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
Dairy Processing Industry	PET60016	2-1	Even 2019/2020	July 28, 2020

Authorization	Course Coordinator	Ka PS S1	Vice Dean 1
	Dr.Ir. Purwadi, MS	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 12: Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight LO 13: Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts
	CLO
	1. Able to understand the requirements of the dairy processing industry including the industrial establishment, regulations, and design. 2. Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors). 3. Able to work as a team in making SWOT analysis and PEST analysis. 4. Able to design a Business Plan in a Dairy Processing Industry.

Brief Course Description	The Dairy Processing Industry Course provides knowledge about the dairy processing industry with various types of processed milk products produced, skills in identifying the internal and external factors that affect the Dairy Processing Industry, making Business Plans based on SWOT analysis and PEST analysis.	
Topics	1. Introduction (development of the dairy industry in Indonesia, explaining matters related to the inputs, processes, and outputs). 2. Dairy Industry Tree 3. Pasteurized, Sterilized, and UHT Dairy Industry 4. Evaporated Dairy Industry of Sweetened Condensed Milk and Powdered Milk 5. Fermented Milk Industry for Liquid and Solid Products 6. Ice Cream and Butter Industry 7. Industrialization of Traditional Dairy Products 8. Internal factors affecting the dairy processing industry 9. External factors affecting the dairy processing industry 10. SWOT and PEST Analysis 11. Business Plan	
References	Alfalafal. 1980. Dairy Handbook. Lund. Sweden Bylund, G. 1995. Dairy Processing Handbook. Lund. Sweden Walstra, P., J.T.M., Wouters., and T.J., Geurts. 2006. Dairy Science and Technology. Second Edition. CRC Press Taylor & Francis. Reddy, S., and A.K., Puniya. 2018. Introductory Dairy Microbiology. http://www.agrimoon.com/introductory-dairy-microbiology-pdf-book/	
Learning Media	Software	Hardware
	Video	LCD Laptop/Computer
Teaching Team	1. Dr.Ir. Purwadi, MS 2. Prof. Dr. Ir. Lilik Eka Radiati, MS., IPU., ASEAN Eng 3. Dr. Ir. Imam Thohari, MP., IPM., ASEAN Eng 4. Dr. Manik Eirry Sawitri, Ir.MS. 5. Dr. Abdul Manab, S.Pt., MP 6. Dr. Herly Evanuari, S.Pt., MP 7. Dr. Khotibul Umam A., S.Pt., Msi	

	8. Dr. Premy Puspitawati Rahayu, S.Pt., MP 9. Ria Dewi Andriani, S.Pt, MSc. MP 10. Mulia Winirsya A.,S.Pt., MP
Prerequisite Courses	Microbiology, Introduction to Animal Product Technology, Animal Product Technology, Quality Control

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 the dairy industry tree coherently and correctly	Explain the developments in the dairy processing industry correctly	Dairy Processing Industry Learning Guidelines 1. Competencies to be achieved 2. Teaching materials 3. Rules for lectures, assignments, exams, and assessments 4. Introduction (development of the dairy industry in Indonesia, explaining matters related to the inputs, processes, and outputs).	Lecture and Discussion on the dairy industry tree	1. Assignments of making a resume and map of the dairy industry tree by the end of this decade	5
2.	Able to explain all dairy products and milk processing industry in the global era	Describe the dairy product and its development in the dairy processing industry	Dairy Industry Tree	1. Verifying the assignment of making a resume and map of the dairy industry 2. Training to find dairy products via the internet.	Presenting the search results for the dairy products	5

3.	Able to explain dairy products with heating technology, such as pasteurized, sterilized, and UHT milk that enters the global market	Describe Pasteurized, Sterilized, and UHT milk products	Pasteurized, Sterilized, and UHT Milk Industry (Initial explanation of pasteurized, UHT, and sterilized milk)	1. Lecture	1. Papers related to the calculation of heating energy 2. Structured assignments related to proper milk temperature before entering PHE and output 3. Resume of the product packaging process in *tetra pak* packaging	7.5
4	Able to explain the evaporated milk industry, sweetened condensed milk	Explain various dairy products with heat in combination with BTP (sugar) correctly	Sweetened Condensed Milk and Powdered Milk Industry	1. Lecture 2. Recitation 3. Group assignments: Divided into groups of evaporated milk, sweetened condensed milk	1. Resume related to the topic of Evaporated Milk, Sweetened Condensed Milk, and Powdered Milk by looking at the quality of KA and sugar content, and the crystallization process	7.5
5	Able to explain the powdered milk industry	Explain the powdered milk correctly	Powdered Milk Industry	1. Lecture 2. Recitation	1. Resume related to the topic 2. Process of instant and non-instant powdered milk	7.5
6	Able to explain the fermented milk industry correctly for solid products (cheese) and able to explain the by-product in the form of whey to improve the economy by utilizing it	Explain the process in the fermented milk product (cheese) industry correctly	Fermented and Solid (cheese) Dairy Industry	1. Lecture 2. Discussion	1. Presenting a simple poster related to the fermented milk industry for solid products 2. Able to explain the fermented milk industry for solid products and the reasons correctly	7.5

					3. Changes in attitude in discussing and working together	
7	Able to explain the fermented milk product industry correctly and able to explain the by-product in the form of whey to improve the economy by utilizing it	Explain the process in the fermented milk product (yogurt) industry correctly and the use of whey for healthy drinks, whey for seasoning	Fermented Milk Industry for Liquid Products (yogurt set, stir, yogurt whey)	1. Lecture 2. Discussion	1. Presenting a simple poster related to the fermented milk industry for liquid products 2. Able to explain the fermented milk industry for liquid products and the reasons correctly 3. Changes in attitude in discussing and working together	7.5
8	Able to explain the dairy processing industry correctly with low temperature for butter (the quality of the raw material is quality cream)	Explain the dairy processing industry correctly with low temperature for butter products	Dairy processing industry with low temperature (butter)	1. Lecture 2. Discussion	1. Able to explain the process in the dairy processing industry with low temperature (butter) coherently 2. Changes in attitude in discussing and working together	7.5
FINAL EXAM						
9	Able to explain the dairy processing industry correctly with low temperature for ice cream (fermented ice cream, non-fat ice cream, ice cream)	Explain the dairy processing industry correctly with low temperature for ice cream products	Dairy processing industry with low temperature (ice cream)	1. Lecture 2. Discussion	1. Able to explain the process in the dairy processing industry with low temperature (ice cream) coherently 2. Changes in attitude in discussing and working together	7.5

10	Able to explain the traditional dairy processing industry	Explain the process in the traditional dairy processing industry which includes curd, *dali, dangke,* and *dodol susu*	Industrialization of Traditional Dairy Products	1. Lecture 2. Discussion	Presenting the results of posters related to the storage of *dodol susu* products in small industries	7.5
11	1. Able to explain the internal and external factors that influence the establishment of the dairy processing industry correctly 2. Able to show changes in attitudes and cooperation between fellow students	1. Explain the internal and external factors affecting the dairy processing industry correctly 2. Work in a team, discussing internal and external factors affecting the dairy processing industry	The internal and external factors affecting the dairy processing industry	1. Discussion 2. The students present the group assignment	Resume related to the internal and external factors in the dairy processing industry	7.5
12	1. Able to make SWOT and PEST analyses in the dairy industry	Analyze SWOT and PEST in the dairy processing industry	SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) and PEST (Political, Economic, Social and Technological)	1. Training/supervising 2. Small project by browsing information for teaching materials	Presenting the results of the supervision in the form of making SWOT and PEST analyses	10
13	Able to design and present a designed business plans	Design a business plan in the dairy processing industry	Business plan	1. Lecture and Discussion	Able to represent and counter the possibilities that occur in the business plan	10
14	Able to design and present a designed business plans	Design a business plan in the dairy processing industry	The stages of making a business plan	2. Lecture and Discussion	Able to represent and counter the possibilities that occur in the business plan	7.5
FINAL EXAM						100

ASSESSMENT RUBRIC

	UNIVERSITY OF BRAWIJAYA FACULTY OF ANIMAL SCIENCE DEPARTMENT OF ANIMAL SCIENCE UNDERGRADUATE STUDY PROGRAM OF ANIMAL SCIENCE		
Course	Dairy Processing Industry		
Score Level	PLO and CLO	Conversion	PLO Score
PLO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry CLO 1: Able to understand the requirements of the dairy processing industry including the industrial establishment, regulations, and design			
Very Good (4)	Showing an understanding of the requirements of the dairy processing industry including the industrial establishment, regulations, and design **very well**	>80-100	1
Good (3)	Showing an understanding of the requirements of the dairy processing industry including the industrial establishment, regulations, and design **well**	>70-80	0.75
Moderate (2)	Showing an understanding of the requirements of the dairy processing industry including the industrial establishment, regulations, and design **limitedly**	>60-70	0.50
Poor (1)	Showing an understanding of the requirements of the dairy processing industry including the industrial establishment, regulations, and design **very limitedly**	≤60	0.25
Score Level	PLO and CLO	Conversion	PLO Score
PLO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry PLO 12: Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight			

CLO 2: Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors)			
Very Good (4)	Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors) **very well**	>80-100	0,50
Good (3)	Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors) **well**	>70-80	0,375
Moderate (2)	Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors) **limitedly**	>60-70	0,25
Poor (1)	Able to understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors) **very limitedly**	≤60	0,125
Score Level	PLO and CLO	Conversion	PLO Score
PLO 13: Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts CLO 3: Able to work as a team in making SWOT analysis and PEST analysis			

Very Good (4)	Able to apply science and technology in the dairy processing industry **very well** to carry out SWOT and PEST analyses.	>80-100	1
Good (3)	Able to apply science and technology in the dairy processing industry **well** to carry out SWOT and PEST analyses.	>70-80	0.75
Moderate (2)	Able to apply science and technology in the dairy processing industry **limitedly** to carry out SWOT and PEST analyses.	>60-70	0.50
Poor (1)	Able to apply science and technology in the dairy processing industry **very limitedly** to carry out SWOT and PEST analyses.	≤60	0.25
Score Level	PLO and CLO	Conversion	PLO Score
PLO 13: Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts CLO 4: Able to design a Business Plan in a Dairy Processing Industry			
Very Good (4)	Showing an ability to design a business plan in a dairy processing industry **very well**	>80-100	1
Good (3)	Showing an ability to design a business plan in a dairy processing industry **well**	>70-80	0.75
Moderate (2)	Showing an ability to design a business plan in a dairy processing industry **limitedly**	>60-70	0.50
Poor (1)	Showing an ability to design a business plan in a dairy processing industry **very limitedly**	≤60	0.25

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	CLO 4
Midterm Exam	25	40	60		
Final Exam	25		30	30	40
Practicum	25			60	40
Assignment	15		20	40	40
Quiz	5	50	50		
Activeness/discipline/attitude	5	20	20	40	20
CLO WEIGHT					

PLO Score Calculation

CLO	CLO Score	CLO Weight	PLO		
			PLO 4	PLO 12	PLO 13
CLO 1			50	25	25
CLO 2				50	50
CLO 3				50	50
CLO 4				50	50

Midterm Exam : 25%

Final Exam : 25%

Practicum : 25%

Assignment	: 15%
Quiz	: 5%
Activeness/discipline/attitude	: 5%

Basic Format for the Lecture Portfolio

UNIVERSITY OF BRAWIJAYA **FACULTY OF ANIMAL SCIENCE** **STUDY PROGRAM OF ANIMAL SCIENCE**			
Course: Dairy Processing Industry	Code: PET60016	RMK:	Semester: 6
Lecturers	1. Dr.Ir. Purwadi, MS 2. Prof. Dr. Ir. Lilik Eka Radiati, MS., IPU., ASEAN Eng 3. Dr. Ir. Imam Thohari, MP., IPM., ASEAN Eng 4. Dr. Manik Eirry Sawitri, Ir.MS. 5. Dr. Abdul Manab, S.Pt., MP 6. Dr. Herly Evanuari, S.Pt., MP 7. Dr. Khotibul Umam A., S.Pt., Msi 8. Dr. Premy Puspitawati Rahayu, S.Pt., MP 9. Ria Dewi Andriani, S.Pt, MSc. MP 10. Mulia Winirsya Apriliyani, S.Pt, MP		
Introduction (Describe the explanation needed about this course, the experiences that have been encountered) The Dairy Processing Industry Course provides knowledge about the dairy processing industry with various types of processed milk products produced, skills in identifying the internal and external factors that affect the Dairy Processing Industry, making Business Plans based on SWOT analysis and PEST analysis.			

1	**Objectives** (Describe general and specific course objectives)
	The objectives of this course are for students to be able to: 1. Understand the requirements of the dairy processing industry including the industrial establishment, regulations, and design 2. Understand and analyze the internal factors (Human Resources, Raw Material Capital, Infrastructure and Facilities and Culture of the Milk Processing Industry) and the external factors (Socio-Economic, Political, Environmental and Technological factors) 3. Apply the Dairy Processing Industry to make SWOT analysis and PEST analysis 4. Design a Business Plan in a Dairy Processing Industry 5. Work as a team, discuss, and generate high creativity
2	**Learning Strategies** (Describe the strategy used to achieve the course objective - CLO)
	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 dairy processing industry course, explore student understanding, and understanding student difficulties in participating in learning activities.
3	**Lecture Management** (Describe the lecture management: lectures, tutorials, practicum, assignments, major assignments, etc.)
	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

	Management: Lecturer Duties: lecturer, supervisor, facilitator, director Student Duties: searching references, doing assignments, carrying out Midterm Exam and Final Exam, and taking part in discussions/presentations.
4	**Lecture Contents** (explain its suitability with the applicable curriculum)
	1. Introduction (development of the dairy industry in Indonesia, explaining matters related to the inputs, processes, and outputs). 2. Dairy Industry Tree 3. Pasteurized, Sterilized, and UHT Dairy Industry 4. Evaporated Dairy Industry of Sweetened Condensed Milk and Powdered Milk 5. Fermented Milk Industry for Liquid and Solid Products 6. Ice Cream and Butter Industry 7. Industrialization of Traditional Dairy Products 8. Internal factors affecting the dairy processing industry 9. External factors affecting the dairy processing industry 10. SWOT and PEST Analysis 11. Business Plan
5	**Lecture Participants** (provide an overview of the lecture participants)
	The lecture participants are 3rd semester students who passed Microbiology, Introduction to Animal Product Technology, Animal Product Technology, Quality Control
6	**Attendance Percentage** (100% lecturer attendance; 80% student attendance)
	% lecturer attendance: 100%

	% student attendance: 80%
7	**Evaluation System** (explain the homework, quizzes, group assignments, practicum, etc.)
	Midterm Exam : 25% Final Exam : 25% Practicum : 25% Assignment : 15% Quiz : 5% Activeness/discipline/attitude : 5%
8	**Class Observation** (explain important and interesting things that were encountered during the lecture)
	1. The students attend the class 100% 2. The students take the quiz completely 3. The students answer questions from the lecturers correctly as a form of lecture reflection at each meeting (proof of the student's name and NIM attached) 4. Conducting a pre-test to students via Google Form (about their interest in the course, so that the class can be adjusted to the student needs)
9	**Learning Outcomes** (explain the achievement of the objectives that have been set, also include the learning achievements that can be explained)
	The expected learning outcomes include: 1. LO 4: Able to develop comprehensive insight and mindset according to the science and field of the animal industry. 2. LO 12: Able to design and conduct experiments, analyze and interpret data to make correct decisions in solving problems in the field of animal science, meet ethics, and have environmental insight

	3. LO 13: Able to apply animal technology that is oriented towards improving production, efficiency, quality, and sustainability based on mastery of animal science including breeding, feed, processing of products, marketing management and organizing a sustainable animal production system, and applying entrepreneurial concepts
10	**Obstacles** (provide an overview of the main obstacles in the learning process)
	The number of students who enrolled in the Dairy Processing Industry Course was large so that sometimes it was difficult to divide the industrial locations for practicum
11	**Score Distribution** (provide the score distribution following the learning achievements of this course)
	The percentage of students with successful Learning Outcomes, then the data processing and evaluation were carried out. Score distribution, based on the achievement if A is equivalent to CLO ... B is equivalent to CLO ... etc.
12	**Conclusion**
	Student success to achieve Learning Outcomes
13	**Improvement Recommendations**
	The Learning Outcomes are difficult to achieve so they need to be revised
	Appendices:
	1. Student assignments and assignment evaluation process/assignment evaluation track record 2. Quiz

	3. Results of the learning process etc.