	Universitas Negeri Surabaya Faculty of Sports and Health Sciences, Undergraduate Nutrition Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Food Microbiology	1321102012		T=2	P=0	ECTS=3.18	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Amalia Ruhana, S.P., M.P.H.

Learning model	**Case Studies**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	Discussion of microorganisms and their role in the field of nutrition which includes cell structure and function, classification and properties, microbial growth, principles of microbial counting, microbiological damage, pathogenic microbes, and principles of the fermentation process. Student learning experiences are gained through discussion activities and food problem solving (PBL) tasks related to microorganisms.
References	**Main :**

1. . Adams, M.R. dan M.O. Moss. 2008. Food Microbiology (Third Edition). The Royal Society of Chemistry. Cambridge, UK..
2. J. M., M.J. Loessner, dan D.A. Golden. 2005. Modern Food Microbiology (Seventh Edition). Springer Science Business Media, Inc. New York, USA..
3. Fardiaz, Srikandi. 2014. Mikrobiologi Pangan 1. Jakarta: Gramedia.
4. Hutkins, R. W. 2006. Microbiology and Technology of Fermented Foods (First Edition). IFT Press and Blackwell Publishing. Iowa, USA.
5. Sopandi, T. dan Wardah. 2014. Mikrobiologi Pangan (Teori dan Praktik). Yogyakarta: Andi
6. Waluyo, Lut., 2011. Mikrobiologi Umum. Malang: Umm Press.

Supporters:	
Supporting lecturer	Dra. Hj. Siti Sulandjari, M.Si. Noor Rohmah Mayasari, Ph.D. Raisya, S.TP., M.TP., M.Sc. Wildan Alfira Gusrianto, M.Gz. Dr. Salma Shafrina Aulia, S.Gz., M.Si.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Understand the lecture contract	1. Explain the description of Food Microbiology, lecture achievements and scope		Method: Discussion and question and answer 2 X 50			0%

2	Mastering the cell structure of Microorganisms	1. Describe the morphology and structure of bacterial cells 2. Describe the morphology and structure of mold cells 3. Describe the morphology and structure of our cells	**Criteria:** Describe the comparison of microorganism cell structures completely and correctly according to the rubric	Online Lecture with zoom meeting Cooperative 2 X 50 group discussions			0%
3	Understand the classification and properties of microorganisms	1. Compare the properties of each group of bacteria 2. Compare the characteristics of each group of yeast 3. Compare the characteristics of each group of molds	**Criteria:** Describe the groups and properties of Bacteria, Mold and Kamir completely and correctly according to the rubric	Online lectures using zoom meetingModel; Cooperative Method: 2 X 50 Group Discussion			0%
4	Understanding the metabolism of microorganisms	1. Explain the sources of nutrients for the growth of microorganisms 2. Compare aerobic respiration, anaerobic respiration, and food fermentation by microbes 3. Analyzing the role of protein metabolism during microbial growth 4. Describe the lipid metabolism of microorganisms	**Criteria:** Describe the metabolism of microorganisms completely and correctly according to the rubric	Online lectures using zoom meetings Cooperative Method: 2 X 50 group discussions			0%
5	Students master the growth of microorganisms	1. Compare the phases of the growth curve of microorganisms 2. Describe the factors that influence the growth of microorganisms 3. Calculate the growth of microorganisms	**Criteria:** 1. Describes the growth of microorganisms 2. According to the rubric	Approach: Scientific Method: Presentation and Group Discussion 2 X 50			0%
6	Students understand the quantitative and qualitative analysis of microorganisms in food	1. Compare the composition and use of various microbial media 2. Quantitatively analyze microorganisms using the Total Plate Count method 3. Quantitatively analyzing microorganisms using the MPN method 4. Analyzing microorganisms with the Rapid Microscopic Method	**Criteria:** Analyze quantitatively and qualitatively microorganisms in food according to the rubric.	Online Lecture Approach: Scientific Model: Case Study Method: Discussion, question and answer, assignment 2 X 50			0%

7	Students understand the identification of factors that influence the growth of microorganisms	1. Able to test the influence of temperature factors on the growth of microorganisms 2. Able to test the influence of water content (Aw) on the growth of microorganisms 3. Able to test the influence of pH factors on the growth of microorganisms 4. Able to test the influence of oxygen content factors on the growth of microorganisms	**Criteria:** According to the rubric, formulate the problem, describe the basic theory, and prepare a trial design completely and correctly according to the rubric	Approach: Scientific Model: Problem Based Method: Practical, Discussion, Presentation 2 X 50			0%
8	UTS		**Criteria:** A score of 100 is given if all questions are answered correctly according to the answer key	2 X 50			0%
9	Students understand the test for the influence of microorganism growth factors	1. Able to test the influence of nutritional factors on the growth of microorganisms 2. Able to test the influence of oxygen levels on the growth of microorganisms 3. Able to test the effect of pH factors on the growth of microorganisms 4. Able to test the effect of water content (Aw) on the growth of microorganisms	**Criteria:** According to the rubric, formulate the problem, describe the basic theory, and prepare a trial design completely and correctly	Approach: Scientific Model: Problem Based Method: Observation, discussion presentation, 2 X 50			0%
10	Students understand pathogenic microorganisms	1. Analyzing the incidence of intoxication by microbes through food 2. Analyzing the incidence of infection through food	**Criteria:** Describe intoxication and infection correctly according to the Rubric	· Online lectures using zoom meetings · 2 X 50 group discussions			0%
11	Students understand microbiological damage in storing plant foods	1. Identify types of microorganisms that damage vegetables 2. Analyze damage to vegetables by microbes 3. Analyze damage to fruit by microbes 4. Analyze damage to grain by microbes 5. Analyze damage to tubers by microbes	**Criteria:** Analyze microbiological damage in the storage of animal foodstuffs according to the Rubric	Offline/online lectures using zoom meetings Approach: Scientific Model: Case based Method: practicum, discussion, assignment 2 X 50			0%
12	Students understand microbiological damage in storing animal foods	1. Identify types of microorganisms that damage animal food 2. Analyzing meat damage by microbes 3. Analyzing fish damage by microbes 4. Analyzing milk damage by microbes 5. Analyzing egg damage by microbes	**Criteria:** Analyze microbiological damage in the storage of animal foodstuffs according to the Rubric	Approach: Scientific Model: Case based Method: practicum, discussion and assignment 2 X 50			0%

13	Students understand the prevention of microbiological damage to food ingredients	1. Arrange physical conditions to prevent food damage 2. Select chemical compounds to prevent food damage 3. Select appropriate radiation techniques to prevent food damage	**Criteria:** Describe the prevention of microbiological damage to food according to the Rubric	Offline/online lectures using zoom meetings Approach: Scientific Method: Group discussions, assignments Model: Case based Steps: Orient students to the problem Organize students to learn Guide individual or group investigations Develop and present results Analyze and evaluate the problem solving process 2 X 50			0%
14	Students understand the role of microorganisms in fermentation of vegetable materials.	1. Analyzing tape fermentation 2. Analyzing pickled vegetable fermentation 3. Analyzing Nata de Coco fermentation 4. Analyzing tempeh fermentation 5. Analyzing Soy Sauce Fermentation 6. Analyzing Tauco fermentation 7. Analyzing Beer fermentation 8. Analyzing Vinegar fermentation	**Criteria:** Describe the role of microorganisms in fermentation of vegetable materials according to the Rubric	Offline/online lectures using zoom meetings Approach: Scientific Model: Problem based Method: Discussion, Assignment 2 X 50			0%
15	Students understand microorganisms in fermentation of animal ingredients	1. Analyzing yoghurt fermentation 2. Analyzing kefir fermentation 3. Analyzing shrimp paste fermentation 4. Analyzing cheese fermentation 5. Analyzing spicy fish fermentation 6. Analyzing sausage fermentation	**Criteria:** Describe the role of microorganisms in fermentation of animal ingredients according to the Rubric	Offline/online lectures using zoom meetings Approach: Scientific Method: practical, discussion and assignment Model: case based 2 X 50			0%
16	UAS			2 X 50			0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
		0%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.

4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.