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

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight	SEMESTER	Compilation Date
Functional Food	4710203026		T=3 P=0 ECTS=6.72	2	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Prof. Dr. Nuniek Herdyastuti, M.Si.

Learning model: Case Studies

Program Learning Outcomes (PLO)

PLO study program which is charged to the course

Program Objectives (PO)

PO - 1	Have the ability to work together and take responsibility within a team to support the achievement of work results (S1)
PO - 2	Mastering the theory of macromolecular structure and its application in functional food; (P1)
PO - 3	Have the ability to compile and communicate ideas, thoughts and scientific arguments in the field of functional food responsibly and based on academic ethics. (KU2)
PO - 4	Able to produce accurate, tested and innovative functional food products (KK3)

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: This course will explain functional food, both from food, drinks and products containing bioactive compounds that are healthy for humans, the functional properties of saturated fatty acids, unsaturated fatty acids (singular and plural) and natural trans fatty acids, the functional properties of ingredients. fat replacer, bioactive peptides, functional properties of dietary fiber, resistant starch, prebiotic, probiotic and synbiotic products, polyphenols and antioxidant properties as well as the body's defense mechanism system.

References

Main :

1. Handito, Dody. dkk (2019). Pangan Fungsional . Mataram: Mataram University Press
2. Anton Rahmadi Bohari (2018). Pangan Fungsional Berkhasiat Antioksidan . Mataram: Mulawarman University PressKolakowska. Dkk (2011).
3. Chemical, Biological, and Functional Aspect of Food Lipids. London: CRC Press.
4. Debasis Bagchi (2014). Nutraceutical and Functional Food Regulations in the United States and Around the World. USA: Academic Press.
5. John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.

Supporters:

1. Artikel hasil penelitian dosen dan artikel pada jurnal yang terkait dengan pangan fungsional

Supporting lecturer	Dr. Prima Retno Wikandari, M.Si. Dr. Ratih Dewi Saputri, S.Si., 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	master the science-engineering theory needed for analysis and design of functional food development	1.1. Accurately explain the meaning of functional food and give examples. 2.2. Accuracy in explaining the relationship between diet and lifestyle on health 3.3. Accuracy of classifying the types and functional properties of bioactive components 4.4. Actively participate in identifying problems, asking questions, conveying opinions or group discussion results	**Criteria:** 1.Observation 2.participation 3.Oral test **Form of Assessment** : Participatory Activities, Tests	1x 50' lecture contract, group division, explanation of learning methods project base method 2x 50'; discussions and questions and answers explore students' knowledge about how lifestyle and diet influence health and the role of functional food in overcoming these problems (1 1) 3 x 60; individual assignment to read review articles and create a resume containing identification and classification of functional foods (sources, types and benefits) 3 X 50		**Material:** Introduction to functional food lectures (Definition, scope, classification and benefits of functional food for health, factors that influence lifestyle changes, factors that influence eating habits. **Reference:** *Debasis Bagchi (2014). Nutraceutical and Functional Food Regulations in the United States and Around the World: Academic Press.* **Material:** Introduction to functional food lectures (Definition, scope, classification and benefits of functional food for health, factors that influence lifestyle changes, factors that influence eating habits. **Literature:** *articles from lecturers' research and articles in journals related to functional food*	5%

2	Able to describe, classify, explain and interpret the theory of bioactive peptides as functional foods	1.1. Accuracy in explaining the meaning of bioactive peptides (C4, B4) 2.2. Accuracy in classifying methods of obtaining, types and benefits. (C3, A3) 3.3. Accuracy in explaining the mechanism of bioactivity of bioactive peptides (C4, B4) 4.4. Accuracy in interpreting tables and pictures regarding functional food classification. (C2,B2)	**Criteria:** 1.Participation 2.Work method **Form of Assessment** : Participatory Activities, Practice/Performance	1x50': read a review article on bioactive peptides 2 x 50': present the results in PPT form for discussion 3x 60': Individual assignment to do an LKM on bioactive peptides 3 x 60: Group assignment Read review article on dietary fiber and make a PPT 3		**Material:** Bioactive peptide **Library:** *Articles from lecturers' research and articles in journals related to functional food*	5%
3	Able to explain, classify, explain and give examples of dietary fiber as a functional food	1.1. Accuracy in explaining the meaning of dietary fiber (C4, B4) 2.2. Accuracy of classifying types based on their physicochemical properties and benefits (C3, A3) 3.3. Accuracy in explaining the bioactive mechanism of dietary fiber (C4, B4) 4.4. Accuracy in providing examples of food fiber products in the environment and their benefits (C4, C3)	**Criteria:** 1.Participation 2.Oral test **Form of Assessment** : Participatory Activities	1x50': create and explain a classification diagram of dietary fiber and its benefits 2x20': students bring examples of several food sources of functional dietary fiber and explain each benefit and development ideas (1 1) 3x 60: individual reading assignments on the results of fiber development research food for health and create a resume about dietary fiber. 3 X 50		**Material:** Food Fiber **Literature:** *Articles from lecturers' research and articles in journals related to functional food*	5%
4	Able to explain, classify, explain and give examples of prebiotics, probiotics, synbiotics as functional foods	1.1. Accuracy in explaining the meaning of prebiotic, probiotic and synbiotic (C4, B4) 2.2. Accuracy of classifying prebiotic, probiotic and synbiotic types based on their physicochemical properties and benefits (C3, A3) 3.3. Accuracy in explaining the bioactive mechanisms of prebiotics, probiotics and synbiotics (C4, B4) 4.4. Accuracy in giving examples and explaining prebiotic, probiotic and	**Criteria:** 1.Observation 2.Participation 3.Oral test **Form of Assessment** : Participatory Activities	3 X 50	1x50': read a bioactive peptide review article 2 x 50': present the results in PPT form for discussion (1 1) 3x 60: individual reading assignment of research results on the development of dietary fiber for health and create a resume about dietary fiber.	**Material:** Introduction to resistant prebiotic, probiotic and synbiotic products **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Introduction to resistant prebiotic, probiotic and synbiotic products. **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals.*	5%

		synbiotic products on the market (C4, C3)				*New York : CRC Press.* **Material:** Biological activity **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Biological activity **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Food sources **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Food sources **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Health Functions and Functional Research Results **Library:** *Articles from lecturers' research results and articles in journals related to functional food*	

5	Able to explain, classify, explain and provide examples of bioactive lipids as functional foods	1.1. Accuracy in describing the meaning of bioactive lipids (C4B4) 2.2. Accuracy of classifying types of bioactive lipids based on their physicochemical properties and benefits. (C3A3) 3.3. Accuracy in explaining the mechanism of lipid bioactivity (C4B4) 4.4. Accuracy in giving examples and explaining bioactive lipids on the market (C4C3)	**Criteria:** 1.Observation 2.Participation 3.Oral test **Form of Assessment** : Participatory Activities	1x50': read a review article on bioactive lipids 2 x 50': present the results in PPT form for discussion (1 1) 3x 60: individual reading assignment of research results on the development of functional foods for health and make a resume about lipids. 3 X 50		**Material:** Introduction to bioactive lipids **Reference:** *Chemical, Biological, and Functional Aspects of Food Lipids. London: CRC Press.* **Material:** Biological activity **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Biological activity **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Food sources **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Food sources **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Health Functions and Functional Research Results **Library:** *Articles from lecturers' research results and articles in journals related to functional food*	5%
6	Able to explain and provide examples of antioxidants as functional foods	1.1. Accuracy in explaining the meaning of antioxidants (C4B4) 2.2. Accuracy in explaining the antioxidant mechanism of polyphenolic compounds (C4B4) 3.3. Be able to	**Criteria:** 1.Observation 2.Participation 3.Oral test **Form of Assessment** : Test	1x50': read an antioxidant review article 2 x 50': present the results in PPT form for discussion (1 1) 3x 60: individual reading assignment of research results on the		**Material:** Introduction to polyphenol products and their antioxidant properties **Reference:** *Anton Rahmadi Bohari (2018). Functional Foods with Antioxidant*	5%

		provide examples of foods rich in polyphenols and their antioxidant activity (C2B2)		development of functional foods for health and make a resume about antioxidants. 3 X 50		*Efficacy. Mataram: Mulawarman University Press Kolakowska. et al (2011).* **Material:** Introduction to polyphenol products and their antioxidant properties **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Introduction to polyphenol products and antioxidant properties **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Biological activity **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Biological activity **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Food sources **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Food sources **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:**		

						Health Functions and Functional Research Results **Library:** *Articles from lecturers' research results and articles in journals related to functional food*	
7	Able to explain humoral and cellular body defenses	1. Accuracy of explaining humoral and cellular body defenses (C4B4)	**Criteria:** Oral test	1x50': read a review article on humoral and cellular body defense 2 x 50': present the results in PPT form for discussion (1 1) 3x 60: individual reading assignment of research results and create a resume related to humoral and cellular body defense. 3 X 50		**Material:** Introduction to the body's defense mechanism system **Reference:** *Debasis Bagchi (2014). Nutraceutical and Functional Food Regulations in the United States and Around the World. USA: Academic Press.* **Material:** Introduction to the body's defense mechanism system **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Biological activity **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Biological activity **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.* **Material:** Food sources **References:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Food sources **Reference:** *John Shi (2007).*	5%

						Functional Food Ingredients and Nutraceuticals. New York : CRC Press. **Material:** Health Functions and Functional Research Results **Library:** *Articles from lecturers' research results and articles in journals related to functional food*	
8	Midterm Evaluation / Midterm Exam		**Criteria:** Test **Form of Assessment** : Test	2 X 50			10%
9	Able to apply logical, critical, systematic and innovative thinking in the context of developing or implementing science and/or technology according to their field of expertise.	Accuracy in analyzing functional food journal articles (C5D4)	**Form of Assessment** : Project Results Assessment / Product Assessment	1x50': assignment explanation 2 x 50': article review (1 1) 3x 60: article review assignment 3 X 50		**Material:** Study articles about functional food. **Reference:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Review of articles about functional food **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.*	5%
10	Able to apply logical, critical, systematic and innovative thinking in the context of developing or implementing science and/or technology according to their field of expertise.	Accuracy in analyzing functional food journal articles (C5D4)	**Form of Assessment** : Project Results Assessment / Product Assessment	1x50': assignment explanation 2 x 50': article review (1 1) 3x 60: article review assignment 3 X 50		**Material:** Study articles about functional food. **Reference:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Review of articles about functional food **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.*	5%

11	Able to apply logical, critical, systematic and innovative thinking in the context of developing or implementing science and/or technology according to their field of expertise.	Accuracy in analyzing functional food journal articles (C5D4)	**Form of Assessment** : Project Results Assessment / Product Assessment	1x50': assignment explanation 2 x 50': article review (1 1) 3x 60: article review assignment 3 X 50		**Material:** Study articles about functional food. **Reference:** *Handito, Dody. et al (2019). Functional Foods. Mataram: Mataram University Press* **Material:** Review of articles about functional food **Reference:** *John Shi (2007). Functional Food Ingredients and Nutraceuticals. New York : CRC Press.*	5%
12	Able to develop ideas for developing functional food based on local food that are complete and good so that they can be applied to functional food production	1.1. Accuracy in analyzing raw materials and product functional properties (C6B6) 2.2. Accuracy in determining the type of food, formulation, and packaging (C6C6) 3.3. Accuracy in trials (product evaluation) (C6B6) 4.4. Accuracy in business design (cost analysis, promotion and marketing) (C6B6) 5.5. Able to plan project activity schedules well (C6B6) 6.6. Able to be innovative and creative.	**Criteria:** Product Assessment **Form of Assessment** : Project Results Assessment / Product Assessment	2x 50: group assignment to discuss functional food products that will be developed using a functional food approach. 1 x 50: determine the project activity schedule 2 x (3x50): Presentation of the results of the completion of functional food product design made according to a predetermined schedule 3 50		**Material:** Business planning **Literature:** *Articles from lecturers' research and articles in journals related to functional food*	5%
13	Able to develop ideas for developing functional food based on local food that are complete and good so that they can be applied to functional food production	1.1. Accuracy in analyzing raw materials and product functional properties (C6B6) 2.2. Accuracy in determining the type of food, formulation, and packaging (C6C6) 3.3. Accuracy in trials (product evaluation) (C6B6) 4.4. Accuracy in business design (cost analysis, promotion and marketing) (C6B6) 5.5. Able to plan project activity schedules well (C6B6) 6.6. Able to be innovative and creative.	**Criteria:** Product Assessment **Form of Assessment** : Project Results Assessment / Product Assessment	2x 50: group assignment to discuss functional food products that will be developed using a functional food approach. 1 x 50: determine the project activity schedule 2 x (3x50): Presentation of the results of the completion of functional food product design made according to a predetermined schedule 3 50		**Material:** Business planning **Literature:** *Articles from lecturers' research and articles in journals related to functional food*	5%

14	Able to develop ideas for developing functional food based on local food that are complete and good so that they can be applied to functional food production	1.1. Accuracy in analyzing raw materials and product functional properties (C6B6) 2.2. Accuracy in determining the type of food, formulation, and packaging (C6C6) 3.3. Accuracy in trials (product evaluation) (C6B6) 4.4. Accuracy in business design (cost analysis, promotion and marketing) (C6B6) 5.5. Able to plan project activity schedules well (C6B6) 6.6. Able to be innovative and creative.	**Criteria:** Product Assessment **Form of Assessment** : Project Results Assessment / Product Assessment	2x 50: group assignment to discuss functional food products that will be developed using a functional food approach. 1 x 50: determine the project activity schedule 2 x (3x50): Presentation of the results of the completion of functional food product design made according to a predetermined schedule 3 50		**Material:** Business planning **Literature:** *Articles from lecturers' research and articles in journals related to functional food*	5%
15	Able to develop ideas for developing functional food based on local food that are complete and good so that they can be applied to functional food production	1.1. Accuracy in analyzing raw materials and product functional properties (C6B6) 2.2. Accuracy in determining the type of food, formulation, and packaging (C6C6) 3.3. Accuracy in trials (product evaluation) (C6B6) 4.4. Accuracy in business design (cost analysis, promotion and marketing) (C6B6) 5.5. Able to plan project activity schedules well (C6B6) 6.6. Able to be innovative and creative.	**Criteria:** Product Assessment **Form of Assessment** : Project Results Assessment / Product Assessment	2x 50: group assignment to discuss functional food products that will be developed using a functional food approach. 1 x 50: determine the project activity schedule 2 x (3x50): Presentation of the results of the completion of functional food product design made according to a predetermined schedule 3 50		**Material:** Business planning **Literature:** *Articles from lecturers' research and articles in journals related to functional food*	5%
16	Final Semester Evaluation / Final Semester Examination	1.1. Able to promote and sell products through planned methods/events 2.2. Able to show persistence, self-confidence, not afraid to fail, dare to take risks	**Criteria:** Product Assessment **Form of Assessment** : Project Results Assessment / Product Assessment	3 X 50			25%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	20%
2.	Project Results Assessment / Product Assessment	60%
3.	Practice / Performance	2.5%
4.	Test	17.5%
		100%

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.