	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Undergraduate Chemistry Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Food Analysis	4720102003	Study Program Elective Courses	T=2	P=0	ECTS=3.18	7	June 24, 2022

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Project Based Learning**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	Program Objectives (PO)	
	PO - 1	Students have knowledge of the basic principles of food analysis, both macro and micro nutrients, using appropriate methods, both classical (gravimetric and volumetric) and modern (UV-Vis Spectrophotometry, AAS, Chromatography and Electrical), as well as selection methods. based on appropriate material properties according to AOAC standard methods, food safety principles and the latest journals
	PO - 2	Students are skilled in using tools to analyze food ingredients, both macro and micro nutritional ingredients, using appropriate methods, both classical (gravimetric and volumetric) and modern (UV-Vis Spectrophotometry, AAS, Chromatography and Electrical), as well as selecting methods based on exact properties. materials according to AOAC standard methods, food safety principles and the latest journals
	PO - 3	Students have the ability to collaborate and be responsible in carrying out the process of analyzing food ingredients, both macro and micro nutritional food ingredients, using appropriate methods, both classical (gravimetric and volumetric) and modern (UV-Vis, AAS, Chromatography and Electrical Spectrophotometry), as well as selection method based on appropriate material properties according to AOAC method standards, food safety principles and the latest journals
	PO - 4	Students have the ability to communicate the results of analysis of food ingredients, both macro and micro nutrients, using appropriate methods, both classical (gravimetric and volumetric) and modern (UV-Vis Spectrophotometry, AAS, Chromatography and Electrical), as well as selecting methods based on appropriate material properties according to AOAC standard methods, food safety principles and current journals.
	PLO-PO Matrix	

P.O
PO-1
PO-2
PO-3
PO-4

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
PO-1																
PO-2																
PO-3																
PO-4																

Short Course Description	Study of the basic principles of food ingredient analysis methods and data quality, in terms of chemical structure, analysis and application including validation, methods of analyzing macro and micro nutrients in various food ingredients using classical methods and modern methods as well as determining appropriate analytical methods based on standard methods or supporting journals accompanied by laboratory activities. supports so that students are able to master related concepts, are skilled in using tools, are able to collaborate and be responsible and can communicate their knowledge and skills scientifically and their application in the business field	
References	**Main :**	

	1. Slamet Sudarmaji, dkk, 1996.Analisis Bahan Makanan dan Pertanian, Liberty, Yogyakarta 2. James, C.S.,1995Analitycal Chemistry of Foods, Blackie Academic and Professional 3. Journal-journal terkini dengan tema analisis berbagai bahan pangan.
	Supporters:
	1. artikel-artikel jurnal penelitian yang relevan
Supporting lecturer	Prof. Dr. Titik Taufikurohmah, S.Si., M.Si. Rusmini, S.Pd., 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 principles of food analysis in general	1.Explains food analysis in general 2.Explain the scope of food analysis	**Criteria:** Correct answers are included in the participation score **Form of Assessment** : Participatory Activities	learning contractintroduction to food analysis 2 X 50		**Material:** scope of food analysis **Reference:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	0%
2	Understand the basic principles of appropriate analytical methods based on standard methods (AOAC) for food ingredients and sampling	1. Explain the requirements for choosing a food analysis method 2. Determine the quality of the data obtained 3. Determine how to take samples based on type	**Criteria:** Student answers are included in the participation value **Form of Assessment** : Participatory Activities	2 X 50 interactive lectures and discussions		**Material:** principles of food analysis **Bibliography:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta* **Material:** AOAC **Library:** *Latest journals with the theme of analysis of various food ingredients.*	0%
3	Understanding how to analyze water content and micronutrients in food ingredients	1. Determine the water content of food. 2. Determine the ash content of food. 3. Determine the mineral content of food. 4. Determine the vitamin content of food	**Criteria:** Student answers are included in the participation score **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Practical question and answer discussion lecture 2 X 50		**Material:** water analysis **Reference:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	5%
4	Understanding how to analyze water content and micronutrients in food ingredients	1. Determine the water content of food. 2. Determine the ash content of food ingredients. 3. Determine the mineral content of food ingredients	**Criteria:** 1.Student answers are included in the participation value 2.Practicum report includes assignment value **Forms of Assessment** : Project Results Assessment / Product Assessment, Practical Assessment	Practical analysis of water content of 6 X 50 mineral ash		**Material:** micronutrient analysis **Bibliography:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	10%

5	Understanding how to analyze water content and micronutrients in food ingredients	1. Determine the vitamin content of food ingredients	**Criteria:** 1. Student answers are included in the participation value 2. Student reports include assignment grades **Form of Assessment** : Project Results Assessment / Product Assessment	Practical vitamin analysis 6 X 50		**Material:** vitamin analysis **Library:** *Latest journals with the theme of analysis of various food ingredients.*	0%
6	Understanding how to analyze water content and micronutrients in food ingredients	Communicate the results of determining the water content, ash content, mineral content, vitamin content of food ingredients	**Criteria:** 1. Presentation assessment includes assignment grades 2. Student answers are included in the participation value **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Presentation of practical results of 2 X 50 question and answer discussions		**Material:** analysis of water and vitamins **Reference:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	5%
7	Understanding how to analyze water content and micronutrients in food ingredients	Communicate the results of determining the water content, ash content, mineral content, vitamin content of food ingredients	**Criteria:** 1. Student presentations are included in assignment grades 2. Student answers and questions are included in the participation value **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Presentation of practical results 2 X 50		**Material:** vitamin analysis **Literature:** *relevant research journal articles*	5%
8	uss	indicators from meetings 1-7	**Criteria:** The student‘s correct answer gets a score converted into a score that is included in the UTS score component	written test 2 X 50			15%
9	Understand how to analyze macronutrients contained in food ingredients	1. Determine protein levels in food using classical and modern methods 2. Determine carbohydrate levels in food, both complex and simple 3. Understand the selection of appropriate methods based on AOAC standard methods or the latest journals	**Criteria:** Student answers are included in the participation value **Form of Assessment** : Participatory Activities	Question and answer discussion lecture 2 X 50		**Material:** protein **Reference:** *James, CS, 1995 Analytical Chemistry of Foods, Blackie Academic and Professional*	0%

10	Understand how to analyze macronutrients contained in food ingredients	1. Determine the fat content contained in food ingredients and the quality of food fat including iodine value, saponification value, ester value and FFA as well as estimating the MR. 2. Understand the selection of the appropriate method based on the AOAC standard method or the latest journal	**Criteria:** Correct answers are included in the participation score **Form of Assessment** : Project Results Assessment / Product Assessment	Question and answer discussion lecture 2 X 50		**Material:** fat **Reader:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	5%
11	Understand how to analyze macronutrients contained in food ingredients	Apply analysis of protein, fat and carbohydrate levels using selected methods	**Criteria:** Student answers are included in participatory value **Form of Assessment** : Project Results Assessment / Product Assessment	Practical work on determining carbohydrate protein levels 2 X 50		**Material:** fat protein carbohydrate **Reference:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	10%
12	Understand how to analyze macronutrients contained in food ingredients	Apply analysis of protein, fat and carbohydrate levels using selected methods	**Criteria:** Students' answers are included in the participation value **Form of Assessment** : Project Results Assessment / Product Assessment	Practical work on determining carbohydrate protein levels 2 X 50		**Material:** protein, carbohydrates, fat **Reader:** *Slamet Sudarmaji, et al, 1996. Analysis of Food and Agricultural Ingredients, Liberty, Yogyakarta*	10%
13	Understand how to analyze macronutrients contained in food ingredients	Communicate the results of analysis of protein, fat and carbohydrate levels using the selected method	**Criteria:** Students' answers are included in the participation value **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Presentation of the results of the protein fat carbohydrate 2 X 50 practicum		**Material:** protein, carbohydrates, fat **Library:** *Latest journals with the theme of analysis of various food ingredients.*	5%
14	Understand how to analyze additives and alcohol in food ingredients	1. Determine the type of additives in food ingredients. 2. Determining the levels of additives in food ingredients. 3. Determination of alcohol content in food. 4. Understand appropriate analysis methods based on AOAC standard methods or the latest supporting journals	**Criteria:** Student answers are included in the participation value **Form of Assessment** : Participatory Activities	Question and answer discussion lecture 2 X 50		**Material:** additives **Library:** *Latest journals with the theme of analysis of various food ingredients.*	5%

15	Understand how to analyze additives and alcohol in food ingredients	1. Determine the type of additives in food ingredients. 2. Determining the levels of additives in food ingredients. 3. Determination of alcohol content in food. 4. Understand appropriate analysis methods based on AOAC standard methods or the latest supporting journals	**Criteria:** Student answers are included in the participation value **Form of Assessment** : Project Results Assessment / Product Assessment	Practical work on determining the levels of additives 2 X 50		**Material:** additives **Library:** *Latest journals with the theme of analysis of various food ingredients.*	10%
16	UAS	Meeting indicators 9-15	**Criteria:** entrance value of UAS components	2 X 50 test			15%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	15%
2.	Project Results Assessment / Product Assessment	50%
3.	Practical Assessment	5%
		70%

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.