COURSE LEARNING PLAN

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE LEARNING PLAN OF BASIC TECHNOLOGY OF ANIMAL PRODUCTS

Course	Code	Weight (credits)	Semester	Compilation Date
Basic Technology of Animal Product	PET60012	2-1	Odd 2020/2021	July 25, 2020

Authorization	Course Coordinator	Ka PS S1	Vice Dean 1
	Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si	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 analyze the components contained in animal products (carbohydrates, protein, lipids, and water) and their changes and the factors that affect the physical and chemical quality of animal products 2. Able to master the basic processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, basic packaging, basic canning, and nanotechnology 3. Able to analyze various types of food additives used in the processing and preservation of animal products
Brief Course Description	The Introduction to Animal Product Technology course provides knowledge about the analysis of components contained in animal products and their changes, analysis of physical, chemical properties of animal products, basic preservation and packaging to be used in processing and preservation of animal products
Topics	1. Introduction to the Basic Scope of Animal Products

	2. Carbohydrates in Animal Products 3. Protein in Animal Products 4. Water in Animal Products 5. Lipids in Animal Products 6. Heating 7. Drying 8. Cooling and Freezing 9. Basic Fermentation 10. Nanotechnology 11. Irradiation 12. Packaging 13. Canning 14. Food Additives	
References	**References**: 1. Susilo, A., Djalal R, Firman J, Mulia WA. 2019. *Buku Ajar Dasar Teknologi Hasil Ternak.* UB Press. Malang 2. Soeparno. 2009. *Ilmu dan Teknologi Daging.* Universitas Gajah Mada Press, Yogyakarta. 3. P.J. Fellows. 2009. Food Processing Technology. Woodhead Publishing Ltd. 4. Norman W. Desrosier. 2008. *Teknologi Pengawetan Pangan.* UI-Press. Jakarta. 5. Winarno, FG. 2008. *Kimia Pangan dan Gizi.* PT. Gramedia Pustaka Utama, Jakarta.	
Learning Media	Software	Hardware
	Video	LCD Laptop/Computer
Teaching Team	1. Prof. Dr.Ir. Lilik Eka Radiati MS., IPU 2. Prof. Dr. Ir. Djalal Rosyidi, MS 3. Dr. Ir. Imam Thohari, MP 4. Dr. Agus Susilo, S.Pt., MP 5. Dr. Ir. Mustakim, MP 6. Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si 7. Dr. Ir. Manik Erry Sawitri, MP 8. Dr. Herly Evanuarini, S.Pt., MP 9. Dr. Abdul Manab, S.Pt, MP 10. Dr. Dedes Amertaningtyas, S.Pt, MP 11. Dr. Premy Puspitawati Rahayu, S.Pt, MP	

	12. Ria Dewi Andriani, S.Pt, M.Sc 13. Mulia Winirsya Apriliyani, S.Pt, MP 14. Dicky Tri Utama, S.Pt., PhD
Prerequisite Course	Biochemistry

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 and understand Basic Scope of Animal Products	Correct understanding of Basic Scope of Animal Products	Learning guidelines for Basic Scope of Animal Products ● Competencies to be achieved ● The scope of the teaching material ● Classroom rules, assignments, and assessments	1. Lecture 2. Tutorial on Basic Scope of Animal Products	Describing Basic Scope of Animal Products ● Competencies to be achieved ● The scope of the teaching material ● Classroom rules, assignments, and assessments	5
2	Able to explain and understand about Carbohydrates in Animal Products	Correct and proper understanding of Carbohydrates in Animal Products	Carbohydrates in Animal Products	1. Lecture 2. Presenting videos related to Carbohydrates in Animal Products	Describing Carbohydrates in Animal Products	5
3	Able to explain and understand Protein in Animal Products	Correct and proper understanding of Protein in Animal Products	Protein in Animal Products	1. Lecture 2. Presenting videos related to Protein in Animal Products	Describing Protein in Animal Products	5
4	Able to explain and understand about Water in Animal Products	Correct and proper understanding of Water in Animal Products	Water in Animal Products	1. Lecture 2. Presenting videos related to Water in Animal Products	Describing Water in Animal Products	5
5	Able to explain coherently and correctly about Lipids in Animal Products	Correct and proper understanding of Lipids in Animal Products	Lipids in Animal Products	1. Lecture 2. Presenting videos related to Lipids in Animal Products	Describing Lipids in Animal Products	5

6	Able to explain the importance and effect of Heating on foodstuffs	Correct and proper understanding of Heating	Heating	1. Lecture 2. Presenting videos related to Heating 3. Discussion	Describing Heating The assessment is in the form of: journal review about Heating	5
7	Able to explain the importance and effect of Drying on foodstuffs	Correct and proper understanding of Drying	Drying	1. Lecture 2. Presenting videos related to Drying 3. Discussion	Describing Drying The assessment is in the form of: journal review about Drying	5
	MIDTERM EXAM					
8	Able to explain the importance and effect of Cooling and Freezing on foodstuffs	Correct and proper understanding of Cooling and Freezing	Cooling and Freezing	1. Lecture 2. Presenting videos related to Cooling and Freezing 3. Case Study	Describing Cooling and Freezing The assessment is in the form of: journal review about Cooling and Freezing	5
9	Able to explain basic processing and preservation of animal products using the principle of fermentation for foodstuffs	Correct and proper understanding of the Basic Fermentation	Basic Fermentation	Basic Simulation of Simple Fermentation	Describing Basic Fermentation The assessment is in the form of: journal review about Basic Fermentation	10
10	Able to explain basic Nanotechnology for animal products	Correct and proper understanding of Nanotechnology	Nanotechnology	1. Basic Simulation of Simple Nanotechnology 2. Presenting videos related to Nanotechnology	Describing Nanotechnology The assessment in the form of: journal review about Nanotechnology	10
11	Able to explain basic processing and preservation of animal	Correct and proper understanding of Irradiation	Irradiation	1. Lecture 2. Presenting videos related to Irradiation	Describing irradiation	10

	products using irradiation techniques				The assessment is in the form of: journal review about Irradiation	
12	Able to explain basic packaging with the principle of modified atmosphere on storage, preservation, and packaging of animal products	Correct and proper understanding of Packaging	Packaging	1. Lecture 2. Presenting videos related to Packaging	Describing packaging The assessment in the form of: journal review about Packaging	10
13	Able to explain the canning of animal products	Correct and proper understanding of Canning	Canning	1. Lecture 2. Presenting videos related to Canning	Describing Canning The assessment is in the form of: journal review about Canning	10
14	Able to explain food additives that can be used in the processing and preservation of animal products	Correct and proper understanding of Food Additives	Food Additives	1. Simulation of Use / Utilization of Food Additives 2. Case Study	Describing Food Additives The assessment will be in the form of: journal review about Food Additives	10
	FINAL EXAM					

ASSESSMENT RUBRIC

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	Basic Technology of Animal Products		
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 analyze the components contained in animal products (carbohydrates, protein, lipids, and water) and their changes and the factors that affect the physical and chemical quality of animal products			
Very Good (4)	1. Mentioning the components contained in animal products (carbohydrates, protein, lipids, and water) 2. Explaining the changes in the components contained in animal products (carbohydrates, protein, lipids, and water) and the factors that affect the physical and chemical quality of animal products 3. Applying the testing process in animal products (carbohydrates, protein, lipids, and water) 4. Analyzing components contained in animal products (carbohydrates, protein, lipids, and water), and their changes and the factors that affect the physical and chemical quality of animal products	80-100	0.33

Good (3)	1. Mentioning the components contained in animal products (carbohydrates, protein, lipids, and water) 2. Explaining the changes in the components contained in animal products (carbohydrates, protein, lipids, and water) and the factors that affect the physical and chemical quality of animal products 3. Applying the testing process in animal products (carbohydrates, protein, lipids, and water)	70-79	0.25
Moderate (2)	1. Mentioning the components contained in animal products (carbohydrates, protein, lipids, and water) 2. Explaining the changes in the components contained in animal products (carbohydrates, protein, lipids, and water) and the factors that affect the physical and chemical quality of animal products	60-69	0.167
Poor (1)	1. Mentioning the components contained in animal products (carbohydrates, protein, lipids, and water)	<60	0.083

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 master the basic processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, basic packaging, basic canning, and nanotechnology			
Very Good (4)	1. Mentioning the basic types of processing and preservation of animal products	80-100	0.33

	2. Explaining the basic principles of processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, basic packaging, basic canning, and nanotechnology 3. Applying basic knowledge related to the processing and preservation of animal products based on the theory. 4. Analyzing basic processing and preservation of animal products		
Good (3)	1. Mentioning the basic types of processing and preservation of animal products 2. Explaining the basic principles of processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, basic packaging, basic canning, and nanotechnology 3. Applying basic knowledge relatedthe to processing and preservation of animal products based on the theory.	70-79	0.25

Moderate (2)	1. Mentioning the basic types of processing and preservation of animal products 2. Explaining the basic principles of processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, basic packaging, basic canning, and nanotechnology	60-69	0.167
Poor (1)	1. Mentioning the basic types of processing and preservation of animal products	<60	0.083
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 analyze various types of food additives used in the processing and preservation of animal products			
Very Good (4)	1. Mentioning various types of food additives used in the processing and preservation of animal products 2. Explaining the types of food additives, their benefits, and limits on their use in the processing and preservation of animal products 3. Applying the proper use of BTP and its benefits based on the theory	80-100	0.33

	4. Analyzing various types of food additives used in the processing and preservation of animal products		
Good (3)	1. Mentioning various types of food additives used in the processing and preservation of animal products 2. Explaining the types of food additives, their benefits, and limits on their use in the processing and preservation of animal products 3. Applying the proper use of BTP and its benefits based on the theory	70-79	0.25
Moderate (2)	1. Mentioning various types of food additives used in the processing and preservation of animal products 2. Explaining the types of food additives, their benefits, and limits on their use in the processing and preservation of animal products	60-69	0.167
Poor (1)	1. Mentioning various types of food additives used in the processing and preservation of animal products	<60	0.083

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

CLO Score Calculation

Assessed components	Component Weights	CLO Weight on the Score			
		CLO 1	CLO 2	CLO 3	
Midterm Exam	0.25	0.8	0.2		1

Final exam	0.25		0.9	0.1	1
Practicum	0.25	0.4	0.4	0.2	1
Assignments	0.15	0.5	0.5		1
Quiz	0.05	0.4	0.4	0.2	1
Activeness	0.05	0.4	0.3	0.3	1
CLO WEIGHT					

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

Lecture Portfolio

UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**			
Course: Introduction to Animal Product Technology	Code: PET60012	RMK:	Semester: 3
Lecturers	1. Prof. Dr. Ir. Djalal Rosyidi, MS 2. Prof. Dr.Ir. Lilik Eka Radiati MS., IPU 3. Dr. Ir. Imam Thohari, MP 4. Dr. Agus Susilo, S.Pt., MP 5. Dr. Ir. Mustakim, MP 6. Dr. Khotibul Umam Al-Awwaly, S.Pt., M.Si 7. Dr. Ir. Manik Erry Sawitri, MP 8. Dr. Herly Evanuarini, S.Pt., MP 9. Dr. Abdul Manab, S.Pt, MP 10. Dr. Dedes Amertaningtyas, S.Pt, MP 11. Dr. Premy Puspitawati Rahayu, S.Pt, MP 12. Ria Dewi Andriani, S.Pt, M.Sc 13. Mulia Winirsya Apriliyani, S.Pt, MP 14. D Dicky Tri Utama, S.Pt., PhD		
Introduction The Introduction to Animal Product Technology discusses the analysis of components contained in animal products and their changes, analysis of physical, chemical properties of			

animal products, basic preservation and packaging to be used in processing and preservation of animal products	
1	**Objectives**
	After taking this course, the students will be able to: 1. Analyze the components contained in animal products (carbohydrates, protein, lipids, and water) and their changes and the factors that affect the physical and chemical quality of animal products 2. Master the basic processing and preservation of animal products using high temperature, low temperature, decreasing water activity, drying, smoking, salting, curing, fermentation principles, acidification techniques, and competitive microflora, irradiation techniques, and nanotechnology 3. Analyze various types of food additives used in the processing and preservation of animal products 4. Understand the basic packaging and canning of animal products
2	**Learning Strategies**
	The learning strategies carried out in the lectures include lectures, discussions, structured assignments, quizzes, and group presentations
3	**Lecture Management**
	1) Midterm Exam 25% 2) Final Exam 25% 3) Practicum 25% 4) Assignments 15% 5) Quiz 5% 6) Activeness 5%

	The lecturers' duties: as a lecturer, assistant, facilitator, supervisor in all activities in the Introduction to Animal Product Technology course The students' duties: searching for references from the topics presented and assigned to the Introduction to Animal Product Technology course
4	**Lecture Contents**
	The topics in this course are: 1. Introduction to the Basic Scope of Animal Products 2. Carbohydrates in Animal Products 3. Protein in Animal Products 4. Water in Animal Products 5. Lipids in Animal Products 6. Heating 7. Drying 8. Cooling and Freezing 9. Basic Fermentation 10. Nanotechnology 11. Irradiation 12. Packaging 13. Canning 14. Food Additives
5	**Lecture Participants**
	The course participants are 3rd semester students who have passed the Biochemistry and Microbiology courses
6	**Attendance Percentage**
	Lecturer attendance percentage: 100% Student attendance percentage: 80%

7	**Evaluation System**
	1) Midterm Exam 25% 2) Final Exam 25% 3) Practicum 25% 4) Assignments 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 Introduction to Animal Product Technology course or not. The observations that need to be made include: 1. Prerequisite

	2. GPA 3. 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 Introduction to Animal Product Technology course.
11	**Score Distribution** (provide the score distribution following the learning achievements of this course)

	1) Midterm Exam 25% 2) Final Exam 25% 3) Practicum 25% 4) Assignments 15% 5) Quiz 5% 6) Activeness 5%
12	**Conclusion**
	The success of facilitating the students to achieve several LOs in the Introduction to Animal Product Technology 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 Introduction to Animal Product Technology course in this class.
	Appendices:
	1. Assignments 2. Quiz 3. The results of the learning process etc.