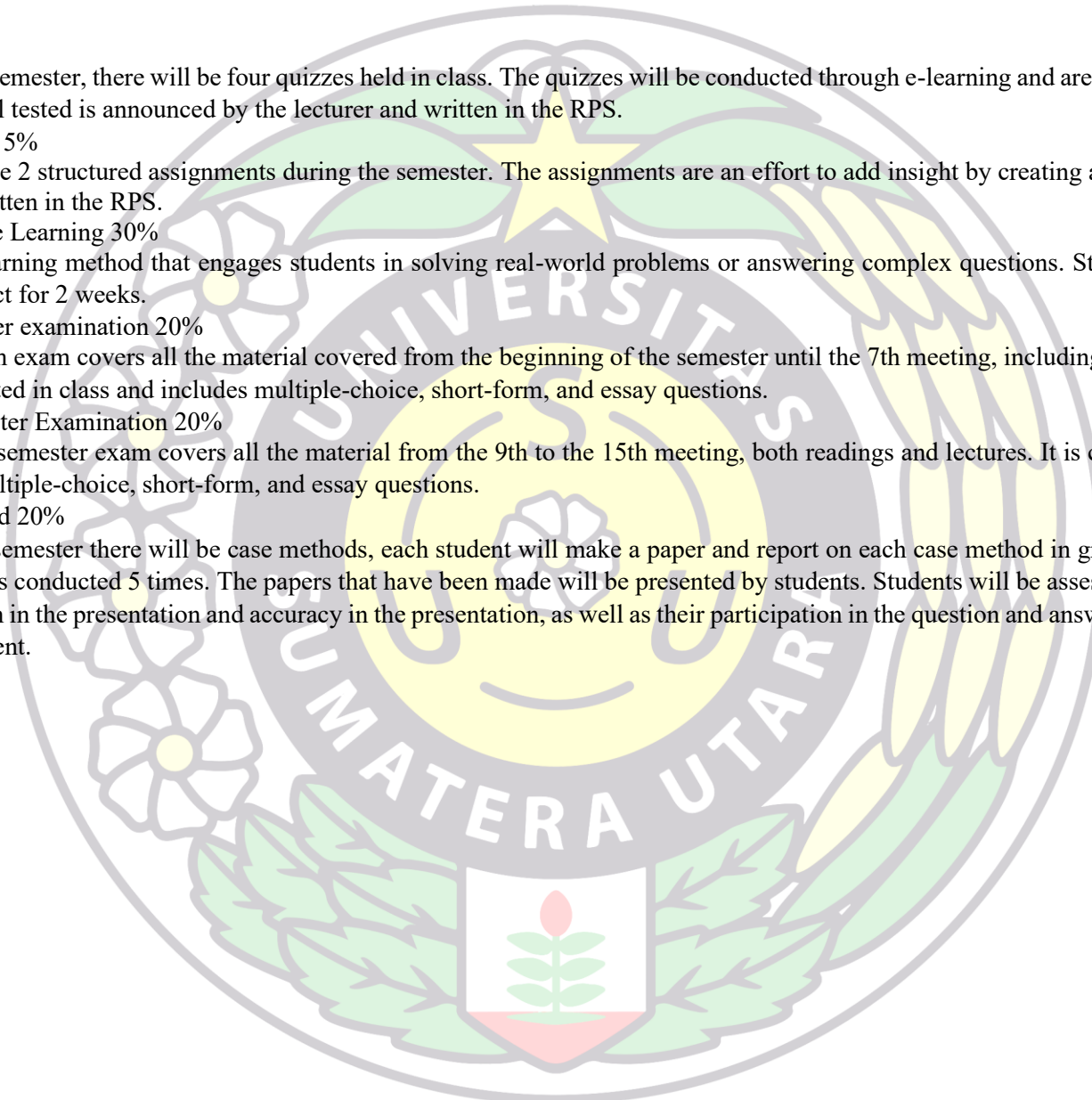


**Assessment Plan:**

Form of Evaluation	Sub-CLO	Assessment Instrument [Frequency]		Bill (proof)	Assessment Weight (%)
		Formative	Summative		
<b>Quiz/question and answer</b>	Sub-CLO2 Sub CLO8	Assessment rubric [2 times]	-	Quiz answers uploaded to class.usu.ac.id	5
<b>Tasks</b>	Sub-CLO3 Sub-CLO5	Assessment rubric [2 times]	-	Assignments uploaded to class.usu.ac.id	5
<b>Problem-based Learning</b>	Sub-CLO11	-	Assessment rubric [1 times]	Logbook/worksheets / slides uploaded to class.usu.ac.id	30
<b>Case Method</b>	Sub-CLO12	-	Assessment rubric [1 times]	Logbook/worksheets / slides uploaded to class.usu.ac.id	20
<b>Written exam 1 (UTS)</b>	Sub-CLO1 and Sub-CLO4 Sub-CLO6	-	Assessment rubric [1 time]	Written exam result sheet	20
<b>Written exam 2 (final exam)</b>	Sub-CLO9 Sub-CLO10 Sub-CLO13 Sub-CLO14	-	Assessment rubric [1 time]	Written exam result sheet	20
<b>Total</b>					100%

**Explanation:**

- a) Quiz 5%  
During the semester, there will be four quizzes held in class. The quizzes will be conducted through e-learning and are scheduled in advance. The material tested is announced by the lecturer and written in the RPS.
- b) Assignment 5%  
There will be 2 structured assignments during the semester. The assignments are an effort to add insight by creating a resume related to the material written in the RPS.
- c) Project Base Learning 30%  
PBL is a learning method that engages students in solving real-world problems or answering complex questions. Students will work on a group project for 2 weeks.
- d) Mid semester examination 20%  
The midterm exam covers all the material covered from the beginning of the semester until the 7th meeting, including reading and lectures. It is conducted in class and includes multiple-choice, short-form, and essay questions.
- e) Final Semester Examination 20%  
The end-of-semester exam covers all the material from the 9th to the 15th meeting, both readings and lectures. It is conducted in class and includes multiple-choice, short-form, and essay questions.
- f) Case Method 20%  
During the semester there will be case methods, each student will make a paper and report on each case method in groups. Case method in this course is conducted 5 times. The papers that have 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 present.



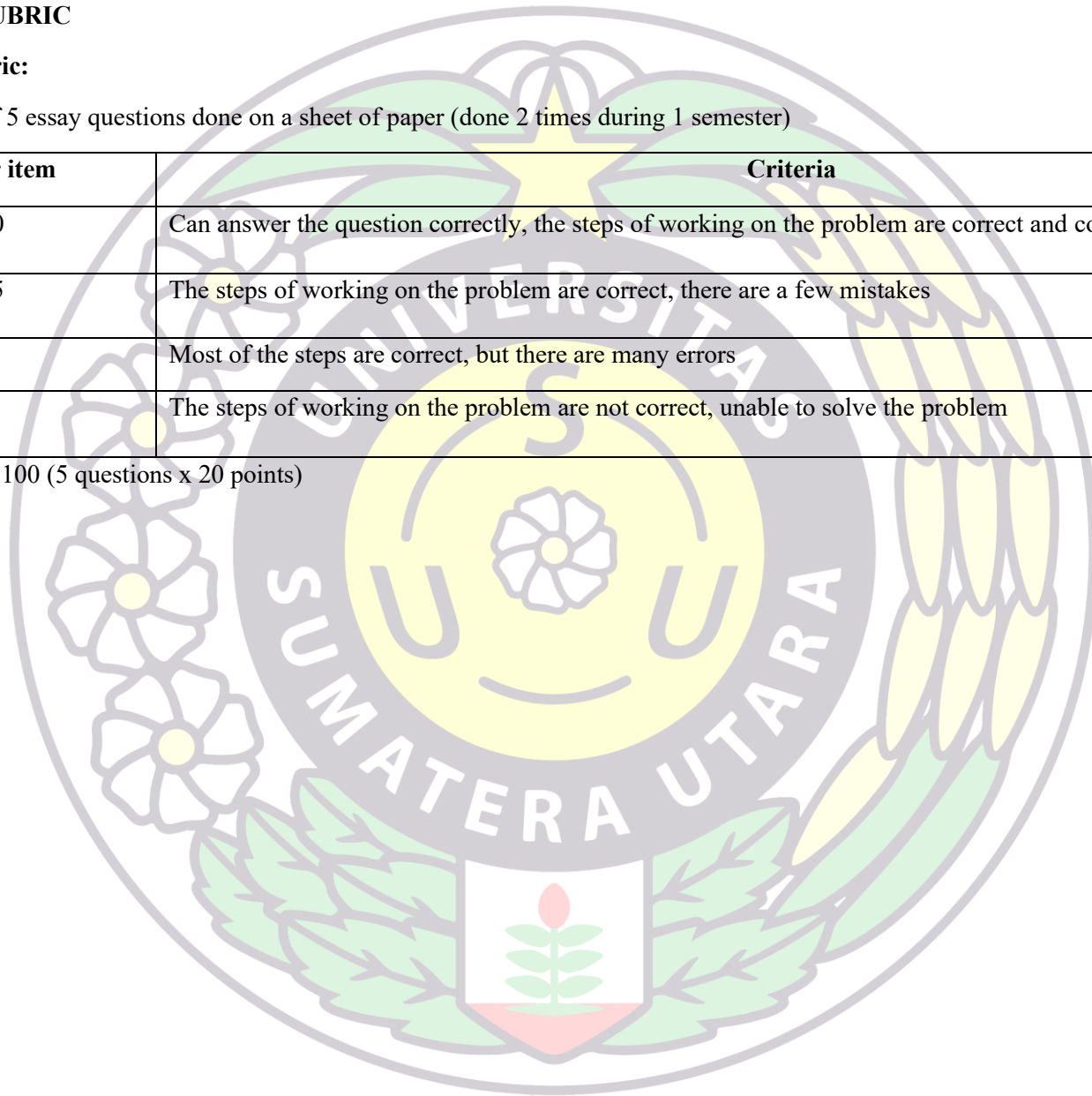
## ASSESSMENT RUBRIC

### Quiz Scoring Rubric:

The quiz consists of 5 essay questions done on a sheet of paper (done 2 times during 1 semester)

Value per item	Criteria
16-20	Can answer the question correctly, the steps of working on the problem are correct and completely correct.
11-15	The steps of working on the problem are correct, there are a few mistakes
6-10	Most of the steps are correct, but there are many errors
0-5	The steps of working on the problem are not correct, unable to solve the problem

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



**Teaching Journal/Proposal/Report/Paper Assessment Rubric:**

<b>Assessment Criteria</b>	<b>4 Very good</b>	<b>3 Good</b>	<b>2 Simply</b>	<b>1 Less</b>
<b>Understanding of Learning Topics with Resumed Journals</b>	Understand the topic exactly once (25)	Understand the topic (20)	Does not fully and appropriately understand the topic (15)	Not understanding the topic (10)
<b>Contents</b>	Drafts show understanding participants integrate information that has been learnt and/or assigned to read during lectures properly and appropriately. (25)	Drafts demonstrate an understanding of the material covered and integrate some of the information that has been learnt and/or assigned to read during lectures. (20)	Drafts show an understanding of the material covered and only integrate a small portion of the information that has been learnt and/or assigned to read during the lecture. (15)	Drafts show a lack of understanding of the material discussed so it is not clear and does not integrate the material. Information that has been learnt and/or assigned to read during lectures. (10)
<b>Clarity of Writing</b>	All writing ideas are well conveyed. (25)	Most of the ideas are well-written and clear. (20)	Some of the ideas are well-written and clear. (15)	The idea of the writing is not conveyed well and clearly. (10)
<b>Language Clarity</b>	Uses foreign/Indonesian language well and correctly few grammatical and word choice errors that do not interfere with understanding. (25)	Uses foreign/Indonesian language well and correctly with few grammatical and word choice errors that interfere with understanding. (20)	Uses foreign/Indonesian language fairly well and correctly with some grammatical and word choice errors. (15)	Do not use the foreign/Indonesian language properly and correctly as the writing contains many grammatical and word choice errors. (10)
<b>Total</b>	<b>81-100 (Excellent)</b>	<b>61-80 (Good enough)</b>	<b>41-60 (Enough)</b>	<b>0-40 (Less)</b>

**Group Presentation Task Assessment Rubric:**

<b>CATEGORIES</b>	<b>4 Very good</b>	<b>3 Good</b>	<b>2 Simply</b>	<b>1 Less</b>
<b>Group Preparation</b>	<p>The group is fully prepared and has optimised presentation exercises.</p> <p>Mutual complementarity between group members with clear tasks for each group member. (25)</p>	<p>The group seemed reasonably prepared but may need more practice presenting.</p> <p>The responsibilities of each group member need to be identified. (20)</p>	<p>The group made an effort to prepare but did not do any presentation preparation exercises.</p> <p>Tasks and responsibilities are assigned and accepted without careful consideration. (15)</p>	<p>The group seemed to have not prepared at all for the presentation.</p> <p>Tasks and responsibilities are assigned and accepted randomly. (10)</p>
<b>Presentation Organisation</b>	<p>The group presented the content, logically, and systematically, through a cohesive introduction, main points, and conclusion.</p> <p>The group used visual aids that effectively supported and reinforced the presentation. (25)</p>	<p>The group presented the content logically and systematically, with an introduction, main idea and conclusion.</p> <p>The group used visual aids that showed a link to the content of the presentation. (20)</p>	<p>The group presented the content fairly logically and systematically, but it did not contain an introduction, main idea, or conclusion.</p> <p>The group occasionally used visual aids that did not support the content of the presentation. (15)</p>	<p>The group presented the content randomly without any introduction, main idea, or conclusion.</p> <p>Groups using unsupportive visual aids or no visual aids at all. (10)</p>
<b>Task Achievement</b>	<p>Each group member can demonstrate solid knowledge through their exposure and elaboration, and deliver the part of the presentation that is assigned to them within the time allotted. (25)</p>	<p>Each group member demonstrates good knowledge through their exposure and elaboration but in less time than the time allocated to them. (20)</p>	<p>Each group member demonstrated sufficient knowledge but failed to elaborate, and presented his or her part in only half the time allotted to him or her. (15)</p>	<p>Each group member has no knowledge of the content and presents his/her section in less than half the time allocated to him/her. (10)</p>

<b>Mastery of Presentation Content</b>	<p>Each group member demonstrates a full understanding of the presentation topic.</p> <p>The main points presented are supported by evidence and critically evaluated. (25)</p>	<p>Each group member demonstrated a good understanding of the presentation topic.</p> <p>Most of the main points are illustrated with relevant evidence. (20)</p>	<p>Each group member demonstrated a good understanding of some aspect of the topic.</p> <p>Some illustrations are given, but not critically evaluated. (15)</p>	<p>Each group member did not seem to understand the presentation topic very well.</p> <p>Some evidence was mentioned, but not integrated in the presentation or evaluated. (10)</p>
<b>Answers to Questions</b>	<p>The group was able to correctly answer almost all the questions asked by the audience about their presentation topic. (25)</p>	<p>The group was able to correctly answer most of the questions asked by the audience about the tropes of their presentation. (20)</p>	<p>The group was able to correctly answer some of the questions the audience asked about their presentation topic. (15)</p>	<p>The group was unable to answer the questions posed by the audience on the topic of their presentation appropriately. (10)</p>
<b>Communication Quality</b>	<p>Group interaction with the audience shows interest and respect for the opinions of others. Responses support effective communication. (25)</p>	<p>Group interaction with an audience shows interest and respect for the opinions of others. Responses generally support effective communication. (20)</p>	<p>Some parts of the interaction in the discussion show interest and respect for others' opinions. (15)</p>	<p>Interaction in the discussion shows disrespect for other people's opinions. Responses do not support effective communication. (10)</p>
<b>Total</b>	<p><b>81-100 (Excellent)</b></p>	<p><b>61-80 (Good enough)</b></p>	<p><b>41-60 (Enough)</b></p>	<p><b>0-40 (Less)</b></p>

Source: Halimi, Sicily. "Assessment Rubric: Learning Plan Book MK Introduction to Teaching Methods", 2021.

Maximum score: 25 x 6 components = 150 points: 1.5 = 100

**Essay Writing Exam Scoring Rubric:**

<b>Assessment Criteria</b>	<b>4 Very good</b>	<b>3 Good</b>	<b>2 Simply</b>	<b>1 Less</b>
<b>Understanding of the Question</b>	Understand the question exactly once (25)	Understand the question (20)	Does not understand the question fully and correctly (15)	Did not understand the question (10)
<b>Contents</b>	Answers show understanding participants integrate information that has been learnt and/or assigned to read during lectures properly and appropriately. (25)	Answers demonstrate an understanding of the material in question and integrate some of the information learnt and/or assigned to read during the lecture. (20)	Answers show a lack of understanding of the material in question and only integrate a small portion of the information that has been studied and/or assigned to read during the lecture. (15)	The answer shows a lack of understanding of the material in question, so it is not clear and does not integrate the material. Information that has been learnt and/or assigned to read during lectures. (10)
<b>Clarity of Writing</b>	All writing ideas are well conveyed. (25)	Most of the ideas are well-written and clear. (20)	Some of the ideas are well-written and clear. (15)	The idea of the writing is not conveyed well and clearly. (10)
<b>Language Clarity</b>	Uses foreign/Indonesian language well and correctly few grammatical and word choice errors that do not interfere with understanding. (25)	Uses foreign/Indonesian language well and correctly with few grammatical and word choice errors that interfere with understanding. (20)	Uses foreign/Indonesian language fairly well and correctly with some grammatical and word choice errors. (15)	Do not use the foreign/Indonesian language properly and correctly as the writing contains many grammatical and word choice errors. (10)
<b>Total</b>	<b>81-100 (Excellent)</b>	<b>61-80 (Good enough)</b>	<b>41-60 (Enough)</b>	<b>0-40 (Less)</b>

**Multiple Choice Exam Scoring Rubric:**

<b>Value per item</b>	<b>Criteria</b>
100/many questions	Can answer the question correctly
0	Answers are less precise / not by the answer key that has been provided

