

Module designation	Research Techniques in Animal Nutrition and Feed Science
Semester(s) in which the module is taught	Even semester
Person responsible for the module	Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng. Prof. Dr. Ir. Zuprizal, DEA., IPU., ASEAN Eng. Prof. Dr. Ir. Zaenal Bachruddin, M.Sc., IPU., ASEAN Eng. Prof. Dr. Ir. Lies Mira Yusiati, S.U., IPU., ASEAN Eng. Prof. Dr. Ir. Kustantinah, DEA., IPU. Dr. Ir. Bambang Suhartanto, DEA., IPU. Ir. Andriyani Astuti, S.Pt., M.Sc., Ph.D., IPM. Ir. Nafiatul Umami, S.Pt., M.P., Ph.D., IPM., ASEAN Eng.
Language	Bahasa and English
Relation to curriculum	Specialization's Compulsory
Teaching methods	Classical lecture and discussion
Workload (incl. contact hours, self-study hours)	Total workload: 79 hours Contact hours: - Lecture: 23 hours - Academic activity: 28 hours Private study: 28 hours
Credit points	2/0
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	<p>Course Outcomes (CO):</p> <ol style="list-style-type: none"> 1. Students are able to understand research theories and techniques, coordinate the logistic needed, take the right samples, process and draw conclusion from the data obtained. 2. Students are able to design a study with suitable research techniques and coordinate the research techniques to be carried out so efficient and well-planned research could be reached. 3. Students master research techniques related to animal nutrition and feed science, competent to work interdisciplinary, as well as communicate their ideas and opinions, especially related with research technique on nutrition and animal feed. <p>Expected Learning Outcomes:</p> <ul style="list-style-type: none"> - Attitudes and Behaviors: <ol style="list-style-type: none"> 1. Piety to God and be able to show religious attitude and maintain the humanity values in carrying the task, which is based on religion, moral, and ethics. (CO1) 2. Be accountable in carrying the professional practice that includes ability to accept accountability towards decision and professional action. It shall be according to the scope of the practice under their responsibility and laws. (CO1) - Mastery in Sciences: <ol style="list-style-type: none"> 1. Able to master the design, management, and development of livestock research. (CO2) - Special skills: <ol style="list-style-type: none"> 1. Able to design interdisciplinary and multidisciplinary research in the animal husbandry. (CO2)

	<p>- General skills:</p> <ol style="list-style-type: none"> 1. Able to develop logical, critical, systematic, and creative thought through scientific research, creation of design in the science and technology, which pays attention and applies humanity values according to their expertise. The graduates are able to arrange scientific concept and the study result based on the principles, procedures, and scientific ethics. (CO3) 2. Able to identify the science that becomes their research object and position it to a research map by using information technology in the context of science development and expertise implementation developed through interdisciplinary or multidisciplinary approaches. (CO3) 3. Able to communicate the result of reasoning and scientific research in form of thesis and scientific writing responsibly based on academic ethics in the accredited national journal. (CO3) 																																															
Content	<p>Students in the graduate program need adequate knowledge in conducting research so that the results can be trusted and accounted. This course provides knowledge concerning research that often used in the animal nutrition and feed science. Basic principles in research techniques are provided to guide student sin better understanding the techniques, to create comprehensive discussion from a research. This course contains several research techniques, either conducted in the laboratory or on site. Courses are done by theory and discussion that students are expected to be able to choose the appropriate research techniques, able to design research techniques either from logistic aspects, retrieval and preparation of samples for both livestock and feed, and data analysis.</p>																																															
Exams and assessment formats	<table border="1"> <thead> <tr> <th data-bbox="595 1308 858 1384">Assessment Components</th> <th data-bbox="858 1308 1129 1384">Course Outcomes (CO)</th> <th colspan="2" data-bbox="1129 1308 1402 1384">Percentage (%)</th> </tr> </thead> <tbody> <tr> <td data-bbox="595 1384 858 1570">1. Midterm exam (written test, take home exam, paper assignment)</td> <td data-bbox="858 1384 1129 1570">CO1, CO2, & CO3</td> <td colspan="2" data-bbox="1129 1384 1402 1570">40</td> </tr> <tr> <td data-bbox="595 1570 858 1756">2. Final exam (written test, take home exam, paper assignment)</td> <td data-bbox="858 1570 1129 1756">CO1, CO2, & CO3</td> <td colspan="2" data-bbox="1129 1570 1402 1756">40</td> </tr> <tr> <td data-bbox="595 1756 858 1794">3. Assignments</td> <td data-bbox="858 1756 1129 1794">CO1, CO2, & CO3</td> <td colspan="2" data-bbox="1129 1756 1402 1794">20</td> </tr> <tr> <th colspan="4" data-bbox="595 1794 1402 1832">Grade and Score</th> </tr> <tr> <th data-bbox="595 1832 791 1870">Grade</th> <th data-bbox="791 1832 995 1870">Score</th> <th data-bbox="995 1832 1200 1870">Grade</th> <th data-bbox="1200 1832 1402 1870">Score</th> </tr> <tr> <td data-bbox="595 1870 791 1908">A</td> <td data-bbox="791 1870 995 1908">≥80</td> <td data-bbox="995 1870 1200 1908">C+</td> <td data-bbox="1200 1870 1402 1908">45-49,9</td> </tr> <tr> <td data-bbox="595 1908 791 1946">A-</td> <td data-bbox="791 1908 995 1946">75-79,9</td> <td data-bbox="995 1908 1200 1946">C</td> <td data-bbox="1200 1908 1402 1946">40-44,9</td> </tr> <tr> <td data-bbox="595 1946 791 1984">A/B</td> <td data-bbox="791 1946 995 1984">70-74,9</td> <td data-bbox="995 1946 1200 1984">C-</td> <td data-bbox="1200 1946 1402 1984">35-39,9</td> </tr> <tr> <td data-bbox="595 1984 791 2022">B+</td> <td data-bbox="791 1984 995 2022">65-69,9</td> <td data-bbox="995 1984 1200 2022">C/D</td> <td data-bbox="1200 1984 1402 2022">30-34,9</td> </tr> <tr> <td data-bbox="595 2022 791 2076">B</td> <td data-bbox="791 2022 995 2076">60-64,9</td> <td data-bbox="995 2022 1200 2076">D+</td> <td data-bbox="1200 2022 1402 2076">25-29,9</td> </tr> </tbody> </table>				Assessment Components	Course Outcomes (CO)	Percentage (%)		1. Midterm exam (written test, take home exam, paper assignment)	CO1, CO2, & CO3	40		2. Final exam (written test, take home exam, paper assignment)	CO1, CO2, & CO3	40		3. Assignments	CO1, CO2, & CO3	20		Grade and Score				Grade	Score	Grade	Score	A	≥80	C+	45-49,9	A-	75-79,9	C	40-44,9	A/B	70-74,9	C-	35-39,9	B+	65-69,9	C/D	30-34,9	B	60-64,9	D+	25-29,9
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	B-	55-59,9	D	20-24,9
	B/C	50-54,9	E	0-19,9
Study and examination requirements	The final grade in the module is composed of 40% performance on Midterm exam, 40% final exam, 20% assignment. Students must have a final grade of 70% or higher to pass			
Reading list	<ul style="list-style-type: none"> - Grobbelaar, J., A.W. Lishman, W.A. Botha, D.J. Millar, and S.F. Lesch. 1981. A simple technique for continuous infusion of adult sheep. <i>S. Afr. J. Anim. Sci.</i> 11: 55-81. - IAEA, 1997. Estimating of Rumen Microbial Protein Yield from Purine Derivatives in Urine. A Laboratory Manual for FAO/IAEA Coordinated Research Programme. IAEA TECDOC-945. Viena. - Little, D.A. 1972. Bone Biopsy in cattle and sheep for studies of phosphorus status. <i>Austr. Vet. J.</i> 48: 668-670. - Long, E.C. 1976. Liquid Scintillation Counting Theory and Techniques. BeckmanInstrumens, Inc. Fullerton California, USA. - Ørskov, E.R. and I. McDonald, 1979. The Estimation of Protein Degradability in the Rumen from Incubation Measurements Weighted According to Rate of Passage. <i>J. Agric. Sci. Camb.</i> 92 : 499 – 503. - Pirt, J. 1985. Principles of Microbe and Cell Cultivation. - Stanbury, P.F. and A. Whitetaker. 1987. Principle of Fermentation Technology. - Verite, R. 1980. Appreciation of nitrogen value of feeds for ruminants. In: Standardization of Analytical Methodology for Feeds. Proceeding of Workshop held Ottawa, Canada. March 1979. Ed. W.J. Pigden, C.C. Balch and M. Graham. Pp. 87- 96. - Widyobroto, B.P., M. Soejono, R. Utomo, Kustantinah, dan A. Agus. 1998. Pengukuran Degradasi In Sacco. Review Metodologi. Lokakarya Standarisasi Pengukuran Degradasi In Sacco di Indonesia, Yogyakarta. - Journals related to feed stuff and formulation. 			