

MODULE HANDBOOK
DOCTORAL PROGRAM OF ANIMAL SCIENCE
UNIVERSITAS BRAWIJAYA

COMPULSORY COURSES

Module/Course Title Philosophy of Science and Scientific Writing					
Module/Course Code PEF90000	Student workload 352 hours	Credits 3 SCU	Semester 1st Semester	Frequency Each Semester	Duration 1 semester
1.	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours Structural assignment 136 hours Independence study 168 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Students are able to think critically, creatively and analyze the truth of theories based on the philosophy of science. • Students are able to reason about the knowledge gained and make deductive and inductive conclusions. • Students are able to prepare proposals and dissertation research reports according to their nature and meaning. • Students are able to write good and correct scientific papers, and have a commitment to norms and ethics in scientific studies. 				
1.	Subject aims/content This course is aimed to Reviewing and providing an understanding of the philosophy of science and theory of truth, describing critical thinking-analysis of knowledge to be reasoned deductively and inductively, understanding the nature and meaning of research, as well as strategies for preparing proposals and research reports that are reliable based on the principles of writing scientific papers that are good and right.				
2.	Teaching methods <ol style="list-style-type: none"> 1. Speech 2. Project Base Learning 3. Case Base Learning 4. Group Discussion 				
5.	Assessment methods <ol style="list-style-type: none"> 1. Individual work 2. Group work 				
6.	This module/course is used in the following study programme/s as well N/A				
7.	Responsibility for module/course <ol style="list-style-type: none"> 1. Prof.Dr.Ir.Hendrawan Soesanto,MRurSc. 2. Prof.Dr.Sc.Ir agr,Ir Suyadi, MS IPU.ASEAN Eng 3. Dr,Ir. Osfar Sofjan.M.Sc. IPU. ASEAN Eng 				
8.	<ol style="list-style-type: none"> 1. C.R.Kothari. 2004. Research Methodology – Methods and Techniques. New Age Internarional Limited Publisher. New Delhi. 2. Jujun S.Suriasumantri. 2007. Filsafat Ilmu: Sebuah Pengantar Populer. Pustaka Sinar Harapan. Jakarta. 3. Moh. Nazir. 2014. Metode Penelitian. Penerbit Ghalia. Jakarta. 				

Module/Course Title Feed Science Studies					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEM 93001	352 hours	3 SCU	1st Semester	Each Semester	1 semester
4.	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours Structural assignment 136 hours Independence study 168 hours	Class size 10-15 students	
5.	Prerequisites for participation -				
6.	Learning outcomes ILO 1: Able to intervene in animal science issues at the macro level ILO 2: Master the theoretical philosophy of animal science field which is relevant to intervene its issues ILO 3: Able to expand and deepen new animal science theory through multi and transdisciplinary approaches to contribute to the achievement of the vision and mission of DAS. ILO 4: Able to contribute in the formulation of policies in regard to social welfare at the macro level through animal science development ILO 5: Find or develop scientific theories/conceptions/ideas, and contribute to the development and apply of science and/or technology in the field of animal science based on scientific methodologies, logical, critical, systematic, and creative thinking				
3.	Subject aims/content This course is presented for students who carry out the Doctoral program by research in the form of short research to improve their ability to do the following things: [1] reviewing scientific articles according to the specified topic, [2] laboratory analysis that supports his dissertation research, [3] compiled the results of the review into a research proposal, and [4] analyzed the data and compiled a report. This course will be carried out for one semester, with the caregiver lecturers being prospective promoters and co-promoters.				
4.	Teaching methods 9. Speech 10. Project Base Learning 11. Case Base Learning 12. Group Discussion				
13.	Assessment methods 3. Individual work 4. Group work				
14.	This module/course is used in the following study programme/s as well N/A				
15.	Responsibility for module/course 4. Prof. Dr. Ir. Siti Chuzaemi, MS.IPU 5. Prof. Dr. Ir. Kusmartono 6. Prof. Dr. Ir. Hendrawan Soetanto, M.Rur.Sc. 7. Prof. Dr. Ir. Hartutik, MP 8. Prof. Dr. Ir. Ifar Subagiyo, MAgr.St				
16.	4. Church D.C. and Pond W.G. , 1982. Basic animal Nutrition and Feedingg, Second Edition. Canada. John Wiley and `Sons, 1982.				

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| | <ol style="list-style-type: none">5. Church, D.C. 1976. Digestive Physiology and Nutritin of Ruminant. Vol. 1: Digestive Physiology. 2nd Ed. Metropolitan Printing Co. Corvalilis, OR6. Chuzaemi, S. 2012. Fisiologi Nutrisi Ruminansia. Universitas Brawijaya Press. Malang7. Devendra, C. 1993. Sustainable animal production from small farm system in south-East asia FAO animal production and health paper 106. FAO Rome8. Hobson, P.N., C.S. Stewart, 1997. The Rumen Microbial Ecosystem. St. Edmundsbury Press Great Britain9. Ifar, S. 1996. Relevance of Ruminant Upland Mixed-Farming System in East Java. Indonesia. Animal Production System Department. Wageningen University. The Netherlands10. McDonald, P., R. Edwards and J. Greenhalgh. 2002. Animal Nutrition. 6th Edition. New York11. Orskov E.R., 1982. Protein Nutrition ini Ruminants, London. Academic Press Inc. 198212. Roeveled, 1998. Focusing Livestock Systems Research. KTLV. Amsterdam. The Netherlands13. Van Soest, P.J. 1994. Nutritional Ecology of the Ruminant. |
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Module/Course Title Animal Product Technology Studies					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PET 94001	352 hours	3 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes 1. Able to master the basic concepts of animal product technology studies Processing and product design 2. Able to apply strategies in optimizing processing processes, and understand the mechanism of component interaction to increase product added value 3. Able to communicate scientific work related to the study of animal product technology.				
4.	Subject aims/content This course discusses about the basic concept of animal product technology and its development includes the implementation of hurdle technology as the principle of preserving animal products. The product development mechanism includes the basic concept of the occurrence of basic phenomena of interaction of animal product components so that an optimal product is produced, both product and process. The interaction of bioactive components derived from food additives so as to support the functional success of the product				
5.	Teaching methods 1. Speech 2. Project Base Learning 3. Case Base Learning 4. Group Discussion				
5.	Assessment methods 1. Scientific article(s) 2. Presentation				
6.	This module/course is used in the following study programme/s as well N/A				
7.	Responsibility for module/course Prof. Dr.Ir. Lilik Eka Radiati MS., IPU				
8.	Other information (References) 1. Anita Cappalwar, et al. 2020. Concept of Hurdle Technology for Food Safety of Food Products of Animal Origin. DOI: 10.31080/ASMI.2020.03.0725				

Module/Course Title Animal Production Studies					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEP 91001	352 hours	3 SCU	1 st semester	Each Semester	1 semester
1.	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours (structural assignment 136 hours and self learning 168 hours)	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	<p>Intended Learning Outcomes:</p> <ul style="list-style-type: none"> • Able to intervene in livestock problems at the macro level. • Able to expand and deepen new livestock theory through a multi and transdisciplinary approach to contribute to the achievement of the vision and mission of PSDIT FPt UB. • Finding or developing scientific theories/conceptions/ideas, and contributing to the development and practice of science and/or technology in the field of animal husbandry based on scientific methodologies, logical, critical, systematic, and creative thinking. • Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main objectives of the research as well as its relationship to broader objectives. <p>Course Learning Outcomes:</p> <ul style="list-style-type: none"> • Able to formulate problems, formulate hypotheses, and research methods of livestock production according to the field of science that is occupied. • Able to conduct a written study of the policy of the livestock production system in national development which aims to fulfill the adequacy of food originating from livestock. • Students are able to collect, process data and interpret the results logically and systematically written in scientific language. 				
4.	<p>Subject aims/content</p> <p>The Science and Field Studies course aims to provide an understanding of livestock production system policies as an aspect of national development studies in terms of fulfilling food adequacy of animal origin in terms of current scientific and technological principles as well as overall achievement methods. Discussion and emergence of ideas or innovations using basic knowledge of concepts, scientific theory is needed as a basis for reviewing regulations that apply to national development goals, logical prospective studies and follow-up on weaknesses and strengths of livestock production systems.</p>				
5.	<p>Teaching methods</p> <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	<ul style="list-style-type: none"> • Assessment methods • Individual work • Group work 				
7.	This module/course is used in the following study programme/s as well N/A				

8.	Responsibility for module/course Prof.Dr.Ir. Veronica Margareta Ani Nurgiartiningsih , M.Sc.
9.	<p>Other information (References)</p> <ol style="list-style-type: none"> 1. Ciptadi, G. A. Budiarto, Aulani'am, Y Oktanella. 2019. Genetika dan Pemuliaan : Peternakan-Veteriner. UB Press. Malang. ISBN 978-602-432-950-1 2. Nurgiartiningsih, V. M. A. 2017. Pengantar Parameter Genetik pada Ternak. UB Press. 3. Schultz, B. et al. 2020. Genetic improvement of livestock, from conventional breeding to biotechnological approaches in Animal Agriculture. Academic Press 4. Thiagarajan, R. 2014. Text book of Animal Breeding. 5. Van der Werf, J. H. J. 2019. Genetic Evaluation and Breeding Program Design. University of New England 6. Gondro, C. J.H.J. van der Werf and B.J. Hayes (Eds). 2013. Genome-Wide Association Studies and Genomic Prediction. ISBN 978-1-62703-446-3

Module/Course Title Animal Reproduction and Breeding Studies					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PER 91002	352 hours	3 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Able to master the basic concepts of the study of Animal Reproduction and Breeding • Able to apply strategies for utilizing reproductive technology and animal breeding for livestock development • Able to communicate concepts and studies in scientific writing in the field of animal reproduction and breeding. 				
4.	Subject aims/content This course discusses about the concept of Animal Reproduction and Breeding includes the implementation of Reproduction in the development and population of animal, The role of Reproductive Technology for increasing livestock productivity, Overcoming reproductive disorders for increasing animal populations, implementing breeding designs/programs in improving genetic quality and animal performance, the role of breeding programs in resource management. animal genetic resources, genetic quality improvement strategies for several important traits in animal and implementation of biotech in animal breeding				
5.	Teaching methods <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	Assessment methods <ul style="list-style-type: none"> • Scientific article(s) • Presentation 				
7.	This module/course is used in the following study programme/s as well N/A				
8.	Responsibility for module/course Prof.Dr.Sc.Agr.Ir. Suyadi, MS. IPU. ASEAN Eng				
9.	Other information (References) <ul style="list-style-type: none"> • B. Hafez, E.S.E Hafez. 2000. Animal Reproductin of Farm Animals. Lippincott Williams & Wilkins. South Carolina. USA. • B. Walsh and M. Lynch. 2018. Evolution and Selection of Quantitative Traits. Oxford Univ Press • Ciptadi, G. A. Budiarto, Aulani'am, Y Oktanella. 2019. Genetika dan Pemuliaan : Peternakan-Veteriner. UB Press. Malang. ISBN 978-602-432-950-1 • Nurgiartiningasih, V. M. A. 2017. Pengantar Parameter Genetik pada Ternak. UB Press. • Schultz, B. et al. 2020. Genetic improvement of livestock, from conventional breeding to biotechnological approaches in Animal Agriculture. Academic Press • Thiagarajan, R. 2014. Text book of Animal Breeding. • Van der Werf, J. H. J. 2019. Genetic Evaluation and Breeding Program Design. University of New England 				

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| | <ul style="list-style-type: none">• Gondro, C. J.H.J. van der Werf and B.J. Hayes (Eds). 2013. Genome-Wide Association Studies and Genomic Prediction. ISBN 978-1-62703-446-3 |
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Module/Course Title Animal Husbandry Socio-Economic Studies					
module/ course code PES 94001	Student work-load 352 hours	Credits 3 SCU	Semester 1 st Sem.	Frequency Each Semester	Duration 1 semester
1	Types of courses Compulsory Course	Contact hours 48 hours	Independent study 304 hours Structural assignment 136 hours Independence study 168 hours	Class size 10-15 students	
2	Prerequisites for participation (if applicable) -				
3	Learning outcomes 1. Understanding the basic concepts of Livestock Socio-Economic Studies based on Industry 4.0 technology 2. implementing strategies in optimizing the application of Industry 4.0 technology in the socio-economic field of livestock, and understanding the mechanism of component interaction to improve Precision Livestock Farming (PLF). 3. Skilled in communicating scientific work related to the socio-economic study of livestock based on industry 4.0.				
4	Subject aims/Content This course aims to provide an understanding of the socio-economic concept of animal science and its development including the implementation of industrial technology 4.0 which can assist in the decision-making process to optimize the production and performance of the livestock industry through the interaction between cost-effective and environmentally practices to support the success of the livestock industry business.				
5	Teaching methods 1. Speech 2. Project Based Learning 3. Case based learning 4. Group Discussion				
6	Assessment methods 1. Individual work 2. Group work				
7	This module/course is used in the following study programme/s as well -				
8	Responsibility for module/course 1.Ir. Hari Dwi Utami, MS. M.Appl.Sc., Ph.D., IPM., ASEAN Eng				
9	Other information 1. Saucedo-Martínez, J.A.; Pérez-Lara, M.; Marmolejo-Saucedo, J.A.; Salais-Fierro, T.E.; Vasant, P. Industry 4.0 framework for management and operations: A review. J. Ambient. Intell. Humaniz. Comput. 2018, 9, 789. 2. Preuveneers, D.; Ilie-Zudor, E. 1.The intelligent industry of the future: A survey on emerging trends, research challenges and opportunities in Industry 4.0. J. Ambient Intell. Smart Environ. 2017, 9, 287–298.				

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| <p>3. Kovacs, G.; Kot, S. New Logistics and Production Trends as the Effect of Global Economy Changes. <i>Pol. J.Manag. Stud.</i> 2016, 14, 115–126.</p> <p>4. Sanders, A.; Elangeswaran, C.; Wulfsberg, J. Industry 4.0 implies lean manufacturing: Research activities in industry 4.0 function as enablers for lean manufacturing. <i>J. Ind. Eng. Manag.</i> 2016, 9, 811–833.</p> |
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ELECTIVE COURSES

Module/Course Title Animal Reproduction Biology					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PER 92002	234.67 hours	2 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Elective Course	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Able to master the basic concepts of animal reproductive biology studies • Able to apply strategies in optimizing the animal reproduction process • Able to communicate the concepts and studies in scientific writings in the field of animal reproductive biology. 				
4.	Subject aims/content This course discusses about the basic concepts of reproductive processes include puberty, mating, pregnancy, birth and postnatal cellular and molecular in animal				
5.	Teaching methods <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	Assessment methods <ul style="list-style-type: none"> • Scientific article(s) • Presentation 				
7.	This module/course is used in the following study programme/s as well N/A				
8.	Responsibility for module/course Prof. Dr.Ir. Nurul Isnaini, MP.				
9.	Other information (References) <ul style="list-style-type: none"> • Hafez, E.S.E. 2008. Reproduction in Farm Animal. 7th edition. Lippicot Philadelphia : Williams and Wilkins • Rahayu, S., T. Susilawati dan A. Soewondo. Biologi Reproduksi Kajian Seluler dan Molekuler • Susilawati, T. 2011. Spermatologi. Malang. UB Press • Jurnal Theriogenology • Jurnal Fertility and Infertility 				

Module/Course Title Small Project of Non-Ruminant					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEM 93002	234.67 hours	2 SCU	1 st semester	Each Semester	1 semester
1.	Types of courses Elective Units	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	<p>Learning outcomes</p> <p>ILO 5 : Find or develop scientific theories/conceptions/ideas, and contribute to the development and apply of science and/or technology in the field of animal science based on scientific methodologies, logical, critical, systematic, and creative thinking</p> <p>ILO 6 : Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main research objectives and relationships with broader objectives</p> <p>ILO 9 : Choose appropriate, current and advanced research and provide benefits to mankind through an inter, multi, or trans disciplinary approach, to develop and/or produce problem solving in the fields of science, technology, and art</p> <p>ILO 10 : Demonstrate academic leadership and develop collegial relationships in managing, developing and fostering resources and organizations under their responsibility as well as communities outside the institution</p>				
1.	<p>Subject aims/content</p> <p>The aim of this course provides a collaborative learning experience between professions in non-ruminant livestock nutrition research. In this course, students will be equipped with knowledge and skills through interactive lectures, small group discussions and small projects, which will be supervised and guided by supervisors in terms of knowledge, science and philosophy and ethics in research, formulating problems, hypotheses, and research designs following the methods used. Furthermore, selected, collected and process data from measurement results and prepared research proposals</p>				
2.	<p>Teaching methods</p> <ol style="list-style-type: none"> 1. Speech 2. Project Base Learning 3. Case Base Learning 4. Group Discussion 				
5.	<p>Assessment methods</p> <ol style="list-style-type: none"> 1. Individual work 2. Group work 				
6.	This module/course is used in the following study programme/s as well N/A				
7.	<p>Responsibility for module/course</p> <ol style="list-style-type: none"> 1. Dr.Ir.Osfar Sjojfan, MSc.IPU 2. Prof. Dr. Ir. M. Halim Natsir, SPt.MP.IPM 3. Dr.Ir. Eko Widodo, M.Agr.Sc.MSc. 				
8.	<p>Other information (References)</p> <ol style="list-style-type: none"> 1. Rick Kleyn. 2018 . Chicken Nutrition. Packington. England 2. Baracho et al. June 2019. Factors Affecting Broiler Production: A Meta Analysis. Brazilian Journal of Poultry Science 				

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| | <ol style="list-style-type: none"><li data-bbox="293 190 1401 297">3. Remus A. 2014. A meta-analysis of the feed intake and growth performance of broiler chickens challenged by bacteria. <i>Poultry Science</i>. 93 :1149–1158 . http://dx.doi.org/10.3382/ps.2013-03540<li data-bbox="293 297 1401 365">4. Azmat Khan et al. 2018. Advances in Nutrigenomics and its Application in Poultry . Article in <i>International Journal of Current Microbiology and Applied Sciences</i> .<li data-bbox="293 365 1401 472">5. Liuting Wu., et al. Dec 2020. The mutual interaction between gut microbiota and protein/amino acid metabolism for host mucosal immunity and health. <i>J, Animal Nutrition</i>. https://doi.org/10.1016/j.aninu.2020.11.003<li data-bbox="293 472 1401 580">6. NasrinNoohi, et al . Dec. 2020. Screening for probiotic characters in lactobacilli isolated from chickens revealed the intra-species diversity of <i>Lactobacillus brevis</i>. <i>Animal Nutrition, J</i>. https://doi.org/10.1016/j.aninu.2020.07.005<li data-bbox="293 580 1401 674">7. Sujuan, D. et al. Dec 2020. The impact of probiotics on gut health via alternation of immune status of monogastric animals. <i>Animal Nutrition, J</i>. https://doi.org/10.1016/j.aninu.2020.11.004 |
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Module/Course Title Small Project of Ruminants and Forage Science					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEM 93003	234.67 hours	2 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Elective Units	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> ● Able to intervene in animal science issues at the macro level (ILO 1) ● Find or develop scientific theories/conceptions/ideas, and contribute to the development and apply of science and/or technology in the field of animal science based on scientific methodologies, logical, critical, systematic, and creative thinking (ILO 5) ● Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main research objectives and relationships with broader objectives (ILO 6) ● Choose appropriate, current and advanced research and provide benefits to mankind through an inter, multi, or trans disciplinary approach, to develop and/or produce problem solving in the fields of science, technology, and art (ILO 9) 				
1.	Subject aims/content The aim of this course provides a collaborative learning experience between professions in ruminant nutrition and forage science research. In this course, students will be equipped with knowledge and skills through interactive lectures, small group discussions and small projects, which will be supervised and guided by supervisors in terms of knowledge, science and philosophy and ethics in research, formulating problems, hypotheses and research designs following the methods used. Furthermore, selected, collected and process data from measurement results and prepared research proposals				
2.	Teaching methods <ol style="list-style-type: none"> 1. Speech 2. Project Base Learning 3. Case Base Learning 4. Group Discussion 				
5.	Assessment methods <ol style="list-style-type: none"> 1. Individual work 2. Group work 				
6.	This module/course is used in the following study programme/s as well N/A				
7.	Responsibility for module/course <ol style="list-style-type: none"> 1. Prof. Dr. Ir. Kusmartono 2. Prof. Dr. Ir. Siti Chuzaemi, MS.IPU 3. Prof. Dr. Ir. Hendrawan Soetanto, M.Rur.Sc. 4. Prof. Dr. Ir. Hartutik, MP 5. Prof. Dr. Ir. Ifar Subagiyo, MAgr.St 				
8.	<ol style="list-style-type: none"> 1. Church D.C. and Pond W.G. , 1982. Basic animal Nutrition and Feedingg, Second Edition. Canada. John Wiley and `Sons, 1982. 2. Church, D.C. 1976. Digestive Physiology and Nutritin of Ruminant. Vol. 1: Digestive Physiology. 2nd Ed. Metropolitan Printing Co. Corvalilis, OR 				

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| | <ol style="list-style-type: none">3. Chuzaemi, S. 2012. Fisiologi Nutrisi Ruminansia. Universitas Brawijaya Press. Malang4. Devendra, C. 1993. Sustainable animal production from small farm system in south-East asia FAO animal production and health paper 106. FAO Rome5. Hobson, P.N., C.S. Stewart, 1997. The Rumen Microbial Ecosystem. St. Edmundsbury Press Great Britain6. Ifar, S. 1996. Relevance of Ruminant Upland Mixed-Farming System in East Java. Indonesia. Animal Production System Department. Wageningen University. The Netherlands7. McDonald, P., R. Edwards and J. Greenhalgh. 2002. Animal Nutrition. 6th Edition. New York8. Orskov E.R., 1982. Protein Nutrition in Ruminants, London. Academic Press Inc. 19829. Roeleved, 1998. Focusing Livestock Systems Research. KTLV. Amsterdam. The Netherlands10. Van Soest, P.J. 1994. Nutritional Ecology of the Ruminant |
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Module/Course Title Animal Product Bioprocess Tecnology					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PET 95003	234.67 hours	2 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Department of Animal Reproduction and Breeding Elective Units	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Able to master the basic concepts of animal product bioprocess technology studies • Able to optimize the use of microbial technology and fermentation of processed animal products • Able to develop analytical methods for bioprocess results. 				
4.	Subject aims/content This course discusses about philosophy, logic of science about bioprocesses in the field of animal products technology including microbial technology and changes in the components of animal products to produce animal products that act as healthy and healthy functional products, preservation of microbes that are useful as probiotics				
5.	Teaching methods Speech Project Base Learning Case Base Learning Group Discussion				
6.	Assessment methods Individual work Discussion				
7.	This module/course is used in the following study programme/s as well N/A				
8.	Responsibility for module/course Dr.Ir., Agus Susilo, Spt. MP.IPM. ASEAN Eng.				
9.	Other information (References)				

Module/Course Title Animal Product Technology Development					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PET 95002	234.67 hours	2 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Department of Animal Reproduction and Breeding Elective Units	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Able design the concept of traceability to the processing flow to the consumer • Able to implement and harmonize product safety supporting regulations • Able to design the documentation of quality assurance of animal products. 				
4.	Subject aims/content This course discusses about the the basic concept of animal product technology development and its development includes the implementation of animal product handling technology to maintain the freshness of products. The product development mechanism includes the basic concept of the occurrence of the basic phenomena of factors that cause product damage so that a product that remains fresh is produced. Products and processes have records and adhere to the process, so they are able to track the stages that cause damage to fresh products. Understand the rules related to products, standardization and distribution and storage				
5.	Teaching methods <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	Assessment methods <ul style="list-style-type: none"> • Individual work • Discussion 				
7.	This module/course is used in the following study programme/s as well N/A				
8.	Responsibility for module/course Prof. Dr.Ir. Djalal Rosyidi, MS.IPU ASEAN Eng.				
9.	Other information (References) <ol style="list-style-type: none"> 1. Processing Technologies for Milk and Milk Products Methods, Applications, and Energy Usage 2. Edited By Ashok Kumar Agrawal, Megh R. Goyal. 2017. 3. 1st Edition, Waste Treatment in the Food Processing Industry, Edited By Lawrence K. Wang, Yung-Tse Hung, Howard H. Lo, Constantine Yapijakis, Copyright Year 2004 4. 1st Edition, Food Traceability and Authenticity, Analytical Techniques, Edited By Didier Montet, Ramesh C. Ray 5. Copyright Year 2018 6. 2nd Edition Smart Biosensor Technology, Edited By George Knopf, Amarjeet S. Bassi, Copyright Year 2019 				

Module/Course Title Non-Ruminant and Miscellaneous Animal Production Strategy					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEP 91002	234,67 hours	2 SCU	1 st semester	Each Semester	1 semester
1.	Types of courses Elective Unit	Contact hours 32 hours	Independent study 202,67 hours (structural assignment 90,67 hours and self learning 112 hours)	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	<p>Intended Learning Outcomes</p> <ul style="list-style-type: none"> • Able to intervene in livestock problems at the macro level. • Able to expand and deepen new livestock theory through a multi and transdisciplinary approach to contribute to the achievement of the vision and mission of PSDIT FPt UB. • Finding or developing scientific theories/conceptions/ideas, and contributing to the development and practice of science and/or technology in the field of animal husbandry based on scientific methodologies, logical, critical, systematic, and creative thinking. • Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main objectives of the research as well as its relationship to broader objectives. <p>Course Learning outcomes</p> <ul style="list-style-type: none"> • 1. Able to formulate problems, formulate hypotheses, and research methods for non-ruminant livestock production and various livestock. • 2. Able to conduct a written study of the policy of the non-ruminant livestock production system and various livestock in national development which aims to fulfill the adequacy of food originating from livestock. • 3. Students are able to collect, process data and interpret the results logically and systematically written in scientific language. 				
4.	<p>Subject aims/content</p> <p>The subject of strategy to increase Non-Ruminant Livestock and miscellaneous Livestock Productions discusses the logic of science, government policy Theories/concepts, strategies to increase production of non-ruminant livestock and various livestock through improved management, implementation of biotechnology and breeding design to produce superior production. Discussion and the emergence of ideas or innovations using basic knowledge of concepts, scientific theories are needed as a basis in formulating strategies for increasing production as outlined in scientific writings and presented.</p>				
5.	<p>Teaching methods</p> <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	<p>Assessment methods</p> <ul style="list-style-type: none"> • Individual work • Group work 				

7.	This module/course is used in the following study programme/s as well N/A
8.	Responsibility for module/course Prof.Dr.Ir. Veronica Margareta Ani Nurgiartiningsih , M.Sc.
9.	<p>Other information (References)</p> <ul style="list-style-type: none"> • Statistik Peternakan dan Kesehatan Hewan 20202. Jakarta: Direktorat Jendral Peternakan dan Kesehatan Hewan. • Commercial Chicken Meat and Egg Production. 2020.(Bell, D.D., W.D. Weaver) Academic Publisher. USA • Poultry Genetics, Breeding and Biotechnology • Dewey M. Caron and Lawrence John Connor, 2013. Honey Bee Biology and Beekeeping. Wicwas Press LLC • Russell Goodman and Peter Kaczynski, 2014. Australian Beekeeping Guide. Fifth Edition. Rusal Industries Research and Development Corporation. • Warhurst P. and Goebel R., 2013. The bee book-beekeeping in Australia.

Module/Course Title Ruminant Production Strategy					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PEP 91003	234.67 hours	2 SCU	1 st semester	Each Semester	1 semester
1.	Types of courses Elective Unit	Contact hours 32 hours	Independent study 202.67 hours (structural assignment 90.67 hours and self learning 112 hours)	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	<p>Intended Learning Outcomes:</p> <ul style="list-style-type: none"> • Able to intervene in livestock problems at the macro level. • Able to expand and deepen new livestock theory through a multi and transdisciplinary approach to contribute to the achievement of the vision and mission of PSDIT FPt UB. • Finding or developing scientific theories/conceptions/ideas, and contributing to the development and practice of science and/or technology in the field of animal husbandry based on scientific methodologies, logical, critical, systematic, and creative thinking. • Develop a research roadmap with an inter, multi, or transdisciplinary approach, based on a study of the main objectives of the research as well as its relationship to broader objectives. <p>Course Learning Outcomes:</p> <ul style="list-style-type: none"> • Able to formulate problems, formulate hypotheses, and research methods for ruminant livestock production. • Able to conduct a written study of the policy of the ruminant livestock production system in national development which aims to fulfill the adequacy of food originating from livestock. • Students are able to collect, process data and interpret the results logically and systematically written in scientific language. 				
4.	<p>Subject aims/content</p> <p>The Ruminant Livestock Production Improvement Strategy course discusses the logic of science, government policy theories/concepts, strategies for increasing ruminant livestock production through improved management, implementation of biotechnology and breeding design to produce superior production. Discussion and the emergence of ideas or innovations using basic knowledge of concepts, scientific theories are needed as a basis in formulating strategies for increasing production as outlined in scientific writings and presented.</p>				
5.	<p>Teaching methods</p> <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	<p>Assessment methods</p> <ul style="list-style-type: none"> • Individual work • Group work 				
7.	This module/course is used in the following study programme/s as well N/A				

8.	Responsibility for module/course Prof.Dr.Ir. Puguh Suryowardoyo, MP.
9.	Other information (References) <ul style="list-style-type: none">• Statistik Peternakan dan Kesehatan Hewan 20202. Jakarta: Direktorat Jendral Peternakan dan Kesehatan Hewan.• Kementerian Pertanian. 2012. Pedoman Pengembangan Kawasan Pertanian• Badan Standarisasi Nasional. 2020. Standar Nasional Indonesia – Bibit Ternak• Journal Animal Production Science• Journal Asian-Australasian of Animal Science

Module/Course Title Genetic Quality Improvement Strategy					
Module/Course Code	Student workload	Credits	Semester	Frequency	Duration
PER 92003	234.67 hours	2 SCU	1 st semester	Each semester	1 semester
1.	Types of courses Department of Animal Reproduction and Breeding Elective Units	Contact hours 36 hours	Independent study 198.67 hours	Class size 10-15 students	
2.	Prerequisites for participation -				
3.	Learning outcomes <ul style="list-style-type: none"> • Able to formulate problems and develop research hypotheses • Able to formulate strategies for improving the animal genetic quality through quantitative genetic models, genomics, crossbreeding programs and biotechnology • Able to collect data, analyze data and interpret the results logically and systematically. 				
4.	Subject aims/content This course discusses about the logic of quantitative and molecular genetics, strategies for improving the animal genetic quality through quantitative genetics models, genomics, crossbreeding programs and biotechnology. Discussion and innovative ideas using basic knowledge, scientific theories are needed as the basis for formulating genetic quality improvement strategies that support national development goals				
5.	Teaching methods <ul style="list-style-type: none"> • Speech • Project Base Learning • Case Base Learning • Group Discussion 				
6.	Assessment methods <ul style="list-style-type: none"> • Individual work • Discussion 				
7.	This module/course is used in the following study programme/s as well N/A				
8.	Responsibility for module/course Prof.Dr.Ir. Veronica Margareta Ani Nurgiartiningsih , M.Sc.				
9.	Other information (References) <ul style="list-style-type: none"> • Ciptadi, G. A. Budiarto, Aulani'am, Y Oktanella. 2019. Genetika dan Pemuliaan : Peternakan-Veteriner. UB Press. Malang. ISBN 978-602-432-950-1 • Nurgiartiningsih, V. M. A. 2017. Pengantar Parameter Genetik pada Ternak. UB Press. • Schultz, B. et al. 2020. Genetic improvement of livestock, from conventional breeding to biotechnological approaches in Animal Agriculture. Academic Press • Thiagarajan, R. 2014. Text book of Animal Breeding. • Van der Werf, J. H. J. 2019. Genetic Evaluation and Breeding Program Design. University of New England • Gondro, C. J.H.J. van der Werf and B.J. Hayes (Eds). 2013. Genome-Wide Association Studies and Genomic Prediction. ISBN 978-1=62703-446-3 				

Module/Course Title Analysis and Synthesis of Livestock Agribusiness Development					
module/ course codePES 94002	Student work-load 234,67 hours	Credits 2 SCU	Semester 1st Sem.	Frequency Each Semester	Duration 1 semester
1	Types of courses Elective course	Contact hours 32 hours	Independent study 202,67 hours Structural assignment 90,67 hours Independence study 112 hours	Class size 10-15 students	
2	Prerequisites for participation (if applicable) -				
3	Learning outcomes <ol style="list-style-type: none"> able to recognize and explain key concepts, ideas and debates in the development of livestock agribusiness and describe the main opportunities and constraints related to the development of livestock agribusiness, which include aspects of added value, competitiveness and poverty reduction. able to critically evaluate contributions in various sectors of activity, types of policies, types of services, as well as the characteristics of actors in the process of developing livestock agribusiness. Able to understand the outlines and discussions of current debates related to the role of markets, the state, institutions, property rights, intellectual property rights, the livestock sector and the non-livestock economy. 				
4	Subject aims/Content <p>The Livestock Agribusiness Development course aims to emphasize progress and changes in rural and urban areas in developing countries, as well as their implications for the pattern of development of livestock agribusiness activities. the discussion of lecture material includes various factors driving progress and change, how to define progress and change, as well as policy interventions that can be implemented to realize the main goals of livestock agribusiness development to improve added value, competitiveness and eliminate poverty. This course reviews the importance of the role of livestock agribusiness for economic development in developing countries. In addition, it also examines concepts, theories and strategies for developing livestock agribusiness. This includes the role of the business funding sector, facilities and infrastructure, business institutions, research and counseling, climate change adaptation and mitigation mechanisms for livestock agribusiness development efforts.</p>				
5	Teaching methods <ol style="list-style-type: none"> Speech Project Based Learning Case based learning Group Discussion 				
6	Assessment methods <ol style="list-style-type: none"> Individual work Group work 				
7	This module/course is used in the following study programme/s as well				
8	Responsibility for module/course Dr. Ir. Bambang Ali N, MS, DAA.IPM. ASEAN.Eng				

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Other information

1. Agribusiness: Principles of Management. David D. Van Fleet, Ella W. Van Fleet, and George J. Seperich. © 2014 Delmar, Cengage Learning.
2. Agribusiness Supply Chain Management. N. Chandrasekaran n G. Raghuram. © 2014 by Taylor & Francis Group, LLC CRC Press is an imprint of Taylor & Francis Group, an Informa business.
3. Strategic Management and Business Policy: TOWARD GLOBAL SUSTAINABILITY. Thomas L. Wheelen and J. David Hunger. Copyright © 2012 by Pearson Education, Inc., publishing as Prentice Hall.
4. Principles of Agricultural Economics. Andrew Barkley and Paul W. Barkley. © 2013 Andrew Barkley and Paul W. Barkley.
5. The future of food and agriculture Trends and challenges. Food and Agriculture Organization of the United Nations Rome, 2017.
6. Understanding Digital Marketing Marketing strategies for engaging the digital generation. Damian Ryan. Third edition 2014 by Kogan Page Limited.
7. Digital Marketing A Practical Approach. Third Edition Alan Charlesworth. Third edition published 2018 by Routledge 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN,
8. Global Marketing. Foreign Entry, Local Marketing & Global Management. Johny K. Johansson. Published by McGraw-Hill/Irwin, a business unit of The McGraw-Hill Companies, Inc.,1221 Avenue of the Americas, New York, NY, 10020. Copyright © 2009.
9. Value Proposition Design. Alexander Osterwalder, Yves Pigneur, Alan Smith, Greg Bernarda, and Patricia Papadakos. Copyright © 2014. Published by John Wiley & Sons, Inc., Hoboken, New Jersey.
10. Operations And Supply Chain Management, Fifteenth Edition. F . R Obert J Acobs and R I Chard B . C Hase. Copyright © 2018 by McGraw-Hill Education.
11. Agricultural Development: New Perspectives in a Changing World. Edited by Keijiro Otsuka and Shenggen Fan. Copyright © 2021 International Food Policy Research Institute (IFPRI).
12. Building a Sustainable Business A Guide to Developing a Business Plan for Farms and Rural Businesses. Developed by the Minnesota Institute for Sustainable Agriculture Saint Paul, MN. Copyright © 2010, Minnesota Institute for Sustainable Agriculture.
13. Agricultural Economics. Prabhu l Pingali and Robert E Evenson. 2010. @2010 ELSEVIER BV. All rights reserved.
14. Agriculture for Development. © 2007 The International Bank for Reconstruction and Development / The World Bank.
15. Role of Livestock in Sustainable Agriculture. IAHA Conference Proceeding on Organic Animal Husbandry November 7-8, 2017.
16. The Role of Livestock in Developing Communities: Enhancing Multifunctionality. Frans Swanepoel, Aldo Stroebel and Siboniso Moyo. Co-published by The Technical Centre for

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17. Handbook of Rural Development. Edited by Gary Paul Green University of Wisconsin-Madison, USA. ©Gary Paul Green 2013.

18. Rural Development Principles, Policies and Management. Third Edition. Katar Singh. Copyright © Katar Singh, 2009. SAGE Publications India Pvt Ltd.

Module/Course Title Digital Based Livestock Agribusiness					
module/ course code PES 94003	Student work-load 234,67 hours	Credits 2 SCU	Semester 1 st Sem.	Frequency Each Semester	Duration 1 semester
1	Types of courses Elective Course	Contact hours 32 hours	Independent study 202,67 hours Structural assignment 90,67 hours Independence study 112 hours	Class size 10-15 students	
2	Prerequisites for participation (if applicable) -				
3	Learning outcomes 1. Students are able to develop a system of approaches, methods, instruments for scenario studies and livestock agribusiness policies. 2. Designing IoT (virtual coworking-space, application) for livestock agribusiness development and education.				
4	Subject aims/Content The Digital-Based Livestock Agribusiness (IoT-Livestock Agribusiness = IoTLA) course aims to improve scientific insight and skills regarding the relevance between agribusiness and livestock food-processors, society, digital communication technology (IoT) management, rural development and social sciences. There are four main components that must be considered: (1) rural communities, (2) production and distribution of livestock commodity goods, (3) sustainability of social institutions and organizations, and (4) sustainability of rural ecosystems, so this course aims to build and develop perceptions of how livestock can contribute to rural development and poverty alleviation focusing on the dynamic interaction between livelihoods in rural areas and livestock and agriculture as a global livestock agribusiness system. This course also accommodates an interdisciplinary perspective on the relationship between global, regional, national and local level processes that shape livestock agribusiness, agriculture and rural development by integrating social science, economics and knowledge related to rural natural resources. The didactic method used eclectically is a combination of delivering theoretical knowledge with empirical insights and case study presentations.				
5	Teaching methods 1. Speech 2. Project Based Learning 3. Case based learning 4. Group Discussion				
6	Assessment methods 1. Individual work 2. Group work				
7	This module/course is used in the following study programme/s as well -				
8	Responsibility for module/course Dr. Ir. Suprih Bambang S, M.S				

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