COURSE LEARNING PLAN

	UNIVERSITY OF BRAWIJAYA
	FACULTY OF ANIMAL SCIENCE
	DEPARTMENT OF ANIMAL SCIENCE
	UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE
	LEARNING PLAN OF EVEN SEMESTER OF 2019/2020

Course	Code	Weight (credits)	Semester	Compilation Date
Animal Product Handling	PET61013	2-1	Semester 4/Even Semester	January 14, 2020

Authorization	Course Coordinator	Ka PS S1	Vice Dean 1
	Dr. Herly Evanuarini, S.Pt., MP.	Dr. Herly Evanuarini, S.Pt, MP	Dr. Ir. M. Halim Natsir, S.Pt., MP., IPM., ASEAN Eng.

Learning Outcomes (LO)	PLO
	LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry
	LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis
	LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way
	CLO
	1. Able to identify the causes and mechanisms of spoilage to milk, meat, eggs, honey, and by-products 2. Able to comprehend the principles of handling milk, meat, eggs, honey, and by-products starting from the reception, the handling process to the distribution 3. Able to implement appropriate handling following the characteristics of animal commodities 4. Able to evaluate handling techniques for animal commodities

Brief Course Description	The Handling of Animal Product course provides knowledge related to the identification and mechanism of the causes of damage to animal commodities to apply proper handling before further processing.
Topics	1. Changes in quality and spoilage of milk 2. Handling and Testing Milk Quality 3. Milk Pre-Treatment 4. Changes in quality and spoilage of meat 5. Handling Post-Harvest Meat, Post-Mortem, and Meat Withering 6. Meat Chilling and Freezing 7. Changes in quality and spoilage of eggs 8. Handling Whole Eggs and Eggs without Shells and Determining Egg Quality 9. Method of handling eggs 10. Changes in quality and spoilage of honey, royal jelly, pollen, and propolis 11. Handling honey, royal jelly, pollen, and propolis 12. Changes in quality and skin deterioration 13. Handling of skin 14. Methods of skin handling
References	Aberle, E.D., Forrest, J.C., Gerrard, D.E., and Mills, E.W. 2012. Principles of Meat Science. 5th Edition. Kendall Hunt Pub Co. San Fransisco Anjarsari, B. 2010. Pangan Hewani Fisiologi Pasca Mortem dan Teknologi. Graha Ilmu. Yogyakarta. Anggara, D.F., D.S, Sutardjo., and K. Suradi. 2013. Pengaruh Penggunaan Jenis Asam pada Proses Pickle Terhadap Kualitas Kimia Kulit Kelinci Peranakan New Zealand White. Universitas Padjajaran. Bandung Buckle, K.A., R.A. Edwards, G.H. Fleet and M. Wooton. 2010. Food Science. Watson Ferguson and Co. Brisbane. Australia. Translated by: H. Purnomo dan Adiono. UI Press, Jakarta Heinz, G., and Hautzinger, P. 2007. Meat Processing Technology for Small to Producers. RAP Publication. FAO. Bangkok Koswara, S. 2009. Teknologi Pengolahan Telur (Teori Dan Praktek). E-Bookpangan.com. 1-28. Lawrie, R.A. 2003. Ilmu Daging. Edisi Kelima. Penerjemah Aminuddin Parakkasi dan Yudha Amwila. Penerbit Universitas Indonesia. UI-Press. Jakarta Pomeranz, Y., and C.E. Meloan. 1994. Food analysis: Theory and Practice. Chapman and Hall. New York Purnomo, H. 1996. Dasar-Dasar Pengolahan dan Pengawetan Daging. PT. Gramedia Widisarana Indonesia. Jakarta

	Purwadi, L.E., Radiati. H.Evanuarini., R.D., Andriani. 2017. Penanganan Hasil ternak. UB Press. Malang Seuss-Baum, I. 2007. Nutritional Evaluation of Egg Compounds. in: Huopalathi R et al., editor. Bioactive egg compounds. Springer. Heidelberg. Soeparno. 2005. Ilmu dan Teknologi Daging. Revised Fourth Edition. Gadjah Mada University Press. Yogyakarta Sudarwanto, M., and Sanjaya, A.W. 2009. Pemalsuan Susu. Departemen Ilmu Penyakit Hewan dan Kesehatan Masyarakat Veteriner. FKH-IPB, Bogor Walstra, P., J.T.M, Wouters., and T.J. Geurts. 2006. Dairy Science and Technology. CRC Press. New York Wiryodiningrat, S. 2009. Pengawetan Kulit Mentah Kambing dengan Asap Cair dari Limbah Tempurung Kelapa. Majalah Kulit, Karet dan Plastik. 25(1): 1-6

Learning Media	Software	Hardware
	Video	LCD
		Laptop/Computer

Teaching Team	1. Dr. Ir. Imam Thohari, MP., IPM 2. Prof. Dr. Ir. Lilik Eka Radiati, MS., IPU. 3. Prof. Dr. Ir. Djalal Rosyidi, MS., IPU., ASEAN Eng. 4. Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si. 5. Dr. Agus Susilo, S.Pt., MP, IPM, ASEAN Eng. 6. Dr. Ir. Purwadi, MS. 7. Dr. Ir. Mustakim, MP., IPM. 8. Dr. Ir. Manik Erry Sawitri, MP. 9. Dr. Herly Evanuarini, S.Pt., MP. 10. Dr. Abdul Manab, S.Pt, MP. 11. Dr. Dedes Amertaningtyas, S.Pt, MP. 12. Dr. Premy Puspitawati Rahayu, S.Pt, MP. 13. Ria Dewi Andriani, S.Pt, M.Sc. 14. Mulia Winirsya Apriliyani, S.Pt, MP. 15. Dicky Tri Utama, S.Pt., PhD
Prerequisite Courses	Biochemistry, Microbiology, Introduction to Animal Product Technology

Week	Sub-CLO	Indicator	Learning Materials / Topics	Learning Methods	Criteria & Form of Assessment	Weighted Score (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Able to explain changes in milk quality and the factors affecting its spoilage coherently	Correct understanding of the difference between fresh milk and spoiled milk, changes in milk quality and the factors affecting its spoilage	Learning guidelines for the Handling of Animal Products course ● Competencies to be achieved ● Scope of teaching material ● Class rules, assignments, and assessments Materials: Changes in quality and spoilage of milk	● Lectures ● Tutorial on changes in quality and spoilage of milk	Describing changes in quality and spoilage of milk Assessment in the form of: Short answer test	7
2	Able to explain and understand fresh milk quality testing	Correct understanding of fresh milk quality testing	Handling and Testing of Milk Quality	● Lectures ● Case Studies	Describing the administration, testing of fresh milk quality, and the distribution Assessment in the form of: journal review	8
3	Able to explain and understand milk pre-treatment	Understanding of milk pre-treatment, including clarification, separation,	Milk Pre-Treatment	● Simulation of milk pre-treatment	Making posters related to the milk pre-treatment process, including	5

		homogenization, bactofugation and termination			clarification, separation, homogenization, bactofugation and termination	
4	Able to explain changes in quality in meat and the factors affecting its spoilage coherently	Understanding of the changes in quality in meat and the factors affecting its spoilage	Changes in quality and spoilage in meat	● Verification of the results of assignments that were given last week with topics related to milk pre-treatment ● Group discussions ● Lectures	Resume of changes in quality in fresh meat during storage, spoilage process, and the factors affecting its spoilage	10
5	Able to explain the handling of post-harvest meat, including post-mortem and meat withering coherently and correctly	Understanding of handling of post-harvest meat, including post-mortem and meat withering	Handling of post-harvest meat, including post-mortem and meat withering	● Verification of last week's assignments in the form of resumes for changes in meat quality and spoilage ● Lectures ● Presenting videos related to the handling of post-harvest meat	Making handling of post-harvest meat flow for post-mortem and withering meat	10
6	Able to explain the importance of meat chilling and freezing	Correct understanding of meat chilling and freezing	Meat chilling and freezing	● Discussions	Assignment to make a resume of advantages, purposes, methods	10

					of meat chilling and freezing	
7	Able to explain changes in quality in eggs and the factors affecting their spoilage coherently	Understanding of changes in egg quality, characteristics that cause spoilage and types of microorganisms that cause spoilage	Changes in quality and spoilage in eggs	● Case studies	Resume of microorganisms that cause spoiled eggs and the factors affecting their spoilage	10
MIDTERM EXAM						
8	Able to explain and understand the handling of whole eggs and eggs without shells	Understanding of the type, structure, composition, and determination of egg quality	Handling of Whole Eggs and Eggs without Shells and Determining Egg Quality	● Discussions	Describing type, structure, composition, and determination of egg quality Making of scrapbook	5
9	Able to explain and understand the handling of whole eggs and eggs without shells	Understanding of handling of whole eggs and eggs without shells	Method of handling eggs	● Lectures ● Discussions	Describing handling of whole eggs and eggs without shells	5
10	Able to analyze changes in quality in honey, royal jelly, pollen, and propolis and the factors affecting their spoilage coherently	Understanding of the changes in quality in honey, royal jelly, pollen, and propolis and the factors affecting their spoilage	Changes in quality and spoilage in honey, royal jelly, pollen, and propolis	● Case studies	Describing the characteristics of spoilage in eggs The students are given assignments related to the	5

					factors that cause spoilage in eggs		
11	Able to explain and understand the handling of honey, royal jelly, pollen, and propolis	Understanding of the characteristics, composition, good quality of honey, royal jelly, pollen, and propolis	Handling of honey, royal jelly, pollen, and propolis	● Lectures ● Discussions	Describing post-harvest honey, royal jelly, pollen, and propolis		5
12	Able to explain changes in skin quality and the factors affecting its deterioration coherently	Understanding of skin and the factors affecting its deterioration	Changes in quality and deterioration in skin	● Case studies	Resume of changes in skin quality, the deterioration that can occur and the factors causing the deterioration		7.5
13	Able to explain the handling of skin process in a coherent, correct, and precise manner	Understanding of the proper handling of skin	Handling of skin	● Verification of the results of last week's resume in the form of changes in skin quality, the deterioration that can occur and the factors causing the deterioration ● Lectures ● Case studies	Making posters related to the handling of skin		7.5
14	Able to explain the characteristics of good skin and handling of skin to prolong shelf life and improve its quality	Understanding of the characteristics of good skin and handling of skin to prolong shelf life and improve its quality	Methods of skin handling	● Verification of the results of the poster making regarding skin handling ● Lectures	Describing characteristics of good skin and handling of skin to prolong shelf life		5

					and improve its quality	
FINAL EXAM						

ASSESSMENT RUBRIC

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE

Course	Animal Product Handling		
Score Level	**PLO and CLO**	**Conversion**	**PLO Score**
LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way CLO 1: Able to identify the causes and mechanisms of spoilage to milk, meat, eggs, honey, and by-products			
Very Good (4)	1. Mention the things that cause spoilage to animal commodities, including milk, meat, and eggs 2. Mention the things that cause spoilage to animal commodities, including honey and by-products 3. Explain the mechanism of spoilage to animal commodities, including milk, meat, and eggs 4. Explain the mechanism of spoilage to animal commodities, including honey and by-products	>80-100	1
Good (3)	1. Mention the things that cause spoilage to animal commodities, including milk, meat, and eggs	>70-80	0.75

Score Level	PLO and CLO	Conversion	PLO Score
	2. Mention the things that cause spoilage to animal commodities, including honey and by-products 3. Explain the mechanism of spoilage to animal commodities, including milk, meat, and eggs		
Moderate (2)	1. Mention the things that cause spoilage to animal commodities, including milk, meat, and eggs 2. Mention the things that cause spoilage to animal commodities, including honey and by-products	>60-70	0.50
Poor (1)	1. Mention the things that cause spoilage to animal commodities, including milk, meat, and eggs	≤60	0.25
Score Level	PLO and CLO	Conversion	PLO Score
LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way CLO 2: Able to comprehend the principles of handling milk, meat, eggs, honey, and by-products starting from the reception, the handling process to the distribution			
Very Good (4)	1. Mention the principles of handling milk, meat, eggs, honey, and by-products 2. Explain the administration process of animal products, including milk, meat, eggs, honey, and by-products	>80-100	1

Score Level		Conversion	PLO Score
	3. Implementing the process of handling animal products, including milk, meat, eggs, honey, and by-products based on the theories that have been studied 4. Analyzing the handling and distribution system of animal commodities		
Good (3)	1. Mention the principles of handling milk, meat, eggs, honey, and by-products 2. Explain the administration process of animal products, including milk, meat, eggs, honey, and by-products 3. Implementing the process of handling animal products, including milk, meat, eggs, honey, and by-products based on the theories that have been studied	>70-80	0.75
Moderate (2)	1. Mention the principles of handling milk, meat, eggs, honey, and by-products 2. Explain the administration process of animal products, including milk, meat, eggs, honey, and by-products	>60-70	0.50
Poor (1)	1. Mention the principles of handling milk, meat, eggs, honey, and by-products	≤60	0.25
Score Level	PLO and CLO	Conversion	PLO Score
LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way			

CLO 3: Able to implement appropriate handling following the characteristics of animal commodities			
Very Good (4)	1. Implementing milk handling in accordance with the characteristics of the raw materials 2. Implementing meat handling in accordance with the characteristics of the raw materials 3. Implementing egg handling in accordance with the characteristics of the raw materials 4. Implementing the handling of by-products and honey in accordance with the characteristics of the raw materials	>80-100	1
Good (3)	1. Implementing milk handling in accordance with the characteristics of the raw materials 2. Implementing meat handling in accordance with the characteristics of the raw materials 3. Implementing egg handling in accordance with the characteristics of the raw materials	>70-80	0.75
Moderate (2)	1. Implementing milk handling in accordance with the characteristics of the raw materials 2. Implementing meat handling in accordance with the characteristics of the raw materials	>60-70	0.50

Score Level	PLO and CLO	Conversion	PLO Score
Poor (1)	1. Implementing milk handling in accordance with the characteristics of the raw materials	≤60	0.25
LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way CLO 4: Able to evaluate handling techniques for animal commodities			
Very Good (4)	1. Evaluating milk handling techniques for animal commodities 2. Evaluating meat handling techniques for animal commodities 3. Evaluating egg handling techniques for animal commodities 4. Evaluating the techniques for handling by-products and honey for animal commodities	>80-100	0.50
Good (3)	1. Evaluating milk handling techniques for animal commodities 2. Evaluating meat handling techniques for animal commodities 3. Evaluating egg handling techniques for animal commodities	>70-80	0.375
Moderate (2)	1. Evaluating milk handling techniques for animal commodities 2. Evaluating meat handling techniques for animal commodities	>60-70	0.25
Poor (1)	1. Evaluating milk handling techniques for animal commodities	≤60	0.125

Formula to Calculate PLO Score: $\frac{Level\ Skor}{\sum level\ skor} \times \frac{\sum CLO}{\sum PLO}$

CLO Score Calculation

Assessed components	Component Weights	CLO Weight on the Score			
		CLO 1	CLO 2	CLO 3	CLO 4
Midterm Exam	0.25	0.25	0.25	0.25	0.25
Final Exam	0.25	0.25	0.25	0.25	0.25
Practicum	0.25			0.50	0.50
Assignment	0.15	0.50	0.25		0.25
Quiz	0.05	0.50	0.50		
Activeness	0.05	0.25	0.25	0.25	0.25
CLO WEIGHT	100				

PLO Score Calculation

CLO	CLO Score	CLO Weight	PLO		
			PLO 4	PLO 10	PLO 11
CLO 1			0.6	0.2	0.2
CLO 2			0.6	0.2	0.2

CLO 3			0.8	0.1	0.1
CLO 4			0.8	0.1	0.1

Basic Format for the Lecture Portfolio

	UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**

Course: Animal Product Handling	PET61013	RMK:	Semester: 4
Lecturers	1. Dr. Ir. Imam Thohari, MP., IPM 2. Prof. Dr. Ir. Lilik Eka Radiati, MS., IPU. 3. Prof. Dr. Ir. Djalal Rosyidi, MS., IPU., ASEAN Eng. 4. Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si. 5. Dr. Agus Susilo, S.Pt., MP, IPM, ASEAN Eng. 6. Dr. Ir. Purwadi, MS. 7. Dr. Ir. Mustakim, MP., IPM. 8. Dr. Ir. Manik Erry Sawitri, MP. 9. Dr. Herly Evanuarini, S.Pt., MP. 10. Dr. Abdul Manab, S.Pt, MP. 11. Dr. Dedes Amertaningtyas, S.Pt, MP. 12. Dr. Premy Puspitawati Rahayu, S.Pt, MP. 13. Ria Dewi Andriani, S.Pt, M.Sc. 14. Mulia Winirsya Apriliyani, S.Pt, MP. 15. Dicky Tri Utama, S.Pt., Ph.D.		

Introduction The Handling of Animal Product course provides knowledge related to the identification and mechanism of the causes of damage to animal commodities to apply proper handling before further processing.	
1	**Objectives**
	The objectives of this course are for students to be able to: - Identify the causes and mechanisms of spoilage to milk, meat, eggs, honey, and by-products - Comprehend the principles of handling milk, meat, eggs, honey, and by-products starting from the reception, the handling process to the distribution - Implement appropriate handling following the characteristics of animal commodities - Evaluate handling techniques for animal commodities
2	**Learning Strategies**
	The learning strategies carried out in lectures include providing lectures, discussions, structured assignments, quizzes, and group presentations. Interactive discussions are carried out between students and lecturers to find out the extent of their understanding regarding the Handling of Animal Products course, explore student understanding, and understanding student difficulties in participating in learning activities.
3	**Lecture Management**
	1) Lecture: 100 minutes/meeting (14 meetings) 2) Practicum of 150 minutes/meeting (14 meetings) 3) Structured assignments/quizzes/group presentation 4) Attendance: 80% of total attendance

	Class management:
	Lecturer Duties: as a lecturer, assistant, facilitator, supervisor in all activities in the Handling of Animal Products course
	Student Duties: searching for references based on the topics presented and assigned to the Handling of Animal Products course
4	**Lecture Contents**
	1. Changes in quality and spoilage of milk 2. Handling and Testing Milk Quality 3. Milk Pre-Treatment 4. Changes in quality and spoilage of meat 5. Handling Post-Harvest Meat, Post-Mortem, and Meat Withering 6. Meat Chilling and Freezing 7. Changes in quality and spoilage of eggs 8. Handling Whole Eggs and Eggs without Shells and Determining Egg Quality 9. Method of handling eggs 10. Changes in quality and spoilage of honey, royal jelly, pollen, and propolis 11. Handling honey, royal jelly, pollen, and propolis 12. Changes in quality and skin deterioration 13. Handling of skin 14. Methods of skin handling
5	**Lecture Participants**

	The lecture participants are 4th semester students who passed Biochemistry, Microbiology, Introduction to Animal Product Technology	
6	**Attendance Percentage**	
	% lecturer attendance: 100%	
	% student attendance: 80%	
7	**Evaluation System**	
	1) Midterm Exam 25% 2) Final Exam 25% 3) Practicum 25% 4) Assignment 15% 5) Quiz 5% 6) Activeness 5%	
8	**Class Observation**	
	1. The class meeting will discuss the assignments that have been given to each group based on predetermined topics. Active students: proven by their enthusiasm in delivering the results of assignments and active discussions with other members in discussing the topic, and the students seem to have learned and understood the topic presented. The students who get the reward will be announced in the class to motivate other friends to be more diligent and serious in doing their work. 2. The lecturers reflect on the material presented, so that they know the students' response to what has been presented, and can find out whether the students understand what has been discussed or not.	

		The students' response is very important to determine whether the lecturers' strategy in teaching is proper or not.

3. The things that have been achieved by the students in the class need to be considered, whether the learning strategies carried out have been able to achieve CLO in the Handling of Animal Products course or not.

The observations that need to be made include:

1. Prerequisite

2. GPA

1. Google form --- pretest on the students' interest (not the material) so that the lecturers know what to do with the conditions of the students in their class |
| 9 | **Learning Outcomes** | |
| | The expected learning outcomes include:

LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry

LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis

LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way

Presenting a resume, and attaching the evaluation results of the lessons that include

1. The students who passed each LO 4, LO 10 and LO 11 were almost 80% of the total students in the class.

2. The highest LO was obtained at LO 4 which referred to the development of a comprehensive insight and mindset in accordance with the science and the field of the animal industry. Then, it was followed by LO 10 and LO 11 which had the same score. | |

10	**Obstacles**
	The obstacles in the implementation of this course were in terms of practicum, which was the limited laboratory facilities including equipment that needs to be improved to develop student skills and be able to achieve CLO in the Handling of Animal Products course.
11	**Score Distribution**
	1) Midterm Exam 25% 2) Final Exam 25% 3) Practicum 25% 4) Assignment 15% 5) Quiz 5% 6) Activeness 5%
12	**Conclusion**
	The success of facilitating the students to achieve several LOs in the Handling of Animal Products course is as follows: 1) LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry 2) LO 10: Able to involve themselves in the learning process and discussion on an ongoing basis 3) LO 11: Able to show performance, both independently and in teamwork (inter- and multi-disciplinary), identify and analyze to solve problems in quality and measurable way
13	**Improvement Recommendations**
	1. The students who passed each LO 4, LO 10 and LO 11 were almost 80% of the total students in the class.

	2. The highest LO was obtained at LO 4 which referred to the development of a comprehensive insight and mindset in accordance with the science and the field of the animal industry. Then, it was followed by LO 10 and LO 11 which had the same score. LO that was difficult to achieve was due to the learning strategy that was not in accordance with the character of the students in the class, so it is necessary to make improvements to the learning process so that it can improve the achievement of the Handling of Animal Products course in this class.
	Appendices:
	1. Assignments 2. Quiz 3. The results of the learning process