MODULE HANDBOOK

BACHELOR PROGRAM
AGRICULTURAL PRODUCT TECHNOLOGY

FACULTY OF AGRICULTURE
MULAWARMAN UNIVERSITY

SEMESTER 1

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural Product Chemistry I
Module level	Bachelor Program
Code	220303613W007
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	1
Person responsible for the module	Prof. Dr. oec.troph. Ir. Krishna Purnawan Candra, M.S
Lecture	1. Prof. Dr. oec.troph. Ir. Krishna Purnawan Candra, M.S 2. Dra. Yuliani, M.P
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, study case, assignment, presentation, student center learning, problem-based learning.
Workload	1. Lectures : 2 x 50 = 100 minutes per week 2. Exercises and assignments : 2 x 60 = 120 minutes (2 hours) per week 3. Independent study : 2 x 60 = 120 minutes (2 hours) per week 4. Practical : 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to understand of substances and their types, changes, and properties of agricultural product, as well as changes during processing and storage condition</td></tr>
<tr><td>Content</td><td>Courses
1. Basic knowledge of chemistry, types of elements, properties of substances, and changes in substances.
2. Development of atomic theory
3. Electron configuration
4. Understanding the periodic system of elements and periodic properties
5. Chemical bonds and its types, as well as the nomenclature of chemical compounds
6. Basic law of chemistry and chemical reaction equations
7. The concept of atomic mass and molecular mass, the concept of mold and Avogadro's number
8. Middle test (Mid-test)
9. Understanding of acid-base theory
10. Understanding of pH calculation and definition
11. Buffer solution, and calculating the pH of the buffer solution
12. Basic knowledge of basic organic chemistr
13. Oxidation-reduction reaction
14. Understanding of chemistry knowledge
15. Understanding of agricultural chemistry
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/group assignment</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical on laboratory</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Brady JE, Humiston GE. 1986. General Chemistry: Principles and Structure. Edisi ke-4. Versi S1. John Wiley & Sons, Toronto 2. Fay M. Chemistry. Fourth edition. E-book 3. Solomons TWG 1988. Organic Chemistry. Fourth Edition. John Wiley & Sons, Toronto

Course Learning Outcomes (CLO):

1	Students can explain the basic science of chemistry in theory and practice; students have (1) cognitive competencies to explain the theory of chemistry that underlies the properties and reactions of various components of food/agricultural products, and being able to explain and handle how to control chemical reactions that occur in foodstuffs/agricultural products.
2	Students can explain the basic knowledge of chemistry theory and practice; students have (2) psychomotor competencies to carry out chemical practice/analysis based on agricultural chemistry.
3	Students can explain the basic science of chemistry in theory and practice; students have (3) affective competencies to avoid improper methods in handling agricultural chemicals and conducting chemical analysis.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	v							
2	v							
3	v							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Biology of Agricultural Products
Module level	Bachelor Program
Code	220303613W006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	1
Person responsible for the module	Marwati, S.P., M.Si.
Lecture	1. Marwati, S.P., M.Si. 2. Dr. Aswita Emmawati, S.TP., M.Si. 3. Maghfirotin Marta Banin, S.Pi., M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, study case, assignment, presentation, student center learning, problem-based learning.
Workload	1. Lectures : 2 x 50 = 100 minutes per week 2. Exercises and assignments : 2 x 60 = 120 minutes (2 hours) per week 3. Independent study : 2 x 60 = 120 minutes (2 hours) per week 4. Practical : 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination	minimum attendance of 80% (based on Mulawarman University regulation)

Recommended prerequisites	-
Module objectives/intended learning outcomes	1. Able to explain the structure, function and properties of food/agricultural products, as well as changes during processing and storage condition 2. Able to control physical, chemical, biological and microbiological hazards in the food/agricultural product processing chain to ensure quality and food safety
Content	Courses 1. Basic knowledge of biology, characteristics of life, biogenetics and abiogenesis, essentials elements for life, and organization of organisms in the biosphere 2. Basic cell theory, prokaryotes and eukaryotes, prokaryotic cell structure, eukaryotic cell structure, plant and animal cell 3. Cells reproduction (Mitosis, Miosis, Cell Cycle) 4. Cell genetics, structure and gene expression (DNA and RNA, chromosomes, transcription, translation) 5. Various types of evolutionary theories, evolutionary mechanisms 6. Natural selection and mutations 7. Diversity and Characteristics of Archaea, bacteria, fungi, protista 8. Middle test (Mid-test) 9. Taxonomy and plant systematics, plants classifications and their characteristics, plant tissues and their function 10. Plant transportation systems, plant reproductive system, plant respiratory system 11. Transportation system, reproductive system, respiratory system 12. Circulatory system, excretory system and animal homeostasis 13. Concept and scope of ecology 14. Organization of life 15. The development of food, biotechnology and agricultural product 16. Final test
Study and examination requirements and forms of examination	Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:

No.	Objects of Assessment	Forms of Assessment	Quantity (%)
1	Quiz	Written test	10
2	Middle test (UTS)	Written test	15
3	Final test (UAS)	Written test	20
4	Case Study	Individual/group assignment	15
5	Practical	Practical on laboratory	30
6	Affective	Participation	10

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Campbell, Neil A.; Reece, Jane B. 2005. Biology. Benjamin Cummings 2. Kenneth R. Miller, Joseph Levine . 2008. Biology. Pearson Prentice Hall

Course Learning Outcomes (CLO):

1.	Students are able to understand and explain biology as a science, the characteristics of life, the Organization of life, Cells and their parts, Metabolism, energy release, photosynthesis and cell division, Cell Genetics, Evolution and Diversity, Classification in biology, Reproduction and development in animals and plants, Ecology, energy flow, material cycles, Population growth and the interactions between species
2	Students are able to identify the characteristics of life, the Organization of life, Cells and their parts, Metabolism, energy release, photosynthesis and cell division, Cell Genetics, Evolution and Diversity, Classification in biology, Reproduction and development in animals and plants, Ecology, energy flow, material cycles, Population growth and the interactions between species

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1.	v	v						

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Introduction to Humid Tropical Agriculture
Module level	Bachelor Program
Code	220303612W005
Subtitle	Bahasa Indonesia
Courses	2
Semester (s)	1
Person responsible for the module	Hj. Maulida Rachmawati, SP., MP
Lecture	1. Hj. Maulida Rachmawati, SP., MP 2. Dr. Ir. H. Samad Ramayana, MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, case study
Workload	1. Lectures : 2 x 50 = 100 minutes per week 2. Exercises and assignments : 2 x 60 = 120 minutes (2 hours) per week 3. Independent study : 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Students can apply appropriate food/agricultural product analysis techniques and follow the objectives
2. Students are able to design the handling of materials and production processes of humid tropical food/agricultural products and their environment in a sustainable manner.</td></tr>
<tr><td>Content</td><td>Courses
1. Definition and history of agricultural development
2. Elements and features of agriculture
3. Factors Affecting Growth and Yield
4. Energy in agricultural processes
5. Climate and Soil Profiles in Humid Tropical Regions
6. Agricultural Models in the Humid Tropics
7. The process of agricultural activities, especially in humid tropical regions
8. Middle test
9. The importance of postharvest treatment in horticultural products
10. Properties of Agricultural Materials
11. Basic knowledge of harvest, postharvest and marketing
12. Postharvest Objectives 1
13. Postharvest Objectives 2
14. Horticultural Product Handling Techniques 1
15. Horticultural Product Handling Techniques 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>3</td><td>Project</td><td>Individual/group project</td><td>20</td></tr>
<tr><td>4</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting dan *Discussion*
Reading list	1. Nasution, A.H. 2006. Pengantar Ke Ilmu Ilmu Pertanian. IPB. Press, Bogor. 2. Nurmala, T. 2012. Pengantar Ilmu Pertanian. Graha Ilmu, Yogyakarta. 3. Riyanto dan Soehartini Riyanto. 1990. Agroforestri dan Prospeknya di Kalimantan Timur. 4. Soetriono dan Suwandari. 2016. Pengantar Ilmu Pertanain. Intimedia, Malang. 5. Gardjito, M dan wasti, Y.R. 2018. Fisiologi Pascapanen Buah dan Sayur. Gadjah Mada University Press. Yogyakarta. 6. Wuryani. Sri 2008; Perubahan Kimia dan Fisiologi Pascapanen sayuran dan buah-buahan. Wimaya Press UPN "Veteran" Yogyakarta

Course Learning Outcomes (CLO):

1	Students are able to describe and explain the basic principles of agriculture.
2	Students are able to identify the factors that affect the growth of agricultural products.
3	Students are able to determine the climate and soil profiles in humid tropical regions.
4	Students are able to determine method of postharvest handling, including postharvest handling of agricultural products.
5	Students are able to design the post harvest handling and storing agricultural materials.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	v							
2		v						
3			v					
4				v				
5					v			

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Religious Education
Module level	Bachelor Program
Code	MU000603W001
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	1
Person responsible for the module	Muhammad Ridwan, M.Si
Lecture	1. Muhammad Ridwan, M.SI 2. Dr. Ir. Surya Sila, M.P 3. Dr. Ana Margaretta T, S.PAK., M.Si., M.Th 4. Lorensius, S.Pd., M.Pd 5. Kadek Subagiada, S.Si., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical : 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the	minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>examination regulations</td><td></td></tr>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to explain religious education materials and personality development</td></tr>
<tr><td>Content</td><td>Materials are adapted to each religion.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual, Group Discussion</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
<tr><td>Media employed</td><td>Class meeting</td></tr>
<tr><td>Reading list</td><td>1. Anshari, E. S. 1992. Kuliah al-islam. Rajawali.
2. Hanafi, Y. 2022. Internalisasi Nilai-nilai moderasi beragama dalam perkuliahan pendidikan agama islam pada perguruan tinggi. Delta Pijar Khatulistiwa.
3. Husaini, A. 2015. Agama islam: Panduan menjadi cendekiawan mulia dan bahagia. Pro-U Media.
4. Iberani, J. S. 2003. Mengenal Islam. El-Kahfi.</td></tr>
</table>

Course Learning Outcomes (CLO):

1	Student able to internalize religious education materials and personality development

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1								V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Pancasila
Module level	Bachelor Program
Code	MU000603W002
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	1
Person responsible for the module	Nurul Puspita Palupi, S.P., M.Si
Lecture	Nurul Puspita Palupi, S.P., M.Si Dr. Akyar Roeslan, M.P
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>Student has to explain Pancasila as the basis of the state, national ideology, philosophical system, ethical system and basic values for the development of science.</td></tr>
<tr><td>Content</td><td>1. This course examines Pancasila in historical studies as the basis of the state, national ideology, philosophical system, ethical system, and basic values for the development of science.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
<tr><td>Media employed</td><td>Class meeting</td></tr>
<tr><td>Reading list</td><td>1. Ali, Asa’ad, S. 2009. Negara Pancasila, Jalan Kemaslahatan bersama. Jakarta: LP3S.
2. Bahar, S dan Hudawati, N. 1998. Risalah siding BPUPKI dan PPKI. Jakarta. Sekretariat negara RI.
3. Bourchier, David. 2007. Pancasila versi orde baru dan asal muasal negara organis. Yogyakarta: Aditya Media dan PSP UGM.
4. Kusuma, A. 2004. Lahirnya UUD 1945. Jakarta: Fakultas Hukum UI.
5. Pemerintah RI. 2010. Desain induk pengembangan karakter bangsa 2010-2025. Jakarta: Pemerintah Republik Indonesia.
6. Santoso, Listiono, dkk. 2003. Filsafat ilmu sosial, ikhtiar awal pribuminasi ilmu-ilmu sosial. Yogykarta: Gama Media.</td></tr>
</table>

	7. Winarno. 2017. Paradigma baru pendidikan Pancasila. Jakarta: Bumi aksara. 8. Tim. 2016. Pendidikan kewarganegaraan. Dirjen Belmawa Kemenristekdikti.

Course Learning Outcomes (CLO):

1.	Student can internalize Pancasila as the basis of the state, national ideology, philosophical system, ethical system and basic values for the development of science.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1								V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Indonesian Language
Module level	Bachelor Program
Code	MU000603W004
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	1
Person responsible for the module	Bayu Aji Nugroho, S.S., M.HUM
Lecture	Bayu Aji Nugroho, S.S., M.HUM
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Students are proficient in distinguishing between formal and informal Indonesian language
2. Students can effectively write academic papers aligned with disciplinary standards
3. Students are able to generate academic outputs characterized by accurate and appropriate Indonesian language</td></tr>
<tr><td>Content</td><td>1. Pengertian Bahasa Indonesia yang baik dan benar
2. Dasar-dasar Bahasa Indonesia baku I
3. Dasar-dasar Bahasa Indonesia baku II
4. Kaidah ejaan dengan benar (EYD) I
5. Kaidah ejaan dengan benar (EYD) II
6. Proses penalaran ilmiah secara memadai (penalaran induktif, deduktif, dan salah nalar) I
7. Proses penalaran ilmiah secara memadai (penalaran induktif, deduktif, dan salah nalar) II
8. Middle test (UTS)
9. Penyusunan paragraph dengan benar I
10. Penyusunan paragraph dengan benar II
11. Pemilihan topik dan judul penelitian
12. Kerangka krangan - bentuk kerangka pola organisasi
13. Penyusunan karya tulis ilmiah (makalah/skripsi) dengan tatacara yang benar
14. Tata tulis ilmiah dengan benar
15. Pembuatan surat resmi secara baik dan benar
16. Final test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
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A : 80 ≤ Passing Grade ≤ 100
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	75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Akhadiah, Sabarti, Maedar G. Arsjad, Sakura H. Ridwan. 1994. Pembinaan kemampuan menulis Bahasa indonesia. Erlangga. 2. Arifin, E. Zaenal dan S. Amran Tasa. 1989. Cermat berbahasa Indonesia untuk perguruan tinggi. PT. Mediatama Sarana Perkasa. 3. Moeliono, Anton. 1988. Komposisi: Sebuah pengantar kemahiran bahasa. Balai Pustaka. 4. Pedoman umum Ejaan Bahasa Indonesia yang Disempurnakan. 5. Pedoman umum pembentukan istilah.

Course Learning Outcomes (CLO):

1.	Students are proficient in distinguishing between formal and informal Indonesian language
2.	Students can effectively write academic papers aligned with disciplinary standards
3.	Students are able to internalize academic outputs characterized by accurate and appropriate Indonesian language

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1.								V
2.								V
3.								V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Mathematics
Module level	Undergraduate Program (Bachelor degree)
Code	220303612W008
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester(s)	1
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M.Sc
Lecture	1. Dr. Aswita Emmawati, S.TP., M.Sc 2. Dr. Hadi Suprapto, SP, MP
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	lectures, discussions, assignments, and practice questions.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to understand and explain the fundamental concept of functions, limits and mathematical operation and differential operation of mathematics functions</td></tr>
<tr><td>Content</td><td>Courses
1. Understanding Functions, Mathematical Function Models (Linear, Polynormal, Power, Rational, Trigonometric, Exponential, Logarithmic)
2. Concept of Limits and Mathematical Operations
3. Differential Operations of Polynormal Functions
4. Differential Operations of Exponential Functions
5. Differential function operations in the form of Product Rule and Quotient Rule
6. Basic applications of differentials
7. Differential operations of trigonometric functions
8. Middle Test (UTS)
9. Differential operations of functions in the form of chains
10. Differential operations of functions in implicit form
11. Differential operations of functions in the form of logarithms
12. Infinite integral
13. Limited Integral
14. Integral applications in engineering phenomena I
15. Integral applications in engineering phenomena II
16. Final test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual, Group project</td><td>25</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/group assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Emplyode media	Face to face meetings, Assignments and discussions
Reading list	

Course Learning Outcomes (CLO):

1.	Able to understand and explain the fundamental concept of functions, limits and mathematical operation and differential operation of mathematics functions

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Basic Social and Cultural Sciences
Module level	Degree program
Code	MU000603W006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester(s)	1
Person responsible for the module	Dr. Fitriyana, S.Pi., M.Si
Lecture	Dr. Fitriyana, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	lectures, discussions and questions and answers.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain of culture, its components and its significance in human societies</td></tr>
<tr><td>Content</td><td>Courses
1. Etymology of the word "culture" and the definition of "culture" from several branches of science I
2. Etymology of the word "culture" and the definition of "culture" from several branches of science II
3. Definition of culture and forms of culture from several experts
4. Elements of Culture I
5, Elements of Culture II
6. The purpose, role and function of culture II
7. The purpose, role and function of culture II
8. Middle test (UTS)
9. Community dynamics and cultural learning processes I
10. Community dynamics and cultural learning processes II
11. Understanding the nature or characteristics of culture I
12. Understanding the nature or characteristics of culture II
13. Definition of civilization and characteristics of civilization I
14. Definition of civilization and characteristics of civilization II
15. value system, outlook on life, ideology, customs and legal norms
16. Final test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
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<tr><td>4</td><td>Case Study</td><td>Individual/group assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Emplyode media	Class and online meetings (Zoom and Mulawarman Online Learning System (MOLS))
Reading list	1. Liliweri, Alo. 2014. Introduction to Cultural Studies. Bandung: Nusa Media. 2. Kuntowijoyo. 2006. Culture and Society. Yogyakarta: Tiara Wacana Yogya. 3. Koentjaraningrat. 2009. Introduction to Anthropology. Jakarta: Rineka Cipta. 4. Bahari, Nooryan. 2014. Art Criticism. Yogyakarta: Student Library. 5. Ranjabar, Jacobus. 2013. Indonesian Social and Cultural System: An Introduction. Bandung: Alfabeta Publisher. 6. Nuraeni, Heny Gustini et al. 2013. Cultural Studies in Indonesia. Bandung: CV Pustaka Setia. 7. Elly M. Setiadi et al. 2006. Basic Social and Cultural Sciences Second Edition 6th Printing. Jakarta: Kencana.

Course Learning Outcomes (CLO):

1.	Able to explain of culture, its components and its significance in human societies

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

SEMESTER 2

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural English
Module level	Bachelor
Code	220303623W003
Subtitle	English
Courses	3 (2-1)
Semester (s)	2
Person responsible for the module	Anton Rahmadi, S.TP., M.Sc., Ph.D
Lecture	1. Anton Rahmadi, S.TP., M.Sc., Ph.D 2. Sulistyo Prabowo, S.TP., MPH., Ph.D
Language	English
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, student-centered learning, project-based learning, discussion, and assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. The use of English is adapted to intermediate and pre-advanced levels. Use emphasizes the ability to understand scientific reading and increase the vocabulary and expressions in English by 4000-5000 words. The sentence structure (grammar) is given according to the scientific reading</td></tr>
<tr><td>Content</td><td>Courses
1. Course description and objectives
2. A person’s daily routine, writing, and grammar focus
3. Discussing news, reading, and grammar focus: past simple and past continuous tense
4. Listening, reading, and grammar focus: past tense
5. Reading an article and grammar focus: Present perfect and past simple
6. Types of celebrations, language focus: request and obligation, and grammar focus: modal verbs
7. Types of celebrations, language focus: request and obligation, and grammar focus: modal verbs 2
8. Mid Test
9. Short conversation and question and response
10. Long conversation
11. Independent and dependent clauses
12. Parts of speech
13. Vocabulary section
14. Reading comprehension (1)
15. Reading comprehension (2)
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group project</td><td>15</td></tr>
<tr><td>5</td><td>Case study</td><td>Individual/Group Assignment</td><td>15</td></tr>
<tr><td>6</td><td>Practical</td><td>Practical</td><td>20</td></tr>
<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1.	Students are expected to demonstrate a comprehensive grasp of advanced English usage tailored to intermediate and pre-advanced proficiency levels. This includes the ability to effectively comprehend scientific literature, expand vocabulary to encompass 4,000-5,000 words and idiomatic expressions, and accurately construct grammatically sound sentences mirroring those found in academic texts.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1								V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural Products Chemistry II
Module level	Bachelor
Code	220303622W007
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M. Si
Lecture	1. Dr. Aswita Emmawati, S.TP., M. Si 2. Dr. Hadi Suprapto, S.P., M.P.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, project-based learning, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry I

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the structure, function, and chemical properties of agricultural products
2. Able to control physical, chemical, biological, and microbiological hazards in the food/agricultural product processing chain to ensure the quality and safety of agricultural products per regulations</td></tr>
<tr><td>Content</td><td>Courses
1. Chemical components in agricultural materials
2. Chemical and physical components of water in food
3. Carbohydrate 1
4. Carbohydrate 2
5. Protein 1
6. Protein 2
7. Fat
8. Mid Test
9. Vitamin
10. Mineral
11. Antinutritional components
12. Toxic component 1
13. Toxic component 2
14. Flavors and Dyes
15. Antioxidant
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
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<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employee	Class meeting
Reading list	1. Food Chemistry Fennema, 4th Edition 2. Kimia Pangan Komponen Makro, Feri Kusnandar 3. Komponen Minor dan BTP, Teti Estiasih et al.

Course Learning Outcomes (CLO):

1.	The students can understand and explain the advanced knowledge of the chemical properties of agricultural products, including carbohydrates, lipids, proteins, vitamins, minerals, water, bioactive components of plants and animals, anti-nutrients and toxins, flavors, food additives, and changes -changes that occur in these components as a result of environmental factors (temperature, humidity, pH, etc.)

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Analytical Chemistry for Agricultural Products Research
Module level	Bachelor
Code	220303622W010
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Dra. Yuliani., MP
Lecture	1. Dra. Yuliani., MP 2. Maghfirotin Marta Banin, S.Pi., M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study, student center learning.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry I Mathematics

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the basics of analytical chemistry, processing and displaying data, analysis of gravimetry, titrimetry, spectrophotometry, electrophoresis and chromatography</td></tr>
<tr><td>Content</td><td>Courses
1. Definition of analytical chemistry and chemical analysis methods
2. Solution, solubility, and solubility concentration
3. Problem-solving about solutions and solution concentrations
4. Definition and principles of gravimetric analysis
5. Calculation of analysis results by gravimetry method
6. Examples of quantitative chemical analysis with gravimetric method
7. Examples of quantitative chemical analysis with gravimetric method 2
8. Mid Test
9. Definition and principles of titrimetry/volumetric analysis
10. Titration method
11. Theoretical basis of chemical analysis spectrophotometry method
12. Testing of food chemistry/agricultural products by spectrophotometry method
13. Testing of food chemistry/agricultural products by spectrophotometry method
14. Analysis techniques by chromatography method
15. Analysis techniques by chromatography method 2
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
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<tr><td>4</td><td>Project</td><td>Individual/Group Project</td><td>25</td></tr>
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<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Achmad Mursyidi dan Abdul Rohman. 2008. Volumetri dan Gravimetri. Gadjah Mada University Press. 2. Dwi Puspitasari, I. 2017. Kimia Analitik Dasar Dengan Strategi Problem Solving dan Open-ended Experiment. Penerbit Alfabeta, Bandung 3. Jeffery GH, Basset J, Mendham J, Denney RC (1989). Vogel's Texbook of Quantitative Chemical Analysis. 5th ed. Longman Scientific & Technical, Essex, England. 4. Hargis LG (1988). Analytical Chemistry : Principles and Techniques. Prentice-hall International Inc, New jersey. 5. Anwar Nur, M. 1989. Spektroskopi. PAU Pangan dan Gizi, Institut Pertanian Bogor 6. Sudarmadji, S. 1996. Teknik Analisis Biokimiawi. Liberty, Yogyakarta. 7. Adnan M. 1997. Teknik kromatografi untuk analisis bahan makanan. Penerbit Andi, Yogyakarta

Course Learning Outcomes (CLO):

1.	The students can understand and explain the advanced knowledge about the scope of analytical chemistry, the fundamentals of analytical chemistry, data processing, gravimetric analysis, titrimetry, spectrophotometry, electrophoresis, and chromatography.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Citizenship
Module level	Bachelor
Code	MU0000602W003
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Nurul Puspita Palupi, S.P., M.Si.
Lecture	1. Nurul Puspita Palupi, S.P., M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-
Module objectives/intended learning outcomes	1. Citizenship education aims to develop knowledge and understanding as well as awareness of National Security Defense (HANKAMNAS), the student environment in the context of National Resilience (TANNAS),

<table>
<tr><td></td><td>in addition to helping to foster increased awareness of national discipline. For this reason, students are given an understanding of an introduction to entrepreneurship, Archipelago Insight, National Resilience from Politics, National Security Defense Strategy as a basis for understanding the Universal People's</td></tr>
<tr><td>Content</td><td>Courses
1. Citizenship Education in Higher Education
2. Human rights
3. Rights and obligations of citizens
4. Defending the country
5. democracy
6. Archipelago insights
7. National resilience
8. Mid test
9. Implementation of Nusantara insights
10. National resilience
11. Nature and aspects of national resilience
12. Social aspects in national resilience
13. Politics and national strategy (1)
14. Politics and national strategy (2)
15. Implementation of national politics and strategy
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
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<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Indvidual/Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Andrain, Charles. 1992. Kehidupan Politik dan Perubahan Sosial. Yogyakarta: Tiara Wacana. 2. Bachtiar, Harsja W.1987. Integrasi Nasional Indonesia dalam Wawasan Kebangsaan Indonesia. Jakarta: Badan Komunikasi Penghayatan Kesatuan Bangsa (Bakom. PKB) Pusat. 3. Baswir, Revrisond. 1999. Sistem Ekonomi Kerakyatan (Makalah). Yogyakarta: Tidak diterbitkan. 4. Budiarjo, Meriam, 1998, Dasar-Dasar Ilmu Politik, Jakarta : Gramedia. 5. Darmodiharjo, Darji, 1983, Pancasila dalam Perspektif, Jakarta: Aries Lima. 6. Ebenstein, Wiliiam H, Soeri Soeroto. 1982. Pemahaman Sejarah Indonesia Sebelum dan Sesudah Revolusi. Jakarta: LP3ES. 7. Ebenstein, William & Fagelman, Edwin, 1994, Isme-Isme Dewasa Ini (Terjemahan), Jakarta, Erlangga. 8. Gaffar, Afan. 2002. Politik Indonesia. Yogyakarta: Pustaka Pelajar. 9. Kantaprawira, Rusadi, 1983, Sistem Politik Indonesia, Bandung : Sinar Baru. 10. Lemhanas. 2000. Pendidikan Kewarganegaraan. Jakarta. 11. Margenthou, Hans J. 1990. Politik Antar Bangsa (Terjemahan). Jakarta: Yayasan Obor Indonesia. 12. Mas'oed, Mohtar dan Mac Andrew, Colin (ED). 1990. Perbandingan Sistem Politik, Yogyakarta : UGM. Press. 13. Morgenthou, Hans, 1990, Politik Antar Bangsa (Terjemahan), Jakarta : Yayasan Obor Indonesia. 14. Nasikun, 1993, Sistem Sosial Indonesia, Jakarta: Rajawali Press. 15. Pamuji S, 1985, Demokrasi Pancasila dan Ketahanan Nasional, Jakarta : Bina Aksara. 16. Puspowardoyo. 1991. Pancasila sebagai ideologi Ditinjau dari Pandangan Hidup Bersama, Pancasila Sebagai deology. Jakarta: BP7 Pusat. 17. Dan Ditjen. Dikti. Depdikbud. 1997. Kewiraan Buku Induk Pendidikan Kewarganegaraan. Jakarta: Lemhanas 18. Sunarto,dkk. 2011. Pendidikan Kewarganegaraan. Semarang: IKIP Semarang Press.

	19. Suryosumarto, Budi Santoso. 1989. Sistem Informasi Manajemen Nasional. Jakarta: Aries Lima. 20. Usman, Oetojo dan Alfian, 1991, Pancasila sebagai Ideologi, Jakarta; BP-7 Pusat. 21. Wibisono S, Koento. 2001. Demokrasi sebagai Sarana Kehidupan Berbangsa dan Bernegara. Jakarta: Dirjen Dikti.

Course Learning Outcomes (CLO):

1.	Students are expected to cultivate a deep understanding of advanced concepts within National Security Defense (HANKAMNAS), encompassing the evolution of knowledge and an acute awareness of the student environment within the framework of National Resilience (TANNAS). This academic pursuit aims to cultivate a heightened sense of national discipline within the student body

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1.								V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Computer Applications for the Agricultural Industry
Module level	Bachelor
Code	220303622W008
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	2
Person responsible for the module	Yulian Andriyani, S.TP., M.Sc
Lecture	1. Yulian Andriyani, S.TP., M.Sc 2. Agustu Sholeh Pujokaroni, S.TP, M.Sc., Ph.D 3. Panggulu Ahmad Ramadhani Utoro, S.TP., MT.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment, project-based learning.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Get to know the function and use of the internet, website programming, and simulation programs using programming languages</td></tr>
<tr><td>Content</td><td>Courses
1. History and Development of Computers
2. The Benefits of Computers in Various fields (software, hardware, and brainware)
3. Computer Data Processing
4. Computer Operating System
5. Microsoft Office Word (1I)
6. Microsoft Office Word (2)
7. Microsoft Office Word (3)
8. Mid Test
9. Microsoft Office Power Point (1)
10. Microsoft Office Power Point (2)
11. Microsoft Office Excel (1)
12. Microsoft Office Excel (2)
13. Corel Draw Graphic Design (1)
14. Corel Draw Graphic Design (2)
15. Laptop Installation
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/Group Assignment</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO)

1.	The students can determine methods and apply the advanced knowledge learn the function and use of the Internet, website programming, and simulation programs using programming languages
2.	The students can demonstrate and organize the function and use of the Internet, website programming, and simulation programs using programming languages.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			v					
2							v	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Fundamentals of Management
Module level	Bachelor
Code	220303622W004
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Syarifah Maryam, S.P., M.P
Lecture	1. Syarifah Maryam, S.P., M.P 2. Tetty Wijayanti, SP., MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Definition and concept of management; history and management figures, development of management science; management functions, management resources, leaders and leadership, planning, organizing include; organization, departmentalization, staff and committees, degradation; personnel arrangement, briefing includes; directing, leading, coordinating, motivating and controlling; analysis of management practices in Indonesia and developed countries.</td></tr>
<tr><td>Content</td><td>Courses
1. Definition and functions of management
2. History and scope of management
3. Environment and organizational culture
4. Planning function in management
5. Organizational functions in management
6. Coordination techniques in management
7. Motivation in management
8. Mid test
9. Motivational theories
10. Decision-making in management
11. Teamwork (1)
12. Teamwork (2)
13. Leadership in the organization
14. Supervisory function in management (1)
15. Supervisory function in management (2)
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Williams, C. (2016). MGMT-Principle of Management. 8th Edition, Mason: South-Western Cengage Learning. 2. Nawangwulan, I.M, & Prasetio, T. (2018). Dasar-dasar Manajemen, Tangerang Selatan: UPJ Press 3. Various relevant management-related books and articles

Course Learning Outcomes (CLO):

1.	The students are able to demonstrate and organize the advanced knowledge of the history and management figures, the development of management science, management functions, management resources, leaders and leadership, planning, organizing including organization, departmentalization, staff and committees, degradation; personnel arrangement, briefing includes; directing, leading, coordinating, motivating and controlling; analysis of management practices in Indonesia and developed countries.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							v	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Knowledge of Agricultural Materials
Module level	Bachelor
Code	220303622W005
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Dr. Sukmiyati Agustin, S.TP., M.Si.
Lecture	1. Dr. Sukmiyati Agustin, S.TP., M.Si. 2. Dr. Hadi Suprapto, S.P., M.P.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. This course discusses the chemical and physical characteristics of various agricultural products, the reactions that occur and cause food damage</td></tr>
<tr><td>Content</td><td>Courses
1. Scope of knowledge of agricultural products
2. Cereals and legumes
3. Vegetables and fruits
4. Tubers
5. Refreshing ingredients
6. Fatty oils
7. Spices
8. Mid test
9. Source and nature of meat
10. Source and nature of poultry
11. Source and nature of eggs
12. Properties of milk
13. Properties of fermented foods
14. Types, functions, and applications of food additives
15. Types, functions, and applications of food additives 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual/Group Project</td><td>25</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
</table>

Media emplyode	Class meeting
Reading list	1. Muchtadi et al. 2010. Ilmu Pengetahuan Bahan Pangan. Penerbut AlfaBeta. 2. Atma, Y. 2018. Dasar Pengetahuan Bahan Pangan. Trilogi University Press. 3. Potter, N.N., Hopkins, J.J. 1995. Food Science. Springer Science. 4. Fardiaz, D. 2006. Kimia Pangan. Pusat Penerbitan Universitas Terbuka. 5. Fisiologi Pasca Panen dan Pemanfaatan Buah-buahan dan Sayuran-sayuran Tropika dan Subtropika, Gadjah Mada University Press: Jogjakarta. 6. Lawrie, R. A. 2003. Ilmu Daging. Terjemahan Parakkasi, A. Edisi Ke-5. Universitas Indonesia, Jakarta. 7. Malaka, R. 2010. Pengantar Teknologi Susu. Masagena Press: Makassar 8. Pantastico, 1989. Fisiologi Pasca Panen dan Pemanfaatan Buah-buahan dan Sayuran-sayuran Tropika dan Subtropika. Gadjah Mada University Press: Jogjakarta. 9. Tien R.,Sugiyono, Fitriyono Ayustaningwarno, Ilmu Pengetahuan Bahan Pangan.: Alfabeta. 10. Soeparno, 2005. Ilmu Dan Teknologi Daging. Gadjah Mada University Press. Yogyakarta. 11. Winarno, 2004. Kimia Pangan dan Gizi, Penerbit PT Gramedia, Jakarta.

Course Learning Outcomes (CLO):

1.	The students are able to understand and explain the knowledge of types/sources of agricultural products, their composition, physical and chemical properties, how to handle, and damage that may occur to agricultural products
2.	The students are able to identify and control the of types/sources of agricultural products, their composition, physical and chemical properties, how to handle, and damage that may occur to agricultural products

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	v							
2		v						

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Microbiology of Agricultural Products
Module level	Bachelor
Code	220303622W006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M.Si.
Lecture	1. Dr. Aswita Emmawati, S.TP., M.Si. 2. Marwati, S.TP., MP 3. Maghfirotin Marta Banin, S.Pi., M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, student center learning, project based learning, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Biology of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. This course discusses the principles of microbiology which include the history of the development of microbiology, classification of microorganisms (prokaryotic and eukaryotic), bacteria, fungi, protozoa, algae, viruses, metabolism of microorganisms, nutrition and cultivation of microorganisms, growth microorganisms, control of microorganisms, genetics of microorganisms, and the role of microorganisms in human life</td></tr>
<tr><td>Content</td><td>Courses
1. History and scope of microbiology
2. Microorganism identification methods
3. Characteristics of archaea
4. Characteristics of bacteria
5. Characteristics of the fungus
6. Characteristics of unicellular protozoa and algae
7. Characteristics of helminths, viruses and prions
8. Mid test
9. Growth and development factors of microorganisms
10. Nutritional Needs for Microorganisms
11. Microorganism growth control
12. Cell genetics of microorganisms
13. Genetic engineering and recombinant technologies in microorganisms
14. Pathogenic microorganisms and their impact on health
15. Utilization of microbiology for food processing of tropical agricultural products in the valley
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75</td></tr>
</table>

	75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Kathleen Park Talaro dan Barry Chess. 2018. Foundations in Microbiology 10th Edition 2. Pelczar, M.J., and Chan, E.C.S. 2013. Dasar-Dasar Mikrobiologi. Penerjemah Ratna Siri Hadioromo et al., Jakarta. Penerbit Universitas Indonesia (UI Press) 3. Madigan et al., 2015, Brock Biology of Microorganisms 14th edition, Pearson Education 4. Winiati P. Rahayu, C.C. Nurwitri. 2012. Mikrobiologi Pangan. IPB Press 5. Sopandi,T dan Wardah. 2014. Mikrobiologi Pangan. Penerbit. Andi Yogyakarta.

Course Learning Outcomes (CLO):

1.	The students are able to identification and control the knowledge : a. History of microbiology and knowing the benefits of microbiology in the field of agricultural product processing b. Differences in characteristics, as well as characterizing and identifying various microorganisms c. Principles of growth, metabolism, and genetics typical of microorganisms d. The harm caused by microorganisms to human health that spreads through agricultural products e. Benefits and applications of microorganisms for humans and their environment f. Basic techniques required in a microbiology laboratory

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		v						

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Physical Chemistry of Agricultural Products
Module level	Bachelor
Code	220303622W009
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	2
Person responsible for the module	Dra. Yuliani., MP
Lecture	1. Dra. Yuliani., MP 2. Agustu Sholeh Pujokaroni, S.TP., M.Sc., Ph.D
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry I

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the structure, function, and properties of foodstuffs/agricultural products, as well as their changes during processing and storage
2. The scope of the course includes the basics of thermodynamics, molecules, kinetics, properties of phases, surfaces, crystals, polymers, dispersions, colloids and emulsions</td></tr>
<tr><td>Content</td><td>Courses
1. Gas
2. Solution
3. Collaborative properties of solutions
4. Viscosity
5. Viscosity 2
6. Extraction techniques using solvents
7. Extraction techniques using solvents 2
8. Mid test
9. Chemical thermodynamics
10. Food emulsion system
11. Polymers and crystallization of food ingredients
12. Properties of food rheology
13. Properties of food rheology
14. Colloidal food system
15. Colloidal food system 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual/Group Project</td><td>25</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Bird,T .1988. Kimia Fisik untuk Universitas. Alih bahasa : Kwee Ie Tjien. PT Gramedia, Jakarta 2. Coupland, J.N. An Introduction to the Physical Chemistry of Food. Springer, Ner York. 3. Yazid, E .2005. Kimia Fisik untuk Paramedis. Penerbit Andi, Yogyakarta.

Course Learning Outcomes (CLO):

1.	The students are able to understand and explain the knowledge and have competence: 1. Cognitive: namely mastering the theory of physical chemistry that underlies the properties and reactions of various components of food/agricultural products. 2. Psychomotor: that is, having the ability to apply and apply based on these physical-chemical properties to food products/agricultural products 3. Affective: namely avoiding improper methods in handling foodstuffs/agricultural products

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	v							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Physics of Agricultural Products
Module level	Bachelor
Code	220303623W002
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	2
Person responsible for the module	Sofian, SP., M.Sc.
Lecture	1. Sofian, SP., M.Sc. 2. Panggulu Ahmad Ramadhani Utoro, S.TP., MT.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, Presentation, discussion, assignment
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the structure, function, and properties of foodstuffs/agricultural products, as well as their changes during processing and storage</td></tr>
<tr><td>Content</td><td>Courses
1. Introduction to Basic Physics
2. Mass and density
3. Fluid flow
4. Fluid Transport
5. Rheology
6. Quiz
7. Thermodynamics
8. Mid Test
9. Angular momentum, force and moment of inertia
10. Equilibrium (Elasticity, tension and strain)
11. Equilibrium (Elasticity, tension and strain) 2
12. Laws of static fluids
13. Laws of Dymaics fluids
14. Heat and Gas
15. Heat and Gas 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Project</td><td>15</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>15</td></tr>
<tr><td>6</td><td>Practical</td><td>Practical in Laboratory</td><td>20</td></tr>
<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50</td></tr>
</table>

	50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Philip Kristanto. 2020. Fisika Dasar (Teori, Soal, dan Penyelesaian) 2. Vivien F. Dkk. PDF. Fisika Dasar untuk ilmu pangan. 3. Abdullah,M.Fisika Dasar I, 2016. Buku elektronik 4. D. Halliday, R. Resnick, J. Walker. 2013. Fundamental of Physics, 10th Edition. Wiley. 5. D. C. Giancoli. 2010. Physics: Principles with Application, 6th Edition. Addison-Wesley. 6. Resnick, R & Halliday, D. 1966. Physics. John Wiley& Son. 7. Giancoli, D.C. 1884. General Physics. Prentice Hall

Course Learning Outcomes (CLO):

1.	The students are able to understand and explain the aknowledge of unit system mechanics, scalar/vector quantities, Newton's laws, equilibrium principles. Liquid properties of static liquid substances, liquid flowing substances, surface tension molecular phenomena. Heat and temperature thermodynamics, energy transformation, heat transformation, modern physics quantum theory, and nuclear radiation.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

SEMESTER 3

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural Statistics
Module level	Bachelor's Degree
Code	220303632W001
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	3
Person responsible for the module	Prof. Dr. oec. Troph. Ir. Krishna Purnawan candra, MS
Lecture	1. Prof. Dr. oec. Troph. Ir. Krishna Purnawan candra, MS 2. Dr. Miftakhur Rohmah, S.P., MP 3. Dr. Hadi Suprapto, S.P., MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment, problem-based learning, student center learning, practical
Workload	1. Lecture: 2 x 50 = 100 min/week 2. Exercises and Assignment: 2 x 60 = 120 min (2 h)/week 3. Independent study: 2 x 60 = 120 min (2 h)/week 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4,8 Etcs Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Mathematics</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to apply appropriate food/agricultural product analysis techniques and in accordance with objectives
2. Able to analyze data to handle the materials or the production process of humid tropical agricultural products in a sustainable manner</td></tr>
<tr><td>Content</td><td>Courses
1. Definition of statistics and their role in agriculture
2. Sampling method
3. Descriptive Statistics I
4. Descriptive Statistics II
5. Measure of Central Tendency I
6. Measure of Central Tendency II
7. Measure of Dispersion
8. Mid Test
9. Kurtosis
10. Hypothesis Testing I
11. Hypothesis Testing II
12. Comparative Analysis I
13. Comparative Analysis II
14. Comparative Analysis III
15. Correlation and Regression Analysis
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle Test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final Test</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/group project</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical in laboratory</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	-

Course Learning Outcomes (CLO):

1	Students are able to apply inferential statistical techniques, such as hypothesis testing and regression analysis, in solving research problems in the field of agricultural product technology.
2	Students are able to analyze data to handle the materials or the production process of agricultural product

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			v					
2						v		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Biochemistry of Agricultural Products
Module level	Bachelor's Degree
Code	220303632W005
Subtitle	English
Courses	3 (2-1)
Semester (s)	3
Person responsible for the module	Prof. Dr. Bernatal Saragih, S.P., M.Si
Lecture	1. Prof. Dr. Bernatal Saragih, S.P., M.Si 2. Sulistyo Prabowo, S.TP., MP., MPH., Ph.D 3. Maghfirotin Marta Banin, S.Pi., M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, problem-based learning, discussion, assignment, case study
Workload	1. Lectures= 2 x 50 = 100 min/week 2. Exercise and Assignment = 2 x 60 = 120 min/week 3. Independent study = 2 x 60 = 120 min/week 4. Practical = 1 x 170 = 170 min / week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Recommended prerequisites</td><td>Biology of Agricultural Products, Agricultural Products Chemistry I</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the structure, function, and properties of agricultural products, as their changes during processing and storage</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Agricultural Products Biochemistry
2. Biochemistry of Water I
3. Biochemistry of Water II
4. Biochemistry of Carbohydrate I
5. Biochemistry of Carbohydrate II
6. Biochemistry of Protein I
7. Biochemistry of Protein II
8. Mid Test
9. Biochemistry of Lipid I
10. Biochemistry of Lipid II
11. Biochemistry of Enzyme and Food Digestibility I
12. Biochemistry of Enzyme and Food Digestibility II
13. Metabolism of Carbohydrate
14. Metabolism of Lipid
15. Metabolism of Protein
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual, Group Assignment</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical in laboratory</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	-

Course Learning Outcomes (CLO):

1.	Students are able to explain the structure and function of biomolecules, photosynthesis and biosynthesis of simple molecules, and energy metabolism (carbohydrates, proteins, and lipids).

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	v							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Chemical Analysis of Agricultural Products
Module level	Bachelor's Degree
Code	220303632W009
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M.Si
Lecture	1. Dr. Aswita Emmawati, S.TP., M.Si 2. Dra. Yuliani, MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, student center learning, discussion, assignment, case study.
Workload	1. Lectures = 2 x 50 = 100 min/week 2. Exercises and Assignments = 2 x 60 = 120 min/week 3. Independent study = 2 x 60 = 120 min/week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry II, Analytical Chemistry for Agricultural Products Research

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to application the analysis technique of agricultural product</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Chemical Analysis
2. Principle of Moisture Content Analysis
3. Principle of Ash Content Analysis I
4. Principle of Ash Content Analysis II
5. Principle of Protein Content Analysis I
6. Principle of Protein Content Analysis II
7. Principle of Lipid Content Analysis
8.Mid Test
9. Principle of Qualitative Carbohydrate Analysis
10. Principle of Quantitative Carbohydrate Analysis
11. Principle of Quantitative Carbohydrate Analysis
12. Principle of Vitamin Content Analysis I
13. Principle of Vitamin Content Analysis II
14. Principle of Qualitative and Quantitative Food Additives Analysis
15. Principle of Anti-nutritive Compounds Analysis
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50</td></tr>
</table>

	50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Analisis Pangan. Nuri Andarwulan et al. 2. Analisis Bahan Hasil Pertanian. Slamet Sudarmadji 3. Analisis Pangan, Anton Apriyantono et al. 4. Apriantono,A., dkk. 1989.Analisis Pangan. IPB Press bekerjasama dengan PAU Pangan dan Gizi- IPB, Bogor. 5. Abdul Rohman dan Sumantri. 2007. Analisis Makanan. Gadjah Mada University Press, Yogyakarta. 6. Andarwulan, N., dkk. 2011. Analisis Pangan. Penerbit Dian Rakyat, Jakarta. 7. Girindra, A. 1986. Biokimia I. PT.Gramedia, Jakarta. 8. Sudarmadji, S., dkk. 1997. Prosedur Analisa untuk Bahan Makanan dan Pertanian, edisi ke empat. Liberty, Yogyakarta.

Course Learning Outcomes (CLO)

1.	Students are able to understand the meaning of analysis, the classification of food material, the purpose of analysis, and the procedures of agricultural product analysis.
2.	Students are able to determine the general method of storing samples for chemical and physical analysis.
3.	Students are able to determine and apply the proximate analysis of vitamins, minerals, anti-nutrients, and food additives.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					
2			V					
3			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Economics Engineering
Module level	Bachelor's Degree
Code	190303602W022
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Dr. Sukmiyati Agustin, S.TP., M.Si.
Lecture	1. Dr. Sukmiyati Agustin, S.TP., M.Si. 2. Panggulu Ahmad Ramadhani Utoro, S.TP., MT.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecturer, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week. 3. Independent study: 2 x 60 = 120 min/week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ECTS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Mathematics

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to design the handling of materials and production of humid tropics agricultural products in a sustainable manner
2. Able to analyze data to design the handling of materials and production of humid tropics agricultural products in a sustainable manner</td></tr>
<tr><td>Content</td><td>Courses
1. Cash Flow
2. The Concept of the time value of money
3. Equity Value
4. Annual Value
5. Internal Rate of Return (IRR)
6. Method of payback period
7. Profitability Index
8. Mid Test
9. Benefit Cost Ratio (BCR)
10. Sensitivity Analysis
11. Depreciation
12. Inflation and Deflation
13. Tax Analysis
14. Defender and Challenger in Replacement Analysis
15. Group Assignment
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Giatman, M. 2011. Ekonomi Teknik. Jakarta : PT. RajaGrafindo Persada. 2. Pujawan, I.N. 2009. Ekonomi Teknik. Guna Widya. Surabaya. 3. Newnan, D.G., Eschenbach, T.G., Lavelle, J.P. 2004. Engineering Economic Analysis. 4th Edition. Oxford. New York. 4. Thuesen, GJ, Fabrycky, WJ. 2002. Engineering Economy, 9th Edition Prentice Hall Inc. New Jersey.

Course Learning Outcomes (CLO):

1	Students are able to design the handling of materials and production of humid tropics agricultural products in a sustainable manner
2	Students are able to analyze data to design the handling of materials and production of humid tropics agricultural products in a sustainable manner

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1					v			
2						v		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Microbiology of Agricultural Product Processing
Module level	Bachelor's Degree
Code	220303632W002
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M.Si
Lecture	1. Dr. Aswita Emmawati, S.TP., M.Si 2. Marwati, S.TP., MP 3. Maghfirotin Marta Banin, S.Pi., M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecturer, student center learning, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week. 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Microbiology of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to control of physical, chemical, biological, and microbiological hazards in the food/agricultural product processing chain to control the quality and safety in accordance with regulations
2. Able to determine the method of storage, processing, preservation, and packaging of food/agricultural products</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Microorganism on Agricultural Products
2. Microbial Growth on Agricultural Products I
3. Microbial Growth on Agricultural Products II
4. Microbiological Hazard in Agricultural Products I
5. Microbiological Hazard in Agricultural Products II
6. The Effect of Food Processing on Microorganism I
7. The Effect of Food Processing on Microorganism I
8. Mid Test
9. Foodborne Diseases
10. Foodborne Illness I
11. Foodborne Illness II
12. Food Fermentation
13. Probiotic and Prebiotic
14. Microbial Analysis on Food Industry I
15. Microbial Analysis on Food Industry I
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Fundamentals of Food Microbiology, 4th Edition, Bibek Ray 2. Modern Food Microbiology, 6th Edition. James Jay 3. Food Microbiology, 2nd Edition. Adam and Moss 4. Mikrobiologi Pangan, Winiati P. Rahayu et al. 5. Mikroorganisme dan Pemanfaatannya, Nur Hidayat et al.

Course Learning Outcomes (CLO):

1.	Students are able to control of physical, chemical, biological, and microbiological hazards in the food/agricultural product processing chain to control the quality and safety in accordance with regulations
2	Students are able to determine the method of storage, processing, preservation, and packaging of food/agricultural products

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		v						
2				v				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Operation Unit
Module level	Bachelor's Degree
Code	220303632W003
Subtitle	English
Courses	3 (2-1)
Semester (s)	3
Person responsible for the module	Anton Rahmadi, S.TP., M.Sc., Ph.D
Lecture	1. Anton Rahmadi, S.TP., M.Sc., Ph.D 2. Agustu Sholeh Pujokaroni., S.TP., M.Sc., Ph.D 3. Panggulu Ahmad Ramadhani Utoto, S.TP., MT
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecturer, discussion, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week. 3. Independent study: 2 x 60 = 120 min/week 4. Practical: 1 x 170 = 170 min/week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4,8 ETCS Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Physics of Agricultural Products and Mathematics</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to apply food/agricultural product analysis technique
2. Able to analyze data to design the handling of materials and production process of humid tropic agricultural products</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Operation Unit on Agricultural Products Technology
2. Basic Concepts of Mass Equilibrium
3. Basic Concepts of Energy Equilibrium
4. Fluid Flow
5. Fluid Transport
6. Heat Transfer I
7. Heat Transfer II
8. Mid Test
9. Operation of the drying process
10. Operation of the evaporation process
11. Principle of Separation (Sedimentation)
12. Principle of Separation (Filtration)
13. Balance Theory
14. Size Reduction on Agricultural Products Industry
15. Principle of Mixing
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Assignment</td><td>Individual, Group Discussion</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical in laboratory</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60
Media employed	Class Meeting
Reading list	-

Course Learning Outcomes (CLO):

1	Students are able to apply food/agricultural product analysis technique
2	Students are able to analyze data to design the handling of materials and production process of humid tropic agricultural products

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					
2						V		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Physical Properties of Agricultural Products
Module level	Bachelor's Degree
Code	220303632W007
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Anton Rahmadi, S.TP., M.Sc., Ph.D
Lecture	1. Anton Rahmadi, S.TP., M.Sc., Ph.D 2. Dr. Sukmiyati Agustin 3. Nur Amaliah, S.TP., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecturer, Discussion, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week. 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Physics of Agricultural Products

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to explain the structure, function, and properties of food/agricultural products, and their changes during processing and storage</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Agricultural Products Physical Properties I
2. Basic Knowledge of Agricultural Products Physical Properties II
3. Physical Properties of food and freshener
4. Physical Properties of food and freshener
5. Physical Properties of cereal and legume
6. Physical Properties of Fruit and Vegetables
7. Physical Properties of Tuber and Spices
8. Mid Test
9. Physical Properties of Oil and Lipid I
10. Physical Properties of Oil and Lipid II
11. Physical Properties of Oil and Lipid III
12. Physical Properties of Livestock Products
13. Physical Properties of Poultry Products
14. Physical Properties of Dairy Products
15. Physical Properties of Aquatic Products
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50</td></tr>
</table>

	50 ≤ Passing Grade < 60
Media employed	Class Meeting
Reading list	1. Suharto, 1991. Teknologi Pengawetan Pangan. PT. Rineka Cipta: Jakarta. 2. Anonim. 2002. Fisiologi Lepas Panen Produk Hortikultura. Bogor: M-Brio Press 3. Badan Standarisasi Nasional Indonesia, SNI No. 3141.1:2011. Susu Segar, No. 3926:2008 Telur Ayam Konsumsi, No. 3924:2008 Mutu Karkas Daging Ayam, No. 3932:2008 Mutu Karkas Daging Sapi. 4. Buckle, K.A., Edwardrs, R.A., Fleet, G.H., dan Wooton, M. 1985. Ilmu Pangan. Universitas Indonesia Press : Jakarta. 5. Fisiologi Pasca Panen dan Pemanfaatan Buah-buahan dan Sayuran-sayuran Tropika dan Subtropika, Gadjah Mada University Press: Jogjakarta. 6. Lawrie, R. A. 2003. Ilmu Daging. Terjemahan Parakkasi, A. Edisi Ke-5. Universitas Indonesia, Jakarta. 7. Malaka, R. 2010. Pengantar Teknologi Susu. Masagena Press: Makassar 8. Pantastico, 1989. Fisiologi Pasca Panen dan Pemanfaatan Buah-buahan dan Sayuran-sayuran Tropika dan Subtropika. Gadjah Mada University Press: Jogjakarta. 9. Tien R..,Sugiyono, Fitriyono Ayustaningwarno, Ilmu Pengetahuan Bahan Pangan.: Alfabeta. 10. Soeparno, 2005. Ilmu Dan Teknologi Daging. Gadjah Mada University Press. Yogyakarta. 11. Winarno, 2004. Kimia Pangan dan Gizi, Penerbit PT Gramedia, Jakarta. 12. Gordon and Breach. 2006. Physical Properties of plant and Animal Materials Science. Publisher Inc.: New York.

Course Learning Outcomes (CLO):

1.	Students are able to explain thermodynamics, molecules, kinetics, phase properties, surfaces, crystals, polymers, dispersions, colloids, and emulsions.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Processing Tools and Machines
Module level	Bachelor's Program
Code	220303632W006
Subtitle	English
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Anton Rahmadi, S.TP., M.Sc., Ph.D
Lecture	1. Anton Rahmadi, S.TP., M.Sc., Ph.D 2. Dr. Sukmiyati Agustin, S.TP., M.Si. 3. Panggulu Ahmad Ramadhani Utoro, S.TP., MT.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, Presentation, Discussion, and Assignment
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3 ECTS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Physics of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to design the handling of materials and production process of humid tropics agricultural products in a sustainable
2. Able to analyze data to design solutions in the handling of materials or the production process of humid tropics agricultural products in a sustainable</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Processing Tools and Machine
2. Material handling equipment
3. Internal Combustion Engines, Steam Boiler, Power Transmission, Burner, Electric Motor
4. Size Reduction Tools and Machine
5. Dry and Wet Mixer/Blender, Centrifuge, Filter
6. Dryer, Cooler, Freezer
7. Fermentor, Packer, Wrapper
8. Mid Test
9. Rice Mill Machine and Tools in Industry
10. Oil and Lipid Machines and Tools in Industry
11. Starch and Sugar Machine and Tools in Industry
12. Freshener Technology in Industry
13. Beverage Machines and Tools in the Industry
14. Machine and Tools in the Bakery Products Industry
15. Machine and Tools in the Fermented Product Industry
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	-

Course Learning Outcomes (CLO):

1.	Students are able to design the application of processing tools and machines in various agricultural products industries.
2.	Students are Able to analyze data to design solutions in the application of processing tools and machines in various agricultural products industries.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1					V			
2						V		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Quality Control
Module level	Bachelor's Degree
Code	220303632W008
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	3
Person responsible for the module	Prof. Dr. Bernatal Saragih, S.P., M.Si
Lecture	1. Prof. Dr. Bernatal Saragih, S.P., M.Si 2. Nur Amaliah, S.TP., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment, problem-based learning, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Biology of Agricultural Products, Agricultural Products Chemistry I and Physics of Agricultural Products

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to control physical, chemical, biological, and microbiological hazards on food/agricultural product to assurance the quality and safety in accordance with regulations
2. Able to demonstrate independent performance and organize a team to produce work in the field of food/agricultural products whose usefulness is recognized</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Quality Control
2. The Quality Control Cycle
3. Step Cycle in Quality Control
4. Factors Affecting the Quality Control
5. Sampling Procedures
6. Quality Assurance based on GHP and GMP
7. Case Study (GMP)
8. Mid Test
9. Quality Control
10. The relation of quality-process-control
11. Quality Standards I
12. Quality Standards II
13. 7 Quality Control Tools (7 tools)
14. 8 Steps Quality Improvement
15. Case Study (Food Eligibility)
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Adam MR and Moss MO 1995 Food Microbiology The Royal Society of Chemistry UK Cambridge (Chapter 10-11) 2. Badan Pengawasan Obat dan Makanan. 2020. Pedoman Produksi dan Distribusi Pangan Olahan Pada Masa Status Darurat Kesehatan Coronavirus Disiase 2019 (Covid-19) Di Indonesia. BPOM RI. 3. DSN [Dewan Standarisasi Nasional] 1992 SNI 19-9000-1991 Manajemen Mutu DSN Jakarta 4. DSN [Dewan Standarisasi Nasional] 1991 SNI 19-8402-1991 Mutu-Kosa Kata DSN Jakarta 5. DSN [Dewan Standarisasi Nasional] 1992 SNI 19-9004-1992 Unsur-unsur Mutu Manajemen Mutu dan Sistem Mutu Pedoman DSN Jakarta (hal 5-11 dari 32) 6. DSN [Dewan Standarisasi Nasional] 1992 SNI 19-9001,9002, 9003 dan 9004 -1992 Unsur-unsur Mutu Manajemen Mutu dan Sistem Mutu Pedoman DSN Jakarta 7. Hubbard, M.R., 1990, Statistical Quality Control For The Food Industry, Van Nostrand Reinhold, New York. 8. Jay MJ 1996 Modern Food Microbiology Fifth edition Chapman and Hall New York (Part 4) 9. Kolarik, W.J., 1999, Creating Quality : Process, Design for Result, Mc. Graw Hill, New York. Oackland, J.S. and R.F. Followell, 1990, Statistical Process Control : A Practical Guide, Butterworth Heinnemenn, London. 10. Saragih, B. 2010. Sistem Jaminan Mutu Terpadu Pada Penanganan Hasil Pertanian. Makalah pada Pelatihan. SL-PPHP UPTB Balai Pelatihan Pertanian. Kalimantan Timur. Samarinda. 11. Soekarto ST 1989 Pengujian Organoleptik, Bhrata Karya Jakarta 12. Sudarmadji, S, Bambang, H dan Suhardi, 2003, Analisa Bahan Makanan dan Pertanian, Yogyakarta : Liberty 13. Tobing, Bortiandy. 2018. Buku Panduang Seven Basic Tools & 8 Langkah Perbaikan. PT. Medan Sugar Industri. 14. World Health Organization dan Food and Agriculture Organization Perserikatan Bangsa-Bangsa, 2020. COVID-

	19 dan Keamanan Pangan: Panduan untuk otoritas yang berwenang atas sistem pengawasan keamanan pangan nasional: Panduan Interim

Course Learning Outcomes (CLO):

1.	Students are able to identify and control the quality in the food/agricultural product processing to ensure the quality and safety in accordance with regulation
2	Students are able to demonstrate independent performance and organize a team to produce work in the field of food/agricultural products whose usefulness is recognized

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						
2							V	

SEMESTER 4

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Experimental Design
Module level	Bachelor
Code	220303642W002
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	4
Person responsible for the module	Prof. Dr.oec.troph. Ir. Krishna P. Candra., MS
Lecture	1. Prof. Dr.oec.troph. Ir. Krishna P. Candra., MS 2. Anton Rahmadi,S.TP., M.Sc., Ph.D 3. Dr. Miftakhur Rohmah, S.P., MP (Praktikum) 4. Agustu Sholeh P., S.TP., M. Sc., Ph.D (Practice)
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, student-centered learning, problem-based learning, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. 4. Practical The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Agricultural Statistics</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Definition and scope of experiments, basic elements of experiments (experimental units, treatment, and experimental error), basic assumptions of an experiment (replications and their functions, factors that influence the number of repetitions) and control. Scientific research, research procedures, experimental determination (single and factorial experiments). Classification of Experimental Designs (RAL, RAK, RBSL, RPT) and analysis (analysis of variance).
2. The assumptions underlying the analysis of variance (data are normally distributed and have the same variance). Transformation of data into a normal distribution (Successive Interval Method). Analysis of data that does not meet the assumptions of analysis of variance (non-parameter statistics). Double comparison</td></tr>
<tr><td>Content</td><td>Courses
1. Basic principles of experimental design
2. Complete Random Design (RAL) variety analysis
3. Analysis of the variety of Group Random Design (RAK)
4. Analysis of the Latin Square Design (RBSL) variety
5. BNT Test
6. BNJ Test
7. Duncan test and data transformation
8. Mid test
9. Introduction to the importance of data to be lost/eliminated
10. Factorial (2-factor) experiment on RAL and RAK
11. Factorial experiments with controls on RAL and RAK
12. Factorial (3-factor) experiment on RAL and RAK
13. Basic principles of divided parcel design (RPT)
14. Data analysis with RPT model
15. Contrast and polynomial orthogonal analysis and principles of use of correlation regression analysis
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
</table></td></tr>
</table>

	4	Practicum	Individual, Group Project	30
	5	Assignment	Individual, Group Discussion	15
	6	Affective	Participation	10

A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40

Media emplyode	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1	The students are able to understand and explain the advanced knowledge of the definition and scope of experiments, basic elements of experiments (experimental units, treatments, and experimental errors), basic assumptions of an experiment (repeats and their functions, factors affecting the number of repeats), and their control. Research scientificity, research procedures, and determination of experiments (single and factorial).
2	The students are able to analyze the classification of Experimental Designs (RAL, RAK, RBSL, RPT) and their analysis (variety analysis). The assumptions underlying the variety analysis (data are normally distributed and have the same variety). Data transformation to be normally distributed (Successive Interval Method). Data analysis that does not meet the assumption of variety analysis (Non-parametric statistics). Double comparison.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1.			v					
2.						v		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Food Nutrition
Module level	Bachelor
Code	220303642W006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	4
Person responsible for the module	Prof. Dr. Bernatal Saragih., S.P., M.Si.
Lecture	1. Prof. Dr. Bernatal Saragih., S.P., M.Si. 2. Sulistyo Prabowo, S.TP., MP., MPH., Ph.D
Language	Bahasa Indonesia
Relation to curriculum	Compulsory/~~elective~~
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	Biochemistry of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Introduction to nutrition, nutrients, the relationship between nutrition and food, agriculture, health and growth and development. Digestion and absorption, nutrient metabolism. Function, adequacy and consequences of vitamin and mineral deficiencies for the body. Nutritional problems, nutritional interactions, nutritional status assessment and review of nutritional improvement programs
2. Introduction to nutrition, nutrients, the relationship between nutrition and food, agriculture, health and growth and development. Digestion and absorption, metabolism of nutrients. Function, adequacy and consequences of vitamin and mineral deficiency for the body. Nutrition issues, nutritional interactions, nutritional status assessments and reviews of nutrition improvement programs</td></tr>
<tr><td>Content</td><td>Courses
1. Nutrition in food
2. Types and functions of nutrients in the body
3. Nutrient metabolism
4. Factors that affect nutritional value and how it is evaluated
5. Assessment of food consumption
6. Eating habits
7. Nutrient needs
8. Mid Test
9. Nutrition improvement program
10. Nutrient adequacy
11. Assessment of nutritional status
12. Malnutrition
13. Fortification and anti-nutrition
14. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Muchtadi, Tien R.2010. Teknologi Proses Pengolahan Pangan. Alfabeta. Bandung 2. Estiasih, Teti dan Ahmadi.2009. Teknologi Pengolahan Pangan.Bumi Aksara. Jakarta 3. Sobari, Enceng dan Tim Agrotek Uin 13.2019. Dasar-Dasar Proses Pengolahan Bahan Pangan

Course Learning Outcomes (CLO):

1	The students are able to understand and explain the advanced knowledge of nutrition, nutrients, the relationship between nutrition and food, agriculture, health, and growth and development. Digestion and absorption, metabolism of nutrients. Function, adequacy and consequences of vitamin and mineral deficiency for the body. Nutrition issues, nutritional interactions, nutritional status assessments and reviews of nutrition improvement programs

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Food Regulation
Module level	Bachelor's Degree
Code	190303602W004
Subtitle	English
Courses	2 (2-0)
Semester (s)	4
Person responsible for the module	Prof. Dr. Bernatal Saragih, S.P., M.Si.
Lecture	1. Prof. Dr. Bernatal Saragih, S.P., M.Si. 2. Sulistyo Prabowo, S.TP., M.P., MPH., Ph.D.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, Discussion, Assignment., case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	-

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to control physical, chemical, biological, and microbiological hazards to ensure the quality and safety of agricultural products under regulations</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Food Regulation in Indonesia
2. Food Legislation
3. Government and Minister Authority on Food Regulation
4. International Food Regulation
5. UU No. 18/2012 on Food
6. UU No. 18/2012 on Food
7. Regulation on Food Safety, Quality, and Nutrition
8. Mid Test
9. Food Safety Regulation I
10. Food Safety Regulation II
11. Food Safety Regulation III
12. UU No. 8/1999 on Consumer Protection
13. UU No. 33/2014 on Halal Assurance Products
14. Regulation on Food Information System
15. Regulation on Food Label and Advertisement
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>0</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60</td></tr>
</table>

	E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Codex Alimentarius - Food Labelling - Complete Texts - Revised 2001. Diakses pada http://www.fao.org/3/Y2770E/y2770e08.htm#bm08 2. UU RI No. 18/2012 tentang Pangan. 3. Jaringan Dokumentasi dan Informasi Hukum Badan Pengawas Obat dan Makanan RI.

Course Learning Outcomes (CLO):

1	Students are able to apply the food regulation (food security, food safety, quality control management, food labeling, halal food production, food additives, food contaminants),
2	Students are able to apply the food regulation, the mechanism for formulating national regulations, and the introduction of the the Codex Alimentarius Commission.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V	V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Post-harvest Physiology and Technology
Module level	Bachelor
Code	220303642W008
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	4
Person responsible for the module	Hj. Maulida Rachmawati, SP., MP
Lecture	1. Hj. Maulida Rachmawati, SP., MP. 2. Marwati, S.TP., MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	Physical Properties of Agricultural Products; Biochemistry of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. The scope of this course includes understanding post-harvest physiology and technology, metabolism in agricultural products, respiration patterns (climacteric and non-climacteric), senescence, ethylene, physical and chemical changes on ripening, harvest index, post-harvest pathology and handling. Effects of temperature, RH, and gas composition on physiological, biochemical, quality and freshness of agricultural products
2. Definition, scope and objectives of post-harvest physiology and technology, climacteric processes and senescence in horticultural products, post-harvest index and harvesting of horticultural products, definition of quality (quality) of horticultural products, characteristics of horticultural plants as the basis for the application of post-harvest handling, and the application of post-harvest technology</td></tr>
<tr><td>Content</td><td>Courses
1. Definition of post-harvest physiology and technology
2. Definition of climacteric and non-climacteric
3. Definition of senescene
4. Determination of harvest index and how to harvest horticultural products
5. Index and method of harvesting fruits, vegetables, tubers, legumes, grains
6. Quality and quality components
7. Post-harvest in Indonesia and other countries
8. Mid test
9. Anatomical properties and characteristics of fruits and vegetables
10. Basic principles of post-harvest horticultural products
11. Changes in post-harvest physiology of fruits and vegetables
12. Post-harvest handling of horticultural products (1)
13. Post-harvest handling of horticultural products (1)
14. Post-harvest technology for horticultural products
15. Alternative post-harvest handling technology
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>0</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
</table></td></tr>
</table>

	<table><tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr><tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr><tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr></table> A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Buku 1 : .Muchtadi, D. 1992. Fisiologi Pasca Panen Sayuran dan Buah-buahan. IPB. 2. Buku 2 : Pantastico,ER.B.1986.Fisiologi Pasca Panen. UGM Press. 3. Buku 3 : Tien R.M. dan Sugiyono. 1989. Ilmu Pengetahuan Bahan Pangan. IPB. 4. Buku 4 : . Kartasapoetra,A.G.1989.Teknologi Penanganan Pasca Panen. Bina Aksara. 5. Buku 5 : Winarno, F.G dan Aman , M. 1981. Fisiologi Lepas Panen. Sastra Hud 6. Buku 5 : Winarno, F.G dan Aman , M. 1981. Fisiologi Lepas Panen. Sastra Hud 7. Buku 6 : Kader, A.A. 1992. Postharvest Technology of Horticultural Crops. Publ. 3311. Univ.of California 8. Buku 7 : Wuryani. Sri 2008; Perubahan Kimia dan Fisiologi Pascapanen sayuran dan buah-buahan. Wimaya 9. Press UPN “Veteran” Yogyakarta 10. Pendukung : Jurnal ilmiah dan artikel terkait terbaru

Course Learning Outcomes (CLO):

1	The students are able to understand and explain the advanced knowledge of the physiology of agricultural products and
2	The students are able to apply post-harvest technology to horticultural products in case studies.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V	V						

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Food Process Technology
Module level	Bachelor's Degree
Code	220303642W009
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	4
Person responsible for the module	Prof. Dr. oec.troph. Ir. Krishna Purnawan Candra, M.S.
Lecture	1. Prof. Dr. oec.troph. Ir. Krishna Purnawan Candra, M.S. 2. Hj. Maulida Rachmawati, SP., MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, Discussion, Assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	Operation Unit Processing Tools and Machines

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to determine the method of storage, processing, preservation, and packaging of food/agricultural product</td></tr>
<tr><td>Content</td><td>Courses
1. Basic Knowledge of Process Technology
2. The Concept of Material Transfer and Fluid Flow
3. Heat transfer and Water activity I
4. Heat transfer and Water activity II
5. Heat transfer and Water activity III
6. Effect of Process on Food Sensorys Characteristic
7. Effect of Process on Food Nutrition
8. Mid Test
9. Thermal and Non Thermal Process
10. Blanching and Sterilization
11. Pasteurization
12. Drying
13. Refrigerating and Freezing
14. Extraction and Crystalization
15. Ferementation and chemicals food processing
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>0</td></tr>
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<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60</td></tr>
</table>

	E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. Muchtadi, Tien R.2010. Teknologi Proses Pengolahan Pangan. Alfabeta. Bandung 2. Estiasih, Teti dan Ahmadi.2009. Teknologi Pengolahan Pangan.Bumi Aksara. Jakarta 3. Sobari, Enceng dan Tim Agrotek Uin 13.2019. Dasar-Dasar Proses Pengolahan Bahan Pangan

Course Learning Outcomes (CLO):

1	Students are able to apply their knowledge of physical processing, which includes thermal processes (blanching, sterilization, pasteurization, drying, refrigerating and freezing, extraction, and crystallization) and non-thermal processes (chemical processing and fermentation).

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Research Methodology
Module level	Bachelor
Code	220303642W001
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	4
Person responsible for the module	Dr. Miftakhur Rohmah, S.P., MP
Lecture	1. Dr. Miftakhur Rohmah, S.P., MP 2. Agustu Sholeh Pujokaroni., S.TP., M. Sc., Ph.D 3. Panggulu Ahmad Ramadhani Utoro, S.TP., MT.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, student center learning, problem-based learning, case study.
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	Indonesia languange

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Learn how to conduct scientific research including making research proposals, carrying out research and preparing research results reports. Apart from that, it discusses the research process in general, starting from problem determination, literature review, citation techniques, use of library management programs (Mendeley), identification of experimental research variables, observation and data collection, interpretation of experimental analysis results, and procedures for writing scientific papers (thesis and scientific publications and seminar procedures).</td></tr>
<tr><td>Content</td><td>Courses
1. Research overview
2. Identify broad problem areas, initial data collection, and problem definitions
3. Research variables, theoretical framework and hypothesis formulation
4. Scientific research design
5. Measurement and variable operational processes
6. Research proposal (Chapter I-III)
7. Research proposal (Chapter I-III)
8. Mid test
9. Measurement scale
10. Validity and rehabilitation of measuring instruments
11. Data collection methods
12. Data analysis and data interpretation
13. Thesis (Chapters I -V)
14. Thesis (Chapters I -V)
15. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>4</td><td>Practicum</td><td>Individual, Group Project</td><td>30</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>15</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
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	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1	The students are able to understand and explain the advanced knowledge of scientific research includes making research proposals, conducting research and making research reports. In addition, it discusses the research process in general, starting from problem determination, literature review, citation techniques, the use of library management programs (Mendeley), identification of experimental research variables, observation and data collection, interpretation of experimental analysis results, and procedures for writing scientific papers (theses and scientific publications and seminar procedures).

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Sanitation and Safety in the Food Processing Industry
Module level	Bachelor's Degree
Code	220303642W003
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	4
Person responsible for the module	Sulistyo Prabowo, S.TP.,M.P., MPH., Ph.D.
Lecture	1. Sulistyo Prabowo, S.TP.,M.P., MPH., Ph.D. 2. Marwati, S.TP., M.P.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, Discussion, Case Study, Assignment
Workload	1. Lectures: 2 x 50 = 100 min/week 2. Exercises and Assignments: 2 x 60 = 120 min/week 3. Independent study: 2 x 60 = 120 min/week. The number of meetings per semester is 16 meetings (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)
Recommended prerequisites	Microbiology of Agricultural Product

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to control physical, chemical, biological, and microbiological hazards on food/agricultural product to ensure the quality and safety of agricultural product in accordance with regulations</td></tr>
<tr><td>Content</td><td>Courses
1. Basics Knowledge of Sanitation and Food Safety
2. Regulation on Hygine and Sanitation
3. Microbiology Contamination
4. Chemical and Pyhsics Contamination
5. Basics technique of Sanitation
6. Personal Hygine
7. Hygine and Sanitation of Food Process Facilities
8. Mid Test
9. Plant Layout and Design
10. Clean in Place and Desinfection
11. Sanitation Indicator
12. Clean Water Supply
13. Waste Management
14. Princple of Health, Safety, and Environment
15. ISO, GMP, HACCP, and Halal Assurance
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>0</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>4</td><td>Project</td><td>Individual, Group Project</td><td>25</td></tr>
<tr><td>5</td><td>Assignment</td><td>Individual, Group Discussion</td><td>25</td></tr>
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B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60</td></tr>
</table>

	E : 0 ≤ Passing Grade < 40
Media employed	Class Meeting
Reading list	1. BPOM. (2002). Panduan pengolahan pangan yang baik bagi industri rumah tangga. BPOM Jakarta 2. CSIRO. (2010). Make it safe: a guide to food safety. CSIRO Publishing. Australia 3. Kemenkes RI (2003). Permenkes 715/Menkes/SK/V/2003 tentang persyaratan hygiene sanitasi jasa boga. 4. Lelieveld, H.L.M., Mostert, M.A. Holah, J., White, B.. (2015). Hygiene in Food Processing. CRC Press-Woodhead Publ. Ltd. England 5. Marriott, N.G. dan Gravani, R.B. (2006). Principles of Food Sanitation. 5th ed. Springer. USA 6. UU RI No. 18/2012 tentang Pangan.

Course Learning Outcomes (CLO):

1	Students are able to understand the concept of sanitation and food safety. Students have competencies (1) cognitive: understanding and implementing the concepts of sanitation; (2) psychomotor: implementing sanitation to the business unit or final project; (3) affective: implementing Good Manufacturing Practices in the Food Industry.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						

SEMESTER 5

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural Industrial Waste Handling and Management Technology
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Hj. Maulida Rachmawati, SP., MP
Lecture	1. Hj. Maulida Rachmawati, SP., MP 2. Marwati, S.TP., MP 3. Agustu Sholeh Pujokaroni., S.TP., M.Sc., Ph.D
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, student center learning, case study, problem based learning.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details: 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80 % (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Physics of Agricultural Products, Microbiology of Agricultural Products, Chemical Analysis of Agricultural Products, Biochemistry of Agricultural Products</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. This course covers the definition, regulations, targets, classification and types of waste processing (physical, chemical and biological). Continued technological design for waste management (liquid, solid and gas) as well as hazardous waste destruction processes; recycling technology includes removal of nutrients from waste, energy production from liquid, solid and gas waste as well as management along with examples of waste handling in processed products</td></tr>
<tr><td>Content</td><td>Courses
1. Definition, scope and objectives of waste utilization and treatment
2. Types of waste
3. Waste management of the food industry, hospitals, mines, and households
4. Utilization and treatment of solid and liquid waste
5. Utilization and treatment of waste gas
6. Waste recycling and its utilization
7. Waste bank
8. Mid Test
9. Agricultural waste management
10. Agricultural waste utilization and management technology
11. Production patterns in agricultural waste
12. Utilization and treatment of CPO (palm oil) industrial waste
13. Technology for the utilization and treatment of industrial waste CPO (palm oil)
14. Utilization and treatment of agricultural and livestock waste
15. Utilization and treatment of fishery waste
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 7 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual/group project</td><td>30</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
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	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employee	Class meeting
Reading list	1. Sri Suhartini dam Irnia Nurika.2018. Teknologi Pengolahan Limbah Agroindustri. UB Press. 2. Nusa Idaman Said.2018. Teknologi Pengolahan Air Limbah, teori dan aplikasi. Gramedia 3. Tri Ida Wahyu Kustyorini. 2018. Teknologi Pengolahan Pakan Ternak. 4. Betty Sri Laksmi Jenie dan Winiati Pudji Rahayu. Penanganan Limbah Industri Pangan 5. Cecep Dani Sucipto.2012. Teknologi Pengolahan Daur Ulang Sampah. Gosyen Publishing 6. Arif Sabdo Yuwono dan Yoga Armando. Pengolahan dan Pemanfaatan Limbah Pertanian.kmtb.biotrop.org.

Course Learning Outcomes (CLO):

1	The students are able to identify types of waste, waste and its processing, waste recycling and its utilization, agricultural waste management, application of production patterns in agricultural product waste, waste utilization and management in the CPO (palm oil) industry, utilization and management of livestock and fishery product waste, and applying waste utilization technology that is by the humid tropical forest climate and also the era of the industrial revolution 4.0 based on data literacy, technology and humanities.
2	The students are able to determine types of waste, waste and its processing, waste recycling and its utilization

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						
2			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Agricultural Product Preservation and Packaging Technology
Module level	Bachelor Program
Code	220303652W002
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Dr. Miftakhur Rohmah, S.P., MP
Lecture	1. Dr. Miftakhur Rohmah, S.P., MP 2. Marwati, S.TP., MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, project-based learning, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry, Physical Chemistry of Agricultural Products

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. The scope of the course includes the benefits and dangers of using food additives (BTP), regulations governing the use of BTP and various types of BTP along with their functions and toxicology.
2. Discussion about the preservation of foodstuffs which includes drying, smoking, canning, providing chemical additives, heating, cooling and fermentation. Introduction to the role of food packaging functions and their development from natural, traditional to cutting-edge packaging. Knowledge of types, characteristics, various packaging materials (glass, metal, wood, paper, cardboard, plastic, anti-vibration materials, traditional packaging materials, edible coating). Food labeling requirements, smart packaging.</td></tr>
<tr><td>Content</td><td>Courses
1. Packaging, storage and warehousing of foodstuffs / agricultural products
2. Food damage and its control
3. Packaging and storage
4. Use of packaging materials
5. Food packaging techniques
6. Shelf life of food products
7. Methods of determining shelf life
8. Mid test
9. Principles and techniques for handling agricultural products
10. Process parameters for quality
11. Storage of food products
12. Safety parameters and shelf life
13. Factors influencing damage during storage (1)
14. Factors influencing damage during storage (2)
15. Integrated control of the cause of damage during storage
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>4</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>5</td><td>Project</td><td>Individual/group assignment</td><td>25</td></tr>
<tr><td>6</td><td>Case study</td><td>Individual/group assignment</td><td>25</td></tr>
</table></td></tr>
</table>

	4 | Affective | Participation | 10 A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1.	The students are able to determine and explain the advanced knowledge about the preservation of foodstuffs, which includes drying, fumigation, canning, application of chemical additives, heating, cooling, and fermentation. They will also be introduced to the role of food packaging functions and their development from natural and traditional to cutting-edge packaging. They will also be familiar with the types, characteristics, and various packaging materials (glass, metal, wood, paper, cardboard, plastic, anti-vibration materials, traditional packaging materials, and edible coating). They will also learn about food labeling requirements and innovative packaging.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Entrepreneurship
Module level	Bachelor Program
Code	220303652W003
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Dr. Miftakhur Rohmah, S.P., MP
Lecture	1. Dr. Miftakhur Rohmah, S.P., MP 2. Nur Amaliah, S.TP., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, presentation, assignment, case study, student center learning, problem-based learning.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details: 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimal attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Entrepreneurial insight, fostering a technopreneur-ship spirit, strategies, and challenges. Establishment and industrial management tips. Standardization and certification of agricultural industrial products.
2. The material provided in this course includes the understanding, benefits and functions of entrepreneurship, principles and motivation as well as conditions for entrepreneurship, strategies for capturing opportunities and types of business, as well as the characteristics that need to be possessed and the main elements in entrepreneurship</td></tr>
<tr><td>Content</td><td>Courses
1. Definition, benefits and functions of entrepreneurship 1
2. Definition, benefits and functions of entrepreneurship 2
3. Principles of entrepreneurship
4. Motivation for entrepreneurship
5. Terms and strategies for entrepreneurship 1
6. Terms and strategies for entrepreneurship 2
7. Characteristic of entrepreneurs as well as the advantages and disadvantages of entrepreneurship
8. Middle Test
9. Strategy for choosing the type of business 1
10. Strategy for choosing the type of business 2
11. Applying types of entrepreneurship 1
12. Applying types of entrepreneurship 2
13. Group Discussion (review journal 1)
14. Group Discussion (review journal 2)
15. Group Discussion (review journal 3)
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75</td></tr>
</table>

	75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Irianto, L. 2007 . Kewirausahaan, Disperindagkop. Samarinda. 2. Lupiyuadi, R dan J. Wacik. 1998. Wawasan Kewirausahaan Cara Mudah Menjadi Wirausaha. Fakultas Ekonomi Universitas Indonesia. Jakarta. 3. Saiman, L. 2009. Kewirausahaan. Teori, Praktik, dan Kasus-kasus. Salemba Empat. Jakarta.

Course Learning Outcomes (CLO):

1.	Students are able to demonstrate knowledge of entrepreneurship, principles and motivation, requirements for entrepreneurship, strategies for capturing opportunities, types of businesses, the characteristics that need to be possessed, and the main elements of entrepreneurship.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							V	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Factory Layout and Design
Module level	Bachelor Program
Code	220303652W004
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Yulian Andriyani, S.TP., M.Sc
Lecture	1. Yulian Andriyani, S.TP., M.Sc 2. Panggulu Ahmad Ramadhani Utoro, S.TP., MT
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details: 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Mathematics, Processing Tools and Machines

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Scope of factory design. Planning for small-scale food processing units, inclu planning basic materials, processes, equipment layout and process st Capacity planning, flow and handling of materials and relationships betv activities.
2. The factory design course is aimed at studying the planning of small-scale processing units, including planning basic materials, processes, equipment la and process stages. Capacity planning, flow and handling of materials relationships between activities. As well as introducing examples of application of concepts through. Project Based Learning (PJBL) learning meth several meetings. D. Integrated Unmul PIP</td></tr>
<tr><td>Content</td><td>Courses
1. Definition, purpose, benefits, and design of factory layout
2. Factory location
3. Product design, process design and scheduling 1
4. Product design, process design and scheduling 2
5. Layout design concept
6. Evaluation and follow up of layout design
7. Factory location selection and location determination method
8. Middle Test
9. Determination of factory location
10. Product design, process design and schedule design
11. Number of machines and capacity in work station design
12. Basics of factory design
13. Group Discussion (review journal 1)
14. Group Discussion (review journal 2)
15. Group Discussion (review journal 3)
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 7 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual/Group Assignment</td><td>30</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100</td></tr>
</table>

	B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. James M. Apple. 1990. Tata Letak Pabrik dan Pemindahan Bahan, Edisi Ketiga. Bandung: Penerbit ITB 2. Krishna P Candra. 2018. PERANCANGAN PABRIK | Academic Update (krishnapcandra.com) 3. PERANCANGAN TATA LETAK AZIZAH AISYATI Pendahuluan Definisi Perancangan (slidetodoc.com) 4. Perancangan Lokasi Pabrik (http://staffnew.uny.ac.id/upload/132319413/pendidikan/Modul+MO+BAB+5-PERENCANAAN+LOKASI.pdf) 5. Perancangan Pabrik (Pemilihan Lokasi https://www.youtube.com/watch?v=Ps2XV_jLYX0&t=10s) 6. Dasar-Dasar Perancangan Pabrik (https://www.wnputrio.com/2019/10/dasar-dasar-perancangan-pabrik-plant- design.html) Peraturan Pemerintah Tentang Persyaratan Bangunan Gedung (https://pugpupr.pu.go.id/_uploads/PP/UU_no_28_th_2002.pdf)

Course Learning Outcomes (CLO):

1.	Students are able to determine about planning small-scale food processing units, including planning basic materials, processes, equipment, and layout process stages. Capacity planning, flow, handling of materials, and relationships between activities to resolve related plant layout and design issues.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Fermentation Technology
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Hj. Maulida Rachmawati, SP., MP
Lecture	1. Hj. Maulida Rachmawati, SP., MP 2. Marwati, S.TP., MP 3. Agustu Sholeh Pujokaroni., S.TP., M.Sc., Ph.D
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Microbiology of Agricultural Product Processing</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Explains the meaning and history of fermentation, the basics of the fermentation process, microbial management. development of inoculum, medium, sterilization, aeration and agitation, fermentation process kinetics, process optimization, fermenter design, downloading and purification of results.</td></tr>
<tr><td>Content</td><td>Courses
1. Fermentation process
2. Formulation of fermentation media
3. Microorganisms used in industry
4. Kinetics of microbial growth
5. Fermentation techniques 1
6. Fermentation techniques 2
7. Fermenter design
8. Middle Test
9. Sterilization process
10. Fermentation heat transfer 1
11. Fermentation heat transfer 2
12. Presentations related to permentation technology 1
13. Presentations related to permentation technology 2
14. Presentations related to permentation technology 3
15. Presentations related to permentation technology 4
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 7 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Final test (UAS)</td><td>Written test</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Individual/Group Assignment</td><td>30</td></tr>
<tr><td>4</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1.	Students are able to determind fermentation process, and microbial management. Development of inoculum, medium, sterilization, aeration and agitation, fermentation process kinetics, process optimization, fermenter design, downloading and purification of results

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Food Additives
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Dra. Yuliani, M.P
Lecture	1. Dra. Yuliani, M.P 2. Dr. Miftakhur Rohmah, SP., MP
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Agricultural Products Chemistry I and Microbiology of Agricultural Products

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>The scope of this course includes the definition, classification, application, benefits and dangers of using food additives, regulations governing their use and various types of food additives along with their properties, functions, applications and toxicology.</td></tr>
<tr><td>Content</td><td>Courses
1. Definition, benefits, difference, and risks of using food additives
2. Indonesian government regulation about food additives
3. Antimicrobial preservative
4. Antioxidant preservative
5. Quiz
6. Food additives for food sweeteners group
7. Food additives for food colorant group
8. Middle Test
9. Results of field observations about types of food additives
10. Food additives for food emulsifiers group
11. Food additives for flavoring agents group
12. Food additives for flavor enhancers group
13. Miscellaneous additives group
14. Articles about food additives 1
15. Articles about food additives 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Branen, AL, Davidson, PM., Salminen, S. 1990 . Bahan Tambahan Pangan. Marcel Dekker, Inc, New York, Basel. 2. Belitz, HD.,dan Grosch ,W. 1999. Food Chemistry. 2nd ed. Springer Verlag, Berlin. 3. BPOM RI. 2019. PerBPOM RI No.11 tahun 2019 tentang bahan tambahan pangan. 4. Peraturan Menteri Kesehatan RI No.033 Tahun 2012 tentang bahan tambahan pangan. 5. UU Republik Indonesia N0. 18 Tahun 2012 tentang Pangan.

Course Learning Outcomes (CLO):

1.	Students are able to identify and recognize food additives, so that students have (1) cognitive competence, namely mastering the theory (nature and function of BTP), regulations, and applications of BTP in food products, (2) psychomotor, namely having the ability to detect permitted BTP and its use in food products is not permitted (3) affective: namely avoiding inappropriate methods in handling BTP in food products/agricultural products.
2.	Students are able to determine regulations and applications of BTP in food products.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						
2				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Legume, Cereal and Tuber Technology
Module level	Bachelor Degree
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	5
Person responsible for the module	Sulistyo Prabowo, S.TP., MP., MPH., Ph.D
Lecture	1. Sulistyo Prabowo, S.TP., MP., MPH., Ph.D 2. Hj. Maulida Rachmawati, SP., MP 3. Yulian Andriyani, S.TP., M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, frequently asked questions, practical, case study.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Processing Technology</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>The scope of this course includes an introduction to basic knowledge about legumes, cereals and tubers, physical properties, chemical properties, structure, composition, storage methods and methods of preserving legumes, cereals and tubers. This course also discusses quality improvement, processing and product development from legumes, cereals and tubers.</td></tr>
<tr><td>Content</td><td>Courses
1. Basic knowledge of legumes, cereals and tubers
2. Physical, chemical properties, structure, composition, methods of storage and preservation of legumes 1
3. Physical, chemical properties, structure, composition, methods of storage and preservation of legumes 2
4. Processing and developing legume products
5. Quiz
6. Physical, chemical properties, structure, composition, storage and preservation of cereals 1
7. Physical, chemical properties, structure, composition, storage and preservation of cereals 2
8. Middle Test
9. Maintain and improve product quality as well as process and develop cereal products
10. Physical, chemical, structure, composition, storage, preservation and processing of tubers 1
11. Physical, chemical, structure, composition, storage, preservation and processing of tubers 2
12. Techniques for processing legumes, cereals and tubers
13. Group Discussion
14. Group Discussion
15. Group Discussion
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
</table></td></tr>
</table>

	4 | Assignment | Individual/Group Discussion | 15 5 | Practical | Practical in laboratory | 30 6 | Affective | Participation | 10 A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Buckel, K.A., RA. Edwards, G.H. Fleet and M. Woorton. 2001. llmu Pangan terjemahan Hari Purnomo & Adiono. Universitas lndonesia Press. Jakarta 2. Goldsworthy, P.R and N.M Fisher. 1996. Fisiologi Tanaman Budidaya Tropik Terjemahan Tohari & Soedharoedjian. Gajahmada University Press. Yogyakarta. 3. Soebijanto, T. 1996. HFS dan Industri Ubi Kayu Lainnya. Gramedia. Jakarta 4. Suliantari dan W.P. Rahayu. 1990. Teknologi Fermentasi, umbi-umbian dan biji-bijian. PAU Pangan & Gizi IPB. Bogor 5. Winarno, FG. 1993. Pangan, Gizi, Teknologi dan Konsumen. Gramedia Pustaka Umum. Jakarta

Course Learning Outcomes (CLO):

1.	Students are able to determine process products from basic ingredients such as legumes, cereals, and tubers.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Livestock and Aquatic Products Technology
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	5
Person responsible for the module	Marwati, S.TP., MP
Lecture	1. Marwati, S.TP., MP 2. Hj. Maulida Rachmawati, SP., MP 3. Nur Amaliah, S.TP., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, practical, case study, discussion, assignment.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Knowledge of Agricultural Products</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. The scope of this course includes basic knowledge about livestock products including structure, composition, chemical, physical and microbiological properties. Changes that occur after post-harvest, the quality of livestock products, how to measure quality, how to store, preserve. Development of processed products from livestock products. As well as types, potential and opportunities for utilizing marine and fisheries resources, post-harvest handling of fishery products, fish processing using traditional and modern techniques, processing technology for surimi, gelatin, alginate and carrageenan and chitin-chitosan.
2. Basic knowledge about livestock products includes structure, composition, chemical, physical and microbiological properties. Changes that occur after post-harvest, the quality of livestock products, how to measure quality, how to store, preserve. Development of processed products from livestock products.</td></tr>
<tr><td>Content</td><td>Courses
1. Basic knowledge of livestock products
2. Milk processing technology
3. Methods and technologies of milk preservation and processing
4. Meat processing technology
5. Quiz
6. Post-harvest handling and meat quality testing
7. Livestock by-product technology
8. Middle Test
9. Scope of Poultry
10. Poultry quality standards 1
11. Poultry quality standards 2
12. Preservation of whole and broken eggs
13. Changes in eggs during storage
14. Poultry meat processing technology 1
15. Poultry meat processing technology 2
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
</table></td></tr>
</table>

	3	Final test (UAS)	Written test	20
	4	Assignment	Individual/Group Assignment	15
	5	Practical	Practical in laboratory	30
	6	Affective	Participation	10

A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40

Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1.	Students are able to identify changes that occur after post-harvest, include the quality of livestock products, how to measure quality, store, and preserve.
2	Students are able to determind development of processed products from livestock products. As well as types, potential, and opportunities for utilizing marine and fisheries resources, post-harvest handling of fishery products, fish processing using traditional and modern techniques, and processing technology for surimi, gelatin, alginate, and, carrageenan, and chitin-chitosan.
3.	Students are able to design livestock and aquatic products with value-added innovations.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V			V			
2				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Oil and Fat Technology
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	5
Person responsible for the module	Prof. Dr. oec. Troph. Ir. Krishna Purnawan Candra, MS
Lecture	1. Prof. Dr. oec. Troph. Ir. Krishna Purnawan Candra, MS 2. Yulian Andriyani, S.TP., M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, presentation, assignment, case study, practical.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 minutes per week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Chemical Analysis of Agricultural Products and Processing Technology</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Overview of the oil and fat industry (raw materials, processing, industrial products), sources of oil and fat, physical and chemical properties of oil and fat, extraction and purification of oil and fat, damage to oil and fat fats, packaging, processing of fats and oils as food ingredients (emulsifiers, margarine, butter), and non-food (soap, surfactants, biodiesel).</td></tr>
<tr><td>Content</td><td>Courses
1. Oil and fat technology
2. Palm oil processing technology
3. Coconut processing technology
4. Cocoa processing technology
5. Fat/oil damage
6. Quiz
7. Antioxidants
8. Middle Test
9. Hydrogenation
10. Winterization and fractionation
11. Interesterification
12. Rendering process
13. Basic oleochemicals, oleochemical derivatives and biodiesel
14. Processing margarine and shortening
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Assignment</td><td>Individual/ Group Assignment</td><td>15</td></tr>
<tr><td>5</td><td>Practical</td><td>Practical in laboratory</td><td>30</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	

Course Learning Outcomes (CLO):

1.	Students are able explain the overview of the oil and fat industry (raw materials, processing, industrial products), sources of oil and fat, physical and chemical properties of oil and fat, extraction and purification of oil and fat, damage to oil and fat fats, packaging, processing of fats and oils as food ingredients (emulsifiers, margarine, butter), and non-food (soap, surfactants, biodiesel).
2	Students are able to determine sources of oil and fat, physical and chemical properties of oil and fat, extraction and purification of oil and fat, damage to oil and fat fats, packaging, processing of fats and oils as food ingredients (emulsifiers, margarine, butter), and non-food (soap, surfactants, biodiesel).

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V		V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Quality Management for the Agricultural Products Industry
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Sulistyo Prabowo, S.TP., MP., MPH., Ph.D
Lecture	1. Sulistyo Prabowo, S.TP., MP., MPH., Ph.D 2. Dr. Miftakhur Rohmah, S.P., MP
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, presentation, assignment, case study, problem based learning.
Workload	1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Quality Control

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>Quality management system, quality management principles, documentation and quality manual, Total Quality Management, ISO series, SNI 01-4852-1998 concerning Hazard Analysis andCritical Point Control (HACCP) Systems as well as its implementation guidelines, HAS 23000 concerning Halal Guarantee Systems.</td></tr>
<tr><td>Content</td><td>Courses
1. Quality management in the food industry
2. Quality of food 1
3. Quality of food 2
4. Damage and decline in quality of food
5. Food quality control 1
6. Food quality control 2
7. Quality control and standardization
8. Middle Test
9. Quality control and food safety program
10. Hazard Analysis Critical Control Point (HACCP)
11. Food regulations 1
12. Food regulations 2
13. Quality certification and halal guarantee system
14. Group Discussion
15. Group Discussion
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>6.</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Mamuaja, CF., 2016. Pengendalian mutu dan keamanan pangan. Unsrat Press 2. Mashudi. 2015. Konstruksi Hukum dan Respons Masyarakat Terhadap Sertifikasi Produk Halal: Studi Sociolegal Terhadap Lembaga Pengkajian Pangan, Obat-obatan, dan Kosmetika Majelis Ulama Indonesia. Yogyakarta:Pustaka Pelajar 3. Redaksi Sinar Grafika. 2013. Undang-Undang Pangan 2012 (UU RI No. 18 Tahun 2012. Jakarta: Sinar Grafika 4. Redaksi Sinar Grafika. 2015. Undang-Undang Jaminan Produk Halal, UU RI No. 33 Tahun 2014. Jakarta: Sinar Grafika

Course Learning Outcomes (CLO):

1.	Students are able to identify quality management systems, quality management principles, quality documentation and manuals, Total Quality Management, ISO series, SNI 01-4852-1998 concerning Hazard Analysis and Critical Point Control Systems (HACCP) and implementation guidelines, HAS 23000 concerning Systems Halal Guarantee.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Refreshment Material Technology
Module level	Bachelor Program
Code	220303652P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	5
Person responsible for the module	Hj. Maulida Rachmawati, SP., MP
Lecture	1. Hj. Maulida Rachmawati, SP., MP 2. Dr. Miftakhur Rohmah, S.P., MP
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, presentation, discussion, assignment.
Workload	Lectures: 2 x 50 = 100 minutes per week. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week . Independent Study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 3 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)
Recommended prerequisites	Process Technology

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>Basic knowledge of tea, coffee and chocolate commodities. Post-harvest handling and processing methods for plantation commodities and their storage. Standardization of the quality of processed products and secondary products.</td></tr>
<tr><td>Content</td><td>Courses
1. Definition of refreshing ingredients
2. Coffee beans and their quality
3. Coffee processing
4. Definition of cocoa and its processing
5. Cocoa maturity and fermentation
6. Purpose of cocoa fermentation
7. Cocoa fermentation and cocoa bean drying process
8. Middle Test
9. Definition of tea, chemical components of tea and tea testing
10. Green tea processing and machines used and green tea testing
11. Black tea processing
12. Fragrant tea processing
13. Black tea processed products
14. Green tea processed products
15. Fragrant tea processed products
16. Final Test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/Group Assignment</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>ndividual/Group Assignment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media employed	Class meeting
Reading list	1. Drs. Dyayadi, M.T.2009.Teh, Kopi & Cokelat.Jaya Media.Samarinda.168 hlm. 2. Haryadi dan M. Supriyanto1996.Pengolahan Kakao Menjadi Bahan Pangan. PAU-UGM.Yogyakarta.200 hlm 3. Ir. Endang Sugiharti.2008.Petunjuk Praktis Menanam Kakao.Binamuda Cipta Kreasi.Yogyakarta.74 hlm. 4. Pusat Penelitian Kopi dan Kakao Indonesia.2008.Panduan Lengkap Budidaya Kakao.Agro Media Pustaka.Jakarta.328 hlm. 5. Tuty Anggraini. 2017. Proses dan Manfaat Teh. Padang. CV: Rumahkayu Pustaka Utama.

Course Learning Outcomes (CLO):

1.	Students can explain the basic principles of refreshing ingredients (Tea, Coffee and Cocoa)
2.	Students are able to determine and can carry out post-harvest handling of fresheners
3.	Students can explain the principles and can carry out methods for processing and storing refreshing ingredients
4.	Students are able to determine and standardize the quality of processed products and secondary products

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							
2				V				
3	V							
4				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Field Work Practice (PKL)
Module level	Degree program
Code	220303652W005
Subtitle	Bahasa Indonesia
Courses	2 (0-2)
Semester(s)	5
Person responsible for the module	Vice Dean I Faculty of Agriculture
Lecture	All Lecturers
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	Practical
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 14 meetings. (14 meetings for learning activity). Total 4.760 minutes or equivalent to 79.33 hours in 14 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 14 week = 2380 min/semester 1 Credit = 39.7 h/semester 1 ECTS = 25 h/semester 1 Credit = 39.7/25 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum reached 75 credit (SKS) or 119.25 ECTS (based on Mulawarman University regulation) without E mark, GPA $\geq$ 2.00
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to apply and gain work experience about agricultural product technology concepts and analysis to solve problems found in industries or research institutions</td></tr>
<tr><td>Content</td><td>Field practical</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process in the Academic Regulations of Mulawarman University:
<table>
<tr><td>No.</td><td>Objects of Assessment</td><td>Forms of Assessment</td><td>Quantity (%)</td></tr>
<tr><td>1</td><td>Affective</td><td>Affective Assesment Sheet</td><td>10</td></tr>
<tr><td>2</td><td>Assignment</td><td>Weekly Report</td><td>30</td></tr>
<tr><td>3</td><td>Final Semester Test/Project</td><td>Final Report</td><td>60</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
<tr><td>Emplyode media</td><td>Practical</td></tr>
<tr><td>Reading list</td><td>1. Field Work Practice (PKL) Guideliness</td></tr>
</table>

Course Learning Outcomes (CLO):

1.	Students are able to apply and gain work experience about agricultural product technology concepts and analysis to solve problems found in industries or research institutions

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							V	

SEMESTER 6

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Cake and Bread Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Dra. Yuliani, M.P
Lecture	Dra. Yuliani, M.P Nur Amaliah, S.TP., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, project-based learning, discussion, assignment.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the	minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>examination regulations</td><td></td></tr>
<tr><td>Recommended prerequisites</td><td>Processing technology</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to design the handling of materials and production of moist tropical food/agricultural products and their environment in a sustainable manner.
Able to organize a team to produce food products/agricultural products.</td></tr>
<tr><td>Content</td><td>Courses
1. Introduction and ingredients for making cakes
2. Cake processing, grading and storage methods
3. Classification and quality requirements of biscuits and cookies
4. Quick bread processing method
5. Group discussion (processing method) 1
6. Group discussion (processing method) 2
7. Group discussion (processing method) 3
8. Mid test
9. Introduction and method of making bread
10. Gluten and wheat flour
11. Bread and processing methods
12. Quality and bread processing method
13. Group discussion (Review journal) 1
14. Group discussion (Review journal) 2
15. Group discussion (Review journal) 3
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75</td></tr>
</table>

	75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Anni Faridah, dkk. 2008. Patiseri Jilid 2 untuk SMK. Departemen Pendidikan Nasional. 2. Cauvain, S. 2015. Technology of Breadmaking. Third edition. Springer, London. 3. Herudiyanto, MS., dan Hudaya, S. 2010. Teknologi Pengolahan Kue dan Roti. Penerbit Widya Padjadjaran. Bandung 4. Matz, SA.1992. Cookie and Cracker Technology. Third edition. Van Nostrand reinhold. New York. 5. US. Wheat Associates. 1981. Pedoman pembuatan Roti dan Kue. Judul asli : Bakers Handbook on practical Baking. Penerbit Djambatan, jakarta.

Course Learning Outcomes (CLO):

1	Students are able to understand cake and bread processing methods.
2	Students are able to understand quality control in cake and bread processing methods.
3	Students can apply cake and bread processing methods.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1					V			
2							V	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Enzyme Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Prof. Dr. Bernatal Saragih., S.P., M.Si.
Lecture	Prof. Dr. Bernatal Saragih., S.P., M.Si. Prof. Dr.oec.troph. Ir. Krishna P. Candra., MS Maghfirotin Marta Banin, S.Pi., M. Sc
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, case study, evaluation test.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>examination regulations</td><td></td></tr>
<tr><td>Recommended prerequisites</td><td>Biochemistry of Agricultural Products
Microbiology of Agricultural Products</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to explain the structure, function, and properties of food/agricultural products, their changes during processing and storage.
Able to apply appropriate food/agricultural product analysis techniques.</td></tr>
<tr><td>Content</td><td>Courses
1. Definition, classification and nomenclature of enzymes
2. Mechanism action of enzymes
3. Sources of enzymes
4. Enzyme extraction and isolation methods
5. Specific activity of enzymes
6. Factors activity of enzymes
7. How enzymes are produced
8. Mid test
9. Enzyme purification method 1
10. Enzyme purification method 2
11. Characteristics of enzymes 1
12. Characteristics of enzymes 2
13. Amobil enzymes
14. Seminar paper assignment
15. Seminar paper assigment
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	Muchtadi, Tien R.2010. Teknologi Proses Pengolahan Pangan. Alfabeta. Bandung Estiasih, Teti dan Ahmadi.2009. Teknologi Pengolahan Pangan.Bumi Aksara. Jakarta Sobari, Enceng dan Tim Agrotek Uin 13.2019. Dasar-Dasar Proses Pengolahan Bahan Pangan

Course Learning Outcomes (CLO):

1	Students can describe how to isolate, produce, and characterize enzymes from various potential enzyme sources.
2	Students can explain the application of enzymes in technology in agricultural products, food, and medicine.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							
2			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Evaluation of Nutrition in Processing
Module level	Program Sarjana
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	6
Person responsible for the module	Prof. Dr. Bernatal Saragih., S.P., M.Si.
Lecture	Prof. Dr. Bernatal Saragih., S.P., M.Si. Dra. Yuliani, MP
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, discussion, assignment, case study, project based learning, evaluation test.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent study: 2 x 60 = 120 minutes (2 hours) per week. 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>Chemical Analysis of Agricultural Produsts
Food Nutrition</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to apply appropriate and purposeful food/agricultural product analysis techniques</td></tr>
<tr><td>Content</td><td>Courses
1. Effect of processing on nutrients
2. Protein, digestive and metabolic processes
3. Protein, determination of in vitro
4. Protein, evaluation of the nutritional value
5. Fatty acids, sources and breakdown
6. Fatty acid analysis
7. The effect of fatty acids on health
8. Middle test (UTS)
9. Carbohydrates, fiber sources, fatulens, and chemical analysis
10. Carbohydrates, digestive and metabolic processes
11. Vitamins and the effect of processing on vitamins
12. Vitamin analysis, vitamin availability factors, treatment on vitamins
13. Minerals, mineral chemical properties and bioavailability
14. Mineral, determination of in vitro, serum, and AAS.
15. Anthropometric measurements, the relationship of nutrients of vitamins and minerals
16. Final test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>15</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>15</td></tr>
<tr><td>6</td><td>Practical</td><td>Practical in laboratory</td><td>20</td></tr>
<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	

Course Learning Outcomes (CLO):

1	Students are able to apply knowledge about the availability of food nutrients and nutrient loss factors in the processing of agricultural products.
2	Students are able to apply about the methods of nutritional evaluation of processed agricultural products, in vitro and in vivo nutritional evaluation, ethical clearance.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Fruit and Vegetable Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	6
Person responsible for the module	Yulian Andriyani, S.TP., M.Sc
Lecture	Yulian Andriyani, S.TP., M.Sc Hj. Maulida Rachmawati, SP., MP Nur Amaliah, S.TP., M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, assignment, case study, project based learning, evaluation test.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.3 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Recommended prerequisites</td><td>Food process technology</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to determine methods of shelf life, processing, preserving, and packaging food/agricultural products.</td></tr>
<tr><td>Content</td><td>Courses
1. Basic knowledge of fruits and vegetable and their role in human nutrition
2. Chemical characteristics of fruit and vegetable plant tissues 1
3. Chemical characteristics of fruit and vegetable plant tissues 2
4. Economic Value of Fruits and Vegetables
5. Ripening and senescence methods in fruits and vegetables 1
6. Ripening and senescence methods in fruits and vegetables 2
7. Quiz 1 – 6
8. Mid test
9. Browning reaction on food
10. Technology for handling fresh fruits and vegetables
11. Technology of fruits and vegetables products 1
12. Technology of fruits and vegetables products 2
13. Group discussion (fruit and vegetable processing technology) 1
14. Group discussion (fruit and vegetable processing technology) 2
15. Quiz 9 – 14
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80</td></tr>
</table>

	C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Apandi, M. 1984. Teknologi Buah dan Sayur. Alumni. Bandung. 2. Buckle, dkk. 1987. Ilmu Pangan. UI Press. Jakarta. 3. Kartasapoetra, A.G. 1989. Teknologi Penanganan Pasca panen. Bina Angkasa. Jakarta. 4. Muchtadi, D.1992. Fisiologi Pasca Panen Sayuran dan Buah-buahan. IPB. Bogor. 5. Pantastico, ER.B. 1986. Fisiologi Pasca Panen. Penanganan dan Pemanfaatan Buah-buahan dan Sayur-sayuran Tropika dan Subtropika. Gajah mada University press. Yogyakarta. 6. Salunkhe, D.K. 1976. Storage, Processing and Nutritional Quality of Fruit and Vegetables. CRC Press. United States. 7. Utama, I.M.S., Gucker, J.W., Perman, I.D.G.M. 2002. Teknologi Pasca Panen Hortikultura. Udayana. Denpasar. Bali.

Course Learning Outcomes (CLO):

1	The students are able to understand and explain the advanced knowledge about the application of fruit and vegetable processing technology.
2	The students are able to explain and apply the process of processing fruit and vegetable in a sustainable manner and are able to evaluate based on data.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				
2						V		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Halal Food Technology and Management
Module level	Bachelor program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Sulistyo Prabowo, S.TP., MP., MPH., Ph.D
Lecture	Sulistyo Prabowo, S.TP., MP., MPH., Ph.D Marwati, S.TP., M.P.
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, problem-based learning, presentation, discussion, assignment, evaluation.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation)

<table>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Students are able to understand and apply knowledge about halal food processes, regulations, technology and management</td></tr>
<tr><td>Content</td><td>Courses
1. Halal, business and religious domains
2. Government policies
3. Philosophy and sharia
4. Halal certification
5. 11 criteria of the halal assurance system (SJH) 1
6. 11 criteria of the halal assurance system (SJH) 2
7. Halal assurance system (SJH) in the industry
8. Mid test
9. Halal assurance system (SJH) in slaughterhouses
10. Halal assurance system (SJH) in catering
11. Critical points of halal ingredients
12. Main duties and functions of halal auditors
13. Illegal (haram) product analysis techniques
14. Problem based learning 1
15. Problem based learning 2
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70</td></tr>
</table>

	D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Al Quran Al Kariim 2. Anderson, E. N. (2005). Food and religion. In E. N. Anderson, Everyone Eats: Understanding food and culture (pp.154-161). New York: New York University Press. 3. LPPOM MUI (2012). Halal Assurance System 23000 Series. Jakarta 4. Riaz, N. M., & Chaudry, M. M. (2004). Halal food production. Florida: CRC Press LLC. 5. Qardhawi, Y. 2003. Halal dan Haram dalam Islam. Ahmadi, W., Badawi, W., Saptorini (Penyunting), Era Intermedia. Surakarta. 6. Prabowo S, Rahman AA, Rahman SA, Samah AA, Fadzillah NA. Pensijilan Halal: Cabaran Penggiat Industri Halal Sejagat. Dalam: Rahman RA, Deuraseh N, Jamaludin MA, eds. Isu Halal Kontemporari. 1st Edition. Serdang, Selangor Darul Ehsan: Universiti Putra Malaysia Press; 2014:246-264. http://repository.unmul.ac.id/handle/123456789/3169 7. Prabowo S, Ardhani, F. Produk Asal Haiwan Yang Harus Diwaspadai: In: Rahman RA, Deuraseh N, Jamaludin MA, eds. Isu Halal Kontemporari. 1st Edition. Serdang, Selangor Darul Ehsan: Universiti Putra Malaysia Press; 2014:150- http://repository.unmul.ac.id/handle/123456789/3571 8. Prabowo S. Potensi Pasar Produk Halal Indonesia. Dalam: Santoso U, Rahayu WP, Pambayun R, Giyatmi, Ardiansyah, Harmayani E, eds. Pangan Indonesia Diimpikan. 1st Edition. Yogyakarta: PATPI; 2016:92-94 http://repository.unmul.ac.id/handle/123456789/3564 9. Prabowo S. Pentingnya Sertifikasi Halal. In: Santoso U, Rahayu WP, Pambayun R, Giyatmi, Ardiansyah, eds. Pangan Indonesia Berkualitas. 1st Edition. Yogyakarta: PATPI; 2018:314-318 http://repository.unmul.ac.id/handle/123456789/3565 10. Prabowo S, Rahman AA, Rahman SA, Samah AA. Revealing factors hindering halal certification in east kalimantan Indonesia. JIMA. 2015;6(2):268-291. doi:10.1108/09574090910954864 https://www.emerald.com/insight/content/doi/10.1108/JIMA-05-2014-0040/full/html 11. Prabowo S, Rahman AA. Sertifikasi Halal Sektor Industri Pengolahan Hasil Pertanian. Forum Penelitian AgroEkonomi.

	2016;34(1):57.doi:10.21082/fae.v34n1.2016.57-70 http://ejurnal.litbang.pertanian.go.id/index.php/fae/article/view/7311 12. Prabowo S. Titik Kritis Halal Produk Pangan Khas Kalimantan Timur. Dalam: Sumarna D, Hadi S, eds. Seminar Nasional Jur.THP Unmul Tahun 2011: Tantangan Pengembangan Ketahanan Pangan Dan Pangan Fungsional Berbasis Sumberdaya Lokal. Samarinda, 20 Juli 2011: Jurusan THP Unmul; 2011:75-82 http://repository.unmul.ac.id/handle/123456789/3570 13. Prabowo S. Hambatan penerapan sistem jaminan halal di industri kesehatan. In: Supomo, Sa'adah H, Warnida H, et al., eds. Seminar Nasional Kesehatan 2017. Samarinda, 26 Februari 2017: Akademi Farmasi Samarinda; 2017:29-40 https://akfarsam.ac.id/wp-content/uploads/PROSIDING-2017.pdf 14. Prabowo S, Abd A, Ab S, Samah A A, Man Yacob B Che. Halal culinary: Opportunity and challenge in Indonesia. Procedia - Soc Behav Sci. 2012;121(September):1-10 http://psasir.upm.edu.my/id/eprint/32211/ 15. Prabowo S, Rahman AA, Rahman SA, Samah AA. Development of Halal Hotel in Indonesia. In: Rohman A, Erwanto Y, Raharjo TJ, Noviana E, eds. The 2nd International Seminar on Halalness and Safety of Food and Pharmaceutical Products. Yogyakarta, 17-18 Oct 2012: Integrated Research and Testing Laboratory (LPPT), Gadjah Mada University; 2012:143-152 http://repository.unmul.ac.id/handle/123456789/3569 16. Prabowo S, Rahman AA, Rahman SA, Samah AA. Constraints Experienced by Restaurateurs and Caterers in Indonesia for Halal Certification. In: Bakar J, Nhari RMHR, Mokhtar NFK, Rosman NN, Nor N 'Ain NM, eds. Malaysian International Halal Research & Education. Putrajaya, 2-4 December 2014: Universiti Putra Malaysia;2014:1-8 https://www.slideshare.net/HadiAkbar1/mihrec-2014-conference-proceeding

Course Learning Outcomes (CLO):

1	Students are able to understand the basic concepts and philosophy of halal, halal food government policies, Halal Assurance System, knowledge of halal ingredients, halal audits and certifications, halal food analysis, halal food production methods, and the relationship between halal standards and food sanitation and hygiene.
2	Students are able to apply knowledge about halal food processes, regulations, technology and management.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1		V						
2					V			

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Lactic Acid Bacteria Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Dr. Aswita Emmawati, S.TP., M.Si
Lecture	Dr. Aswita Emmawati, S.TP., M.Si Marwati, S.TP., MP Maghfirotin Marta Banin, S.Pi., M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, project-based learning, presentation, discussion, assignment, evaluation.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation).

<table>
<tr><td>Recommended prerequisites</td><td>Microbiology of Agricultural Products
Microbiology of Agricultural Product Processing</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to explain the characteristics of lactic acid bacteria and their role in the fermentation process of agricultural products.
Able to explain about prebiotics, probiotics, symbiotics, postbiotics and prerequisites for the development of probiotic products from agriculture.</td></tr>
<tr><td>Content</td><td>Courses
1. Introduction of lactic acid bacteria
2. Classification of lactic acid bacteria
3. Metabolism of lactic acid bacteria
4. Lactic acid bacteria fermentation process 1
5. Lactic acid bacteria fermentation process 2
6. Lactic acid bacteria and human health 1
7. Lactic acid bacteria and human health 2
8. Mid test
9. Probiotics
10. Prebiotics
11. Postbiotics and nutribiotics
12. Lactic acid bacteria and antimicrobial compounds
13. Identification and analysis compounds of lactic acid bacteria
14. Application of lactic acid bacteria and their processed products (project based learning) 1
15. Application of lactic acid bacteria and their processed products (project based learning) 2
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
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<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100</td></tr>
</table>

	B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	Vinderola, Ouwehand, Salminen, von Wright. 2019. Lactic Acid Bacteria: Microbiological and Functional Aspect, 5th Edition. CRC Press

Course Learning Outcomes (CLO):

1	Able to understand the characteristics of lactic acid bacteria and their classification. Describe the metabolic pathways in the fermentation of lactic acid, metabolites, and fermented products. Can analyze the differences between probiotics, prebiotics, symbiotics and postbiotics.
2	Able to apply and develop lactic acid bacteria-based products according to the prerequisites for probiotic product development.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Operation Research
Module level	Bachelor Program
Code	220303662W004
Subtitle	English
Courses	2 (2-1)
Semester (s)	6
Person responsible for the module	Anton Rahmadi, S.TP., M.Sc., Ph. D
Lecture	Anton Rahmadi, S.TP., M.Sc., Ph. D deny Agustu Sholeh Pujokaroni, S.TP., M.Sc., Ph. D Panggulu Ahmad Ramadhani Utoro, S.TP., MT
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, case study, student center learning, project-based learning, assignment.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the	Minimum attendance of 80% (based on Mulawarman University regulation).

<table>
<tr><td>examination regulations</td><td></td></tr>
<tr><td>Recommended prerequisites</td><td>Physic of Agricultural Products
Mathematics</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to apply appropriate food/agricultural product analysis techniques and in accordance with the objectives
2. Able to analyze data to design solutions in the sustainable handling of materials or moist food/tropical production processes</td></tr>
<tr><td>Content</td><td>Courses
1. Modeling process and Problem formulation
2. Completion of linear programming models with graphical methods
3. Completion of linear programming model with simplex method I
4. Completion of linear programming model with simplex method II
5. Duality theory and sensitivity analysis
6. Sensitivity analysis
7. Further topic of the simplex method
8. UTS
9. Transportation problems
10. Assignment and assignment problems
11. Target programming problems
12. Integer programming
13. Transport models
14. CPM and PERT
15. AHP
16. UAS</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>15</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>15</td></tr>
<tr><td>6</td><td>Practical</td><td>Practical in laboratory</td><td>20</td></tr>
<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	Solution Manuals. Introduction to Operations Research. 9th edition. Frederick S. Hillier. Problem and Exercises in Operations Research. Leo Liberty.

Course Learning Outcomes (CLO):

1	Students can solve problems to optimize the use of various limited resources with linear programming using a simple method and its application in particular forms of process problems, transportation, assignment (time and dual division), and transshipment.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1						V		
2			V					
3			V					

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Sensory Test
Module level	Bachelor Program
Code	220303662W002
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	6
Person responsible for the module	Sulistyo Prabowo, S.TP., MP., MPH., Ph. D
Lecture	Sulistyo Prabowo, S.TP., MP., MPH., Ph. D Yulian Andriyani, S.TP., M.Sc Dr. Miftakhur Rohmah, S.P., M.P Shabri, S.Si., M.M
Language	Bahasa Indonesia
Relation to curriculum	Compulsory
Type of teaching, contact hours	Lecture, presentation, discussion, assignment, practical, student center learning, problem-based learning, case study.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS -Details : 1 Credit = 170 min / week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS

<table>
<tr><td>Requirements according to the examination regulations</td><td>Minimum attendance of 80% (based on Mulawarman University regulation).</td></tr>
<tr><td>Recommended prerequisites</td><td>Agricultural Statistics</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>The students are able to understand and apply sensory testing methods on food products .</td></tr>
<tr><td>Content</td><td>Courses
Introduction and scope of sensory tests on food ingredients and food processing of agricultural products
Sensory attributes and sensing mechanisms
Physio-psychological in sensory tests
Stimulus Threshold
Good Sensory Practice I
Good Sensory Practice II
Atribute Difference Test
Mid test
Atribute Difference Test II
Atribute Difference Test III
Atribute Difference Test
Test qualitative and quantitative descriptions
Statistical application for sensory test data processing
Statistical application for sensory test data processing
Application of sensory tests in the development and quality control of food products
Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 8 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>15</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Practical</td><td>Practical in laboratory</td><td>30</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>15</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Adawiyah DR dan Waysima. 2009. Buku Ajar Evaluasi Sensori Produk Pangan. Fakultas Teknologi Pertanian, IPB, Bogor. ID 2. Khairunissa, A, dkk. 2009. Faktor-Faktor Yang Mempengaruhi Pengukuran Sensoris. Universitas Jenderal Soedirman. Purwokerto 3. Krissetiana, H. 2014. Uji Organoleptik Bahan Pangan. PT. Citra Adi Parama. Yogyakarta. ID 4. Lawless, H. T. 2013. Labolatory Exercises for Sensory Evaluation. Springer Science. New York 5. Setyaningsih, D, Apriyantono, A, dan Sari, M.P. 2010. Analisis Sensoris untuk Industri Pangan dan Agro. IPB Press. Bogor 6. Garnida, Y. 2020. Uji Inderawi dan Sensoris Pada Industri Pangan. Manggu. Bandung

Course Learning Outcomes (CLO):

1	The students are able to understand the theory of sensory properties and their test sensory.
2	The students are able to apply sensory testing methods on food products and are able evaluate sensory characteristics.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1			V					
2						V		

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Spice and Essential Oil Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	3 (2-1)
Semester (s)	6
Person responsible for the module	Dr. Miftakhur Rohmah, S.P., MP
Lecture	Dr. Miftakhur Rohmah, S.P., MP Yulian Andriyani, S.TP., M.Sc Nur Amaliah, S.TP., M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, project-based learning, practical, discussion, assignment, case study.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. 4. Practical: 1 x 170 = 170 min/ week The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	3 SKS / 4.8 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the	Minimum attendance of 80% (based on Mulawarman University regulation).

<table>
<tr><td>examination regulations</td><td></td></tr>
<tr><td>Recommended prerequisites</td><td>Physics of Agricultural Products
Chemical Analysis of Agricultural Products</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Able to organize a team to produce of food/agricultural products that is recognized</td></tr>
<tr><td>Content</td><td>Courses
1. Regulation, sources, role of spices and essential oils
2. Principles and techniques of cinnamon processing
3. Principles and techniques of clove processing
4. Principles and techniques of vanilla processing
5. Principles and techniques of pepper processing
6. Principles and techniques of ginger processing
7. Principles and techniques of oleoresin processing
8. Mid test
9. Chemical components and physicochemical properties of essential oils
10. Essential oil extraction method 1
11. Essential oil extraction method 2
12. Essential oil extraction method 3
13. Quality of essential oils
14. Isolation and derivation of essential oils
15. Group discussion (essential oil processing)
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 4 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
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<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>15</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>15</td></tr>
<tr><td>6</td><td>Practical</td><td>Practical in laboratory</td><td>20</td></tr>
<tr><td>7</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100</td></tr>
</table>

	B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class meeting
Reading list	1. Baser C H K dan Buchbauer G. 2010. Handbook of Essential Oils, Science, Technology and Applications. CRC Press Boca Roton. 2. Guenther, E. 1990. Minyak Atsiri, Jilid I. (terjemahan) Ketaren. UI Press. Jakarta 3. Haris, R. 1994. Tanaman Minyak Atsiri. Penebar Swadaya. Jakarta 4. Ketaren. 1985. Pengantar Teknologi Minyak Atsiri. Balai Pustaka. Jakarta. 5. Parthsarathy A V, Chempakan B dan Zachariah T J. 2008. Chemistry of Spices. CABI, London, UK. 6. Raghavan S. 2007. Handbook of Spices, Seasoning and Seasoning. CRC Press Boca Roton. 7. Sastrohamidjojo, H. 2004. Kimia Minyak Atsiri. UGM Press. Jogjakarta 8. Santoso, H.B. 2007. Nilam Bahan Industri Wewangian. Kanisius. Yogyakarta.

Course Learning Outcomes (CLO):

1	Students are able to apply knowledge about spices and essential oils, the sources and chemical components spices and essential oils, spice extraction techniques; distillation and extraction of essential oils, determination of the quality of spices and essential oils, isolation and derivation of essential oils.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							V	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Sugar and Polysaccharide Technology
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Dra. Yuliani, M.P
Lecture	Dra. Yuliani, M.P Nur Amaliah, S.TP., M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, discussion, assignment, case study, student center learning.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation).
Recommended prerequisites	Process Technology

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explainthe characteristic of sugars and polysaccharides.
2. Able to determine the extraction and processing method of sugar and polysaccharides</td></tr>
<tr><td>Content</td><td>1. Introduction, sources, types and relationships of sugars, polysaccharides and carbohydrates
2. Structure of carbohydrate molecules (sugars and polysaccharides)
3. Physico-chemical properties of simple carbohydrates
4. Chemical reactions of carbohydrates 1
5. Chemical reactions of carbohydrates 2
6. Sensory properties, optical rotation and sugar nutrients
7. Polysaccharide structure
8. Mid test
9. Water-binding polysaccharides (complex carbohydrates) 1
10. Water-binding polysaccharides (complex carbohydrates) 2
11. Sugar processing technology
12. Extraction and processing of complex polysaccharides 1
13. Extraction and processing of complex polysaccharides 2
14. Extraction and processing of complex polysaccharides 3
15. The role of sugar and polysaccharides in industry
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
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<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60</td></tr>
</table>

	E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Belitz HD, Grosch W.1999. Food Chemistry. 2nd ed. Springer Verlag, Berlin. 2. Goutara, Wijandi S. 1980. Dasar Pengolahan Gula. Jurusan Teknologi Industri Pertanian, Fakultas Teknologi Pertanian, Institut Pertanian Bogor, Bogor. 3. Goutara, Wijandi S. 1985. Dasar Pengolahan Gula II. Agro Industri Press, Jurusan teknologi Industri Pertanian, Fakultas Teknologi Pertanian, Institut Pertanian Bogor, Bogor. 4. Imeson A.1999. Thickening and Gelling Agents for Food. 2nd ed. Aspen Publishers, Inc., Gaytherburg, Maryland. 5. Lehninger AL, alih bahasa : Thenawijaya M. 1990. Dasar-dasar Biokimia. Penerbit Erlangga, Jakarta. 6. Whistler RL, BeMiller N. 1999. Carbohydrate Chemistry for Food Scientists. Eagan Press, St.Paul, Minnesota, USA. 7. Fleche, G. 1985. Chemical modification and degradation of starch. Di dalam van Beynum, G.M.A. dan J.A. Roels (Eds). Starch Conversion Technology. Marcel Dekker, Inc, New York 8. Fortuna T., Juszczak L., and Palasiński M. 2001. Properties of Corn and Wheat Starch Phosphates Obtained from Granules Segregated According to Their Size, EJPAU, Vol. 4. 9. Koswara, Sutrisno. 2009. Teknologi Modifikasi Pati. Tersedia di: EbookPangan.com 10. Jacobs, H. dan J.A.Delcour. 1998. Modifications of granular starch, with retention of the granular structure : a review. J. Agric. Food Chem. 46(8):2895-2905 11. Winarno, F. G., 2004. Kimia Pangan dan Gizi. PT Gramedia Pustaka Utama. Jakarta. 12. Fatriasari, W., Masruchin, N., Hermiati, E. 2019. Selulosa. Lipi Press. Jakarta. 13. Akhmalludin., Kurniawan, Arie. 2009. Pembuatan Pektin dari Kulit Cokelat Dengan Cara Ekstraksi. Universitas Diponegoro: Semarang. 14. Budiyanto, Agus., Yulianingsih. 2008. Pengaruh Suhu dan Waktu Ekstraksi Terhadap Karakter Pektin dari Ampas Jeruk Siam (Citrus nobilis L). Jurnal Pascapanen 5(2): 37-44.

Course Learning Outcomes (CLO):

1	The students are able to understand the advanced knowledge of types and sources of sugar and polysaccharides.

2	The students are able to explain the techniques handling of sugar and polysaccharides.
3	The students are able to apply sugar and polysaccharides processing methods.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							
2				V				

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Technology and Management of Food Services
Module level	Bachelor Program
Code	220303662P006
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester (s)	6
Person responsible for the module	Nur Amaliah, S.TP., M.Si.
Lecture	Nur Amaliah, S.TP., M.Si. Yulian Andriyani, S.TP., M. Sc
Language	Bahasa Indonesia
Relation to curriculum	Elective
Type of teaching, contact hours	Lecture, project-based learning, discussion, assignment, case study, evaluation.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit point	2 SKS / 3.2 ETCS Details : 1 Credit = 170 min/week 1 Credit = 170 x 16 week = 2720 min / semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h / semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation).

<table>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Students are able to understand about planning, management organization, quality control, sanitation and marketing of food/catering service businesses</td></tr>
<tr><td>Content</td><td>Courses
1. Technology, management and development of the food/catering service business
2. Food/catering service business
3. Food/catering service production management
4. Food/catering service HR management
5. Food/catering business (PBL) 1
6. Food/catering business (PBL) 2
7. Evaluate the design program
8. Mid test
9. Food service
10. Food/catering service system 1
11. Food/catering service system 2
12. Halal management of food services 1
13. Halal management of food services 2
14. Food service sanitation management
15. Quiz and group discussion
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 2 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
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<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Media emplyode	Class Meeting
Reading list	1. Amirullah Imam H. 2005. Pengantar Bisnis. Graha Ilmu.Yogyakarta. 2. Bartono. 2005. Analisis Food Product Studi Food Cost dan Pedoman Training. ANDI: Yogjakarta 3. Freddy Rangkuti. 1997. Analisis SWOT Teknik Membedah Kasus Bisnis. Gramedia Pustaka Utama. Jakarta 4. Moerdiyanto. 2008. DIKTAT STUDI KELAYAKAN BISNIS. UNY: Yogjakarta 5. Nawawi Hadari H. 2003. Perencanaan SDM untuk Organisasi Profit yang Kompetitif. Gajah mada University Press. Yogyakarta. 6. PERMENKES RI No.1096/MENKES/PER/VI/2011 7. PERATURAN MENTERI PARIWISATA DAN EKONOMI KREATIF REPUBLIK INDONESIA No. 18 TAHUN 2014 TENTANG STANDAR USAHA JASA BOGA 8. Reymond J. Goodman, Jr. 2002. F & B Service Management. Alih bahasa: Gina Gania, Ivone, Susanti, Erlangga, Jakarta. 9. Roger G. Schroeder. 1977. Manajemen Operasi Jilid I, II. Erlangga Jakarta. 10. Setiawati, Tati. 2008. Modul mata kuliah Manajemen Usaha Boga. FPTK – UPI 11. Sutriyati Purwanti.2008. Modul: Manajemen Usaha. 12. Titin Hera W. 2007. Modul: Penerapan Ketrampilan Produksi dalam Usaha Boga. 13. UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 3 TAHUN 1982 TENTANG WAJIB DAFTAR PERUSAHAAN

Course Learning Outcomes (CLO):

1	Students are able to apply knowledge about planning, management and development of catering service businesses.
2	Students are able to organize a team to produce of food/agricultural products that is recognized

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO)

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1				V				
2							V	

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Product Development and Marketing
Module level	Degree program
Code	220303662W003
Subtitle	Bahasa Indonesia
Courses	2 (2-0)
Semester(s)	6
Person responsible for the module	Sulistyo Prabowo, S.TP., MP., MPH., Ph.D
Lecture	1. Sulistyo Prabowo, S.TP., MP., MPH., Ph.D 2. Dr. Miftakhur Rohmah, SP, MP
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	lectures, discussions, student center learning, practice questions, project based learning, assignments, case study.
Workload	Workload 1. Lectures: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes per week. 3. Independent study: 2 x 60 = 120 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	2 SKS / 3.2 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Minimum attendance of 80% (based on Mulawarman University regulation).
Recommended prerequisites	Entrepreneurship

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to explain the structure, function, and properties of food/agricultural products, and changes during processing and storage.
2. Able to apply appropriate food/agricultural product analysis techniques and in accordance with objectives
3. Able to design the handling of materials and production processes for tropical humid food/agricultural products and their environment in a sustainable manner</td></tr>
<tr><td>Content</td><td>Courses
1. Introduction to product design and development
2. Design development process and organization
3. Product Design and Development Methods
4. Analyze and apply process stages in rational methods
5. Product design and development methods
6. Identification of Consumer Needs (customer requirements) and Market Analysis
7. Quality function development (QFD)
8. Mid test
9. Prototyping
10. Prototyping II
11. Ergonomic evaluation in product design
12. Ergonomic evaluation in product design II
13. Product architecture
14. Concept selection
15. Economic analysis and product development management
16. Final test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 1 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Quiz</td><td>Written test</td><td>10</td></tr>
<tr><td>2</td><td>Middle test (UTS)</td><td>Written test</td><td>10</td></tr>
<tr><td>3</td><td>Final test (UAS)</td><td>Written test</td><td>20</td></tr>
<tr><td>4</td><td>Project</td><td>Individual/group project</td><td>25</td></tr>
<tr><td>5</td><td>Case Study</td><td>Individual/group assigment</td><td>25</td></tr>
<tr><td>6</td><td>Affective</td><td>Participation</td><td>10</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100</td></tr>
</table>

	B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Emplyode media	Meeting Class
Reading list	1. Karl T. Ulrich $ Steven D. Eppinger, Product Development $ Design 2. Nigel Cross, Engineering Design Methods (Strategic for Product Design) 3. Ronald G. Day, Quality Function Deployment

Course Learning Outcomes (CLO):

1.	Students able to explain about products development and marketing
2.	Students are able to apply the product's development process and know the target market.
3.	Students are able to develop agricultural products.

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V							
2			V					
3					V			

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Thesis Assistance I
Module level	Degree program
Code	220303661W001
Subtitle	Bahasa Indonesia
Courses	1 (0-1)
Semester(s)	6
Person responsible for the module	Head of Agricultural Product Technology Study Program
Lecture	Thesis Advisor
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	Discuss, question and answer
Workload	Workload 1. Lectures: 1 x 50 = 50 minutes per week. 2. Exercises and Assignments: 1 x 60 = 60 minutes per week. 3. Independent study: 1 x 60 = 60 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2.720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	1 SKS / 1.6 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS
Requirements according to the examination regulations	-
Recommended prerequisites	-

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Department of Agricultural Product Technology
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<table>
<tr><td>Module objectives/intended learning outcomes</td><td>This course guides students in preparing their undergraduate research theses through intensive mentoring with their thesis advisors. Students will receive direction in selecting research topics, developing the background, formulating research questions, conducting literature reviews, and designing research methodologies suitable for presentation in the proposal seminar. Furthermore, students will develop a research timeline and research instruments to be used in their research process. This course aim to ensure that have well-developed research proposals ready to proceed to the research stage</td></tr>
<tr><td>Content</td><td>1. Course syllabus and an overview of research methodologies suitable for undergraduate theses
2. Brainstorming research ideas
3. Techniques for literature review and reference gathering for the Introduction and Literature Review sections
4. Techniques for formulating the research background, problem statement, objectives, and significance I
5. Techniques for formulating the research background, problem statement, objectives, and significance II
6. Drafting Chapter II (Literature Review) (Part 1)
7. Drafting Chapter II (Literature Review) (Part 2)
8. Drafting chapter III (Research Methods)
9. Middle Test (UTS)
10. Simulating research proposal presentations I
11. Simulating research proposal presentations II
12. Introduction to logbook maintenance and ethical clearance procedures
13. Practical training in Good Laboratory Practice (GLP)
14. Finalizing the research proposal and evaluating its suitability for the proposal seminar I
15. Finalizing the research proposal and evaluating its suitability for the proposal seminar II
16. Final Test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 7 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Participation</td><td>10</td></tr>
<tr><td>2</td><td>Case Study</td><td>Individual Assignment</td><td>25</td></tr>
<tr><td>3</td><td>Middle Test</td><td>Individual test</td><td>10</td></tr>
<tr><td>4</td><td>Project</td><td>Individual project</td><td>30</td></tr>
<tr><td>5</td><td>Final Test</td><td>Proposal Seminar</td><td>25</td></tr>
</table></td></tr>
</table>

	A : 80 ≤ Passing Grade ≤ 100 B : 70 ≤ Passing Grade ≤ 75 75 ≤ Passing Grade < 80 C : 60 ≤ Passing Grade < 65 65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Emplyode media	Meeting Class and Laboratory
Reading list	1. Thesis Guidliness FAPERTA Unmul 2. Research Methods Books, Research Statistics Books

Course Learning Outcomes (CLO):

1.	Students are able to arrange a research proposal, doing presentation and get GLP certification

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							V	

Semester 7

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Community Service Program (KKN)
Module level	Degree program
Code	220303676W004
Subtitle	Bahasa Indonesia
Courses	3 (0-3)
Semester(s)	7
Person responsible for the module	Rector Mulawarman University
Lecture	All Lecturers
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	Observation, discuss, question and answer
Workload	Workload 1. Lectures: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes per week. 3. Independent study: 3 x 60 = 180 minutes per week. The number of meetings per semester is 14 meetings. (14 meetings for learning activity). Total 7.140 minutes or equivalent to 119 hours in 14 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	3 SKS / 4.8 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 14 week = 2380 min/semester 1 Credit = 39.7 h/semester 1 ECTS = 25 h/semester 1 Credit = 39.7/25 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS 3 Credit = 1.6 x 3 = 4.8 ECTS
Requirements according to the examination regulations	Minimum reached 110 credit (SKS) or 174.9 ECTS (based on Mulawarman University regulation) without E mark, GPA $\geq$ 2.00
Recommended prerequisites	-

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>2. Able to collaborate to identify agricultural product technology in the community, design completion programs, and provide solutions by utilizing various potentials in the community, especially those related to literacy and reporting in written form</td></tr>
<tr><td>Content</td><td>Field Study</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process in the Academic Regulations of Mulawarman University:
<table>
<tr><td>No.</td><td>Objects of Assessment</td><td>Forms of Assessment</td><td>Quantity (%)</td></tr>
<tr><td>1</td><td>Affective</td><td>Affective Assesment Sheet</td><td>10</td></tr>
<tr><td>2</td><td>Assignment</td><td>Weekly Report</td><td>30</td></tr>
<tr><td>3</td><td>Final Semester Test/Project</td><td>Final Report</td><td>60</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
<tr><td>Emplyode media</td><td>Practical</td></tr>
<tr><td>Reading list</td><td>2. Community Services Program (KKN) Guideliness</td></tr>
</table>

Course Learning Outcomes (CLO):

1.	Students are able to collaborate to identify agricultural product technology in the community, design completion programs, and provide solutions by utilizing various potentials in the community, especially those related to literacy and reporting in written form

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1							V	V

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Thesis Assistance II
Module level	Degree program
Code	220303671W001
Subtitle	Bahasa Indonesia
Courses	1 (0-1)
Semester(s)	7
Person responsible for the module	Head of Agricultural Product Technology Study Program
Lecture	Thesis Advisor
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	Discuss, question and answer
Workload	Workload 1. Lectures: 1 x 50 = 50 minutes per week. 2. Exercises and Assignments: 1 x 60 = 60 minutes per week. 3. Independent study: 1 x 60 = 60 minutes per week. The number of meetings per semester is 16 meetings. (14 meetings for learning activity, one meeting for mid-semester, one meeting for final examination). Total 2.720 minutes or equivalent to 45.3 hours in 16 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	1 SKS / 1.6 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 16 week = 2720 min/semester 1 Credit = 45.3 h/semester 1 ECTS = 28 h/semester 1 Credit = 45.3/28 = 1.6 ECTS
Requirements according to the examination regulations	-
Recommended prerequisites	-

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Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. This course provides guidance to students in conducting research and writing their undergraduate theses following the proposal seminar. Students will receive direction in data collection, data processing, research results analysis, the development of the results and discussion chapter, and preparation for the final seminar. This course ensures that students possess the necessary academic preparedness and research skills to complete their theses and present their research findings systematically in the final seminar</td></tr>
<tr><td>Content</td><td>1. Course meeting arrangements and Introduction to data analysis methods I
2. Introduction to data analysis methods II
3. Data analysis I
4. Data analysis II
5. Drafting Chapter IV (Results and Discussion) I
6. Drafting Chapter IV (Results and Discussion) II
7. Drafting Chapter IV (Results and Discussion) III
8. Middle Test (UTS)
9. Techniques for preparing manuscripts for publication I
10. Techniques for preparing manuscripts for publication II
11. Drafting Chapter V (Conclusions and Recommendations) and the abstract
12. Simulating research findings presentations (end of term) I
13. Simulating research findings presentations (end of term) II
14. Drafting the journal manuscript and finalizing the thesis I
15. Drafting the journal manuscript and finalizing the thesis II
16. Final Test (UAS)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process are following scheme 7 in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Participation</td><td>10</td></tr>
<tr><td>2</td><td>Case Study</td><td>Individual Assignment</td><td>25</td></tr>
<tr><td>3</td><td>Middle Test</td><td>Individual test</td><td>10</td></tr>
<tr><td>4</td><td>Project</td><td>Individual project</td><td>30</td></tr>
<tr><td>5</td><td>Final Test</td><td>Thesis Product and Presentation</td><td>25</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65</td></tr>
</table>

	65 ≤ Passing Grade < 70 D : 40 ≤ Passing Grade < 50 50 ≤ Passing Grade < 60 E : 0 ≤ Passing Grade < 40
Emplyode media	Meeting Class and Laboratory
Reading list	1. Thesis Guidliness FAPERTA Unmul 2. Research Methods Books, Research Statistics Books

Course Learning Outcomes (CLO):

1.	Students are able to arrange and get a validated research logbook and a draft journal manuscripts

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1					V		V	

SEMESTER 8

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

Module name	Thesis
Module level	Degree program
Code	220303672W003
Subtitle	Bahasa Indonesia
Courses	6 (0-6)
Semester(s)	8
Person responsible for the module	Dean Faculty of Agriculture
Lecture	All Lecturers
Language	Indonesian
Relation to curriculum	Compulsory
Type of teaching, contact hours	Observation, discuss, question and answer
Workload	Workload 1. Lectures: 6 x 50 = 300 minutes per week. 2. Exercises and Assignments: 6 x 60 = 360 minutes per week. 3. Independent study: 6 x 60 = 360 minutes per week. The number of meetings per semester is 14 meetings. (14 meetings for learning activity). Total 14.280 minutes or equivalent to 238 hours in 14 weeks per semester. According to National Regulation No. 53, year 2023.
Credit points	6 SKS / 9.6 ECTS Details: 1 Credit = 170 min/week 1 Credit = 170 min x 14 week = 2380 min/semester 1 Credit = 39.7 h/semester 1 ECTS = 25 h/semester 1 Credit = 39.7/25 = 1.6 ECTS 6 Credit = 1.6 x 6 = 9.6 ECTS
Requirements according to the examination regulations	Minimum reached 110 credit (SKS) or 174.9 ECTS (based on Mulawarman University regulation) without E mark, GPA $\geq$ 2.00
Recommended prerequisites	-

Module Handbook
Department of Agricultural Product Technology
Mulawarman University

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>1. Able to internalize academic ethics in agricultural product technology and able to solve the issues in agricultural product</td></tr>
<tr><td>Content</td><td>Agricultural Product Technology Issues, Compiling a literature review, Research Methodology, Results, and discussion, Conclusions, and suggestions</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of the learning process in the Academic Regulations of Mulawarman University:
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Affective Assesment Sheet</td><td>10</td></tr>
<tr><td>2</td><td>Quiz (Proposal Seminar)</td><td>Proposal Product and Seminar Proposal Presentation</td><td>50</td></tr>
<tr><td>3</td><td>Final Assignment Exam</td><td>Thesis Product and Presentation</td><td>40</td></tr>
</table>
A : 80 ≤ Passing Grade ≤ 100
B : 70 ≤ Passing Grade ≤ 75
75 ≤ Passing Grade < 80
C : 60 ≤ Passing Grade < 65
65 ≤ Passing Grade < 70
D : 40 ≤ Passing Grade < 50
50 ≤ Passing Grade < 60
E : 0 ≤ Passing Grade < 40</td></tr>
<tr><td>Emplyode media</td><td>Meeting Laboratory and Practical</td></tr>
<tr><td>Reading list</td><td>1. Thesis Guidliness FAPERTA Unmul
2. Research Methods Books, Research Statistics Books</td></tr>
</table>

Course Learning Outcomes (CLO):

1.	Students able to internalize academic ethics in agricultural product technology and able to solve the issues in agricultural product

Mapping of Course Learning Outcomes (CLO) with Intended Learning Outcomes (ILO):

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8
1	V	V	V	V	V	V	V	V

COURSE DESCRIPTION

Religion	**3 (2-1)**
The development of students who have faith and devotion to Allah SWT, have noble character, have a work ethic, uphold human values and life, and participate in developing knowledge and technology for the benefit of the nation and the State	
Pancasila	**2 (2-0)**
Understanding Pancasila as the basis for the value of knowledge development formed in an inclusive, tolerant and mutual cooperation attitude in religious and cultural diversity	
Indonesian Language	**2 (2-0)**
Grammar, syntax, spelling, language logic, sentence and paragraph preparation, systematics of writing scientific papers, use of standard terms, absorption from foreign and local languages. Method of Generating summaries.	
Basic Social and Cultural Sciences	**2 (2-0)**
Population, society from culture (Population growth from migration; cultural development, institutions from (Concept of identity, function of the form of the family system): Youth from socialization, (Internalization, learning, specialization; internalization, learning, specialization; The Role of Higher Education, Family and Community as Educational Institutions); Citizens and the State (State and government laws; rights and obligations of citizens; Legal and Political Awareness); Coating and degree parity; Community (Concept of urban-rural-industrial society; influence between industrial city-village communities); Social opposition and national integration and unity): Science (the concept of science; Appropriate and modern technology; the concept of poverty; the influence of technology on society).	
Introduction to Moist Tropical Agriculture	**2 (2-0)**
Discussing the meaning of the history of agricultural development. Wet tropical farming system. The role of the wet tropical agricultural system in development which includes activities to increase income from community welfare, post-harvest handling of wet tropical agricultural products, industrial development and agricultural industrialization.	
Biology of Agricultural Products	**3 (2-1)**
This course discusses Biology as a science, characteristics of life, Organization of life, Cell as the smallest organization of life, cell metabolism, photosynthesis, cell division. Cell genetics, Organization of life, Classification, organ function and organ systems, reproduction, development, physiology and behavior in animals and plants. Ecology. Biosphere, and environmental balance.	

Agricultural Product Chemistry I	**3 (2-1)**
The scope includes the basic understanding of substances and their types, properties and changes in substances, the development of atomic theory, electron configuration, system periodic countdown, chemical bonds and nomenclature of chemical compounds, basic laws of chemistry and reaction equations, the concept of mold and stoichiometrics, acid-base theory, pH calculation, chemical equilibrium, buffer solutions, redox reactions, nuclear chemistry, introduction to organic chemistry and agricultural chemistry.	
Mathematics	**2 (2-0)**
The scope of this course includes Sets, Relationships and Functions, Rows and Series, Matrix Algebra, vectors, logic, Limits, Derivatives and their uses, Integrals and their uses, integral calculus.	
Citizenship	**2 (2-0)**
Civic education aims to develop knowledge and understanding as well as awareness of National Security Defense (HANKAMNAS), the student environment in the context of National Resilience (TANNAS), in addition to helping to foster from increasing awareness of national discipline. For this reason, students are given an understanding of the introduction to entrepreneurship, Nusantara Insights, National Resilience from the Politics of the National Security Defense Strategy as a foundation in understanding the Universal People's Security Defense system.	
Physics of Agricultural Products	**3 (2-1)**
Mechanics of unit systems, scalar/vector quantities, Newton's laws, the principle of equilibrium. Liquid properties of static liquid substances, liquid flowing substances, surface tension molecular phenomena. Heat and temperature thermodynamics, energy transformation, heat transformation. Modern physics quantum theory, nuclear radiation.	
Agricultural English	**3 (2-1)**
The use of English is adjusted to intermediate and pre-advanced levels. The use is emphasized on the ability to understand scientific readings and the addition of vocabulary and expressions in English as many as 4000-5000 words. The sentence structure (grammar) is given according to the scientific reading.	
Knowledge of Agricultural Ingredients	**2 (2-0)**
This course discusses the chemical and physical characteristics of various agricultural materials, the reactions that occur and cause food damage.	
Management Basics	**2 (2-0)**
Definition and concept of management; history and management figures, development of management science; management functions, management resources, leaders and leadership, planning, organizing include; organization, departmentalization, staff and committees, degradation; personnel arrangement, briefing includes; directing, leading,	

coordinating, motivating and controlling; analysis of management practices in Indonesia and developed countries.
Microbiology of Agricultural Products **2 (2-0)**
This course discusses the principles of microbiology which include the history of microbiology development, classification of microorganisms (Prokaryotic and eukaryotic), Bacteria, Fungi, Protozoa, algae, viruses, microorganism metabolism, microorganism nutrition and cultivation, microorganism growth, microorganism control, microorganism genetics, and the role of microorganisms in human life.
Agricultural Product Chemistry II **2 (2-0)**
Knowledge of the chemical properties of agricultural products including carbohydrates, lipids, proteins, vitamins, minerals, water, bioactive components of plants and animals, antinutrients and toxins, flavors, *food* additives, and changes that occur in these components as a result of environmental factors (temperature, humidity, pH and others).
Computer Applications for the Agricultural Industry **2 (0-2)**
This course aims to introduce the function and use of the internet. website programming, simulation programs using programming languages.
Physical Chemistry of Agricultural Products **2 (2-0)**
The scope of the course includes the basics of thermodynamics, molecules, kinetics, phase properties, surfaces, crystals, polymers, dispersions, colloids and emulsions.
Analytical Chemistry for Agricultural Product Research **2 (2-0)**
Scope of analytical chemistry, fundamentals of analytical chemistry, displaying and processing data, analysis of gravimetry, titrimetry, spectrophotometry, electrophoresis and chromatography.
Agricultural Statistics **3 (2-1)**
Description and benefits of statistics. Statistical notations, centralization and diversity of data and their usefulness (Chebisyev's postulate and the Z value). The distribution of data frequencies and their presentation in the form of graphs. Example space, occurrence, chance of an event, random variables (distribution, middle value and variety), discrete chance distribution (binom, multinom, hypergeometric, geometric, poisson), continuous (normal) chance distribution and its application. Drawing of samples (t-spread), estimation of parameters and their testing (middle value, difference between two middle values, variety, ratio of two varieties), recognition of regression and correlation, introduction of variety analysis, introduction of non-parametric statistics.

Microbiology of Agricultural Product Processing	**2 (2-0)**
This course discusses the principles of food microbiology, factors that affect microbial growth during the food processing process (the influence of temperature, water activity, preservatives, and radiation on microbial activity), microorganisms in various agricultural products, fermentation of foodstuffs, the beneficial role of microbes in fermented foods and *food-borne diseases.*	
Operating Unit	**3 (2-1)**
Introduction, engineering the food processing process to increase added value and product diversification, the scope of mastery of an operating process in the form of a black box diagram philosophy. Basic laws about the balance of materials, units, ideal services, energy movement, kinetic processes of equilibrium forces. Fluid mechanics and transportation of liquid materials.	
Engineering Economics	**2 (2-0)**
Scope of engineering economics. Costs, profits and flow of funds. The relationship between the value of money and time and the level of *interest* on capital. Cost analysis with NPV and UACFA. Alternative analysis using the ROR (Payback period, AAR, IRR, MIRR), PI, B/C, Break Event Analysis, Depreciation method.	
Biochemistry of Agricultural Products	**3 (2-1)**
Definition of biochemistry, structure and function of biomolecules, photosynthesis and biosynthesis of simple molecules, metabolism of energy (carbohydrates, proteins, and fats), enzymes and their applications, DNA replication, gene expression, and bioenergetics.	
Processing Tools and Machines	**2 (2-0)**
Types and working principles of processing equipment and machinery for food and agricultural products (material handling equipment (*conveyor, forklift, air combustion, pump*), power plant (*internal combustion engines, steam boiler, power transmission, burner,* electric motor), size reduction equipment (*crusher, miller, blender, slicer*), mixing equipment (*dry mixer, wet mixer*), separator/separator (*centrifuge, filter, siever)*), coolers (*cooler, freezer*), dryers (*electric drier, sun drier, burner drier*), fermenters, packaging equipment (*packer, wrapper*), sterilization equipment (*autoclave, irradiazer*), and room condition control devices (*fan, humidifier*). Application of equipment and machinery in various industries of handling and processing agricultural products.	
Physical Properties of Agricultural Products	**2 (2-0)**
Physical and physiological characteristics of agricultural materials. Dimensions and shapes, density and weight of type, viscosity, surface properties of foodstuffs. Gel formation on carbohydrates and proteins. The basic concept of rheology and the properties of rheology and water activity.	

Quality Control **2 (2-0)**
This course explains the scope of food quality control, the role of food quality supervision and standardization, quality elements and factors, process control in the food industry, process evaluation and quality improvement, measurement of quality performance and consumer satisfaction, population and samples, sampling systems, quality control statistics, product contamination and counterfeiting, and Indonesian National Standards (SNI) (SPB).
Chemical Analysis of Agricultural Products **2 (2-0)**
Definition of analysis, grouping of foodstuffs, objectives of analysis, procedures and conditions for the analysis of agricultural ingredients. The general method of storing samples for the purposes of chemical and physical analysis. How to determine the content of water, ash, protein, fat and oil, carbohydrates, vitamins, minerals, anti-nutrients and additives.
Research Methodology **3 (2-1)**
Learn how to conduct scientific research including making research proposals, conducting research and making research reports. In addition, it discusses the research process in general, starting from problem determination, literature review, citation techniques, the use of library management programs (Mendeley), identification of experimental research variables, observation and data collection, interpretation of experimental analysis results, and procedures for writing scientific papers (thesis and scientific publications and seminar procedures).
Experimental Design **3 (2-1)**
Definition and scope of experiments, basic elements of experiments (experimental units, treatments, and *experimental errors*), basic assumptions of an experiment (repeats and their functions, factors affecting the number of repeats) and their control. Research scientificity, research procedures, determination of experiments (single and factorial). Classification of Experimental Designs (RAL, RAK, RBSL, RPT) and their analysis (variety analysis). The assumptions underlying the variety analysis (data are normally distributed and have the same variety). Data transformation to be normally distributed (*Successive Interval Method*). Data analysis that does not meet the assumption of variety analysis (Non-parameteric statistics). Double comparison.
Sanitation and Safety of the Food Processing Industry **2 (2-0)**
This course presents hygiene and sanitation regulations in food processing both nationally and internationally, sources of contamination and control, basic sanitary techniques, hygienic industrial design, hygiene and sanitation of processing facilities, cleaning and disinfection, *cleaning in place, personal hygiene*, and various sanitary indicator tests, liquid

and solid waste management management, hazardous waste disposal process, recycling technology, labeling and consumer safety information, SSOP, HACCP.
Food Regulation **2 (2-0)**
This course discusses the legal system in Indonesia and internationally in the field of food, the process of drafting laws and regulations under them, and laws and regulations related to food.
Microbiological Analysis of Agricultural Products **3 (1-2)**
General techniques and standard procedures for microbiological analysis, preparation and sterilization of media, aseptic techniques, types of media, factors influencing microbial growth, isolation and culture transfer techniques, simple microbial identification and characterization, microscopic observations (morphology of yeast, bacteria, fungal cells), microbial calculations (cup count, MPN). analysis of air, space and people/worker quality. Coliform test, Food pathogen microbial test, and antimicrobial analysis.
Food Nutrition **2 (2-0)**
Introduction to nutrition, nutrients, the relationship between nutrition and food, agriculture, health and growth and development. Digestion and absorption, metabolism of nutrients. Function, adequacy and consequences of vitamin and mineral deficiency for the body. Nutrition issues, nutritional interactions, nutritional status assessments and reviews of nutrition improvement programs.
Practicum for Physicochemical Analysis of Agricultural Products **2 (0-2)**
Includes the implementation of concepts related to the Analytical Chemistry course, Physical Properties of Agricultural Products, and Chemical Analysis of Agricultural Products.
Post-harvest Physiology and Technology **2 (2-0)**
The scope of this course includes the definition of post-harvest physiology and technology, metabolism in agricultural materials, respiratory patterns (climacteric and non-climateric), senescence, ethylene, physical and chemical changes in ripening, harvest index, post-harvest pathology and its treatment. Effects of temperature, RH, and gas composition on physiology, biochemistry, quality and freshness of agricultural materials.
Processing Process Technology **2 (2-0)**
The scope of this course includes the role of processing process technology, introduction and understanding of the processing process, factors that affect during processing, several food processing techniques, including high temperature processing, low temperature,

drying, fermentation, fumigation, extrusion, pressure, irradiation, microwave, semi-wet food, ingredient formulation techniques.

Food Processing Technology and Agricultural Products	**3 (2-1)**
The scope of this course is about the material process from harvest to semi-finished products and finished products. The process includes threshing, cleaning, drying, peeling, size reduction, and material handling. Food processing includes the basics of rheology, heating, drying, and cooling of foodstuffs.	

Technology for Preservation, Packaging, and Storage of Agricultural Products	**3 (2-1)**
Discussion about the preservation of foodstuffs which includes drying, smoking, canning, providing chemical additives, heating, cooling and fermentation. Introduction to the role of food packaging functions and their development from natural, traditional to cutting-edge packaging. Knowledge of types, characteristics, various packaging materials (glass, metal, wood, paper, cardboard, plastic, anti-vibration materials, traditional packaging materials, edible coating). Food labeling requirements, *smart packaging.*	

Entrepreneurship	**2 (2-0)**
Entrepreneurial insight, fostering the spirit of technopreneurship, its strategies and challenges. Establishment and tips for industrial management. Standardization and certification of agricultural products industry.	

Factory Layout and Design	**2 (2-0)**
Scope of factory design. Planning of small-scale food processing units, including planning of basic ingredients, processes, tool layouts and process stages. Planning of capacity, flow and handling of materials and relationships between activities.	

Sensory Tests	**3 (2-1)**
Introduction to sensory properties and their tests, senses and response measurements, sensory test requirements, selection of panelists, sensory test laboratories, test preparation and preparation, differentiation tests, affective tests (hedonic, hedonic quality, scale), description tests, consumer tests, standard procedures and some examples of the application of sensory tests, statistics in sensory tests.	

Product Development and Marketing	**3 (1-2)**
Basics of product development, product design, food product development tools, Types of new products for a company, applications of new technologies in the industry, simulation of new products, Human interaction with organizations and marketing strategies.	

Operations Research	**3 (2-1)**

Problem solving to optimize the use of various resources that are limited in availability by linear *programming* using a simple method and its application in special forms of transportation, assignment (time and dual division) and *transshipment problems.*
Refreshing Ingredient Technology **2 (2-0)**
Basic knowledge of tea, coffee, and chocolate commodities. Post-harvest handling and processing methods of the plantation products and their storage. Standardization of the quality of processed products and secondary products.
Quality Management of Agricultural Products Industry **2 (2-0)**
Quality management system, quality management principles, quality documentation and manual, Total Quality Management, ISO series, SNI 01-4852-1998 concerning Hazard Analysis and *Critical Point Control* System (HACCP) and its implementation guidelines, HAS 23000 concerning Halal Assurance System.

Legumes, Cereals and Tubers Technology **3 (2-1)**
The scope of this course includes an introduction to basic knowledge about legumes, cereals and tubers, physical properties, chemical properties, structure, composition, storage methods and how to preserve legumes, cereals and tubers. In this course, it is also discussed about quality improvement, processing and product development from legumes, cereals and tubers
Palma, Rubber and Tobacco Technology **2 (2-0)**
Basic knowledge of rubber and tobacco commodities. Post-harvest handling and processing methods of the plantation products and their storage. Standardization of the quality of processed products and secondary products.
Livestock and Aquatic Product Technology **3 (2-1)**
The scope of this course includes basic knowledge about livestock products including structure, composition, chemical, physical and microbiological properties. Changes that occur after post-harvest, the quality of livestock products, the way of measuring quality, the way of storage, preservation. Development of processed products from livestock products. As well as types, potentials and opportunities for the use of marine and fishery resources, post-harvest handling of fishery products, fish processing with traditional and modern techniques, processing technology of surimi, gelatin, alginate and carrageenan and chitin-chitosan.
Food Fortification Technology **2 (2-0)**
Definition of food fortification, general objectives of fortification, history and development of world food fortification, latest issues about fortification, advantages and disadvantages of fortification programs, types of fortifications, food vehicles, food fortification

technology, biofortification, laws on fortification, future fortification challenges, and fortified product intervention strategies.
Fermentation Technology **2 (2-0)**
Explain the meaning and history of fermentation, the basics of the fermentation process, microbial management. development of inoculums, mediums, sterilization, aeration and agitation, fermentation process kinetics, process optimization, fermenter design, download and purification of results.
Agricultural Industrial Waste Handling and Management Technology **2 (2-0)**
This course covers the definition, regulations, objectives, classification and types of waste treatment (physically, chemically and biologically). Technological design continues for waste management (liquid, solid and gas) and hazardous waste disposal processes; Recycling technologies include nutrient removal in waste, energy production from liquid, solid and gaseous wastes and management along with examples of waste handling in processed products.
Oil and Fat Technology **3 (2-1)**
Overview of the oil and fat industry (raw materials, processing, industrial products), oil and fat sources, physical and chemical properties of oils and fats, extraction and purification of oils and fats, deterioration of oils and fats, packaging, processing of fats and oils as food ingredients (emulsifiers, margarine, butter), and non-food (soaps, surfactants, biodiesel).
Food Additives **2 (2-0)**
The scope of this course includes the definition, classification, application, benefits and dangers of the use of food additives, regulations that regulate their use and various types of food additives along with their properties, functions, applications, and toxicology.
Fruit and Vegetable Technology **3 (2-1)**
Basic knowledge of vegetables and fruits. Physical and physical properties of tropical and subtropical fruits and vegetables. Handling in fresh form, processing and preservation.
Functional Food Processing Technology **2 (2-0)**
Definition of functional food, functional food and health (*nutrigenomic, nutribolomic, nutriceutical*), functional food classes and requirements, functional food development,

functional food ingredients (herbal and non-herbal), regulations on functional food, stages of development of functional food development and functional food claims.
Lactic Acid Bacteria Technology **2 (2-0)**
This course discusses the characteristics of lactic acid bacteria, their classification, lactic acid metabolism, fermentation involving lactic acid bacteria, bacteriocins, lactic acid bacteria and health, lactic acid bacteria as probiotics, prebiotic, symbiotic and postbiotic definitions, prerequisites for the development of probiotic products
Nutritional Evaluation in Food Processing **3 (2-1)**
Availability of food nutrients, Factors that cause nutrient loss in the processing of agricultural products. Various consequences of physical, chemical, biological treatment on nutritional value. Methods of nutritional evaluation of processed agricultural products, in vitro and in vivo nutritional evaluation, *ethical clereance*.
Spice and Essential Oil Technology **3 (2-1)**
The scope of this course includes an introduction to the types and history of spices, the benefits of spices, the working principle of olfactory, post-harvest handling of spices, spice products, spices and world culinary, the variety and function of essential oils, essential oil extraction techniques, essential oil purification techniques and essential oil quality.
Cake and Bread Technology **3 (2-1)**
The scope of this course includes several basic knowledge, introduction to ingredients, influencing factors, introduction to equipment, terms in bakery technology, process stages in bakery technology, as well as processing and development of processed products.
Enzyme Technology **2 (2-0)**
Definition of enzymes, classification and nomenclature of enzymes. Sources of enzymes and their extraction methods. Enzyme purification. Enzyme characterization, Enzyme kinetics, Factors affecting enzyme activity, Amobilized enzymes. Application of enzyme technology in industry.
Warehousing Management **2 (2-0)**
The scope of this course includes factors that play a role in storage, methods and techniques of storage and warehousing of various commodities and products of the food industry, warehouse pest control and warehouse management and distribution of goods.

Food Service Technology and Management	**2 (2-0)**
Learn about planning, management and organization of food service businesses, quality control, sanitation to marketing food service businesses.	
Sugar and Polysaccharide Technology	**2 (2-0)**
The scope of the course includes the sources and types of sugars, the structure and physicochemical properties of sugars and polysaccharides, the benefits, nutritional value, sensory properties of sugars and their economic value, as well as the extraction and processing of sugars and polysaccharides from various sources.	
Halal Food Technology and Management	**2 (2-0)**
This course discusses the foundations of halal, halal and haram food philosophy in Islam, the history of halal certification, Law No. 33/2014 concerning the Halal Assurance System, material knowledge, HAS 23000 halal assurance system: documentation and its implementation, halal audit and certification.	
Field Work Practice (PKL)	**2 (0-2)**
The form of field work practice is an internship at a government or private institution or agency related to the field of agricultural product technology or students do their own practice with the help of a supervisor for a certain period of time.	
Real Work Lectures/Community Service (KKN	**3 (0-3)**
The form of Real Work Lecture is to apply the results obtained during lectures to real life in the community as a form of community service at a certain location and time.	
Thesis I Mentoring	**1 (0-1)**
This course is the initial stage in the thesis preparation process, where students will be guided to identify research topics, formulate problems, and set the right goals and methods. Assistance is carried out by a supervisor who will provide direction and evaluation of student research progress. This course also includes the preparation of a thesis proposal that will be presented to get approval from the supervisor.	

Thesis II Mentoring	**1 (0-1)**
This course is an advanced stage of the First Thesis Mentoring, where students continue previously approved research and focus on data collection, analysis, and preparation of research results. At this stage, students will be guided to write thesis chapters in more depth, improve existing drafts, and prepare the thesis for the exam stage. This mentoring aims to ensure that the thesis meets academic standards and is ready to be defended in front of the examiner.	
Seminar	**2 (0-2)**
The seminar includes the presentation of research proposals (Seminar I) and research results (Seminar II) which are carried out based on the thesis writing process.	
Thesis	**6 (0-6)**
The thesis is a report of research results that is carried out independently under the guidance of the supervisor and tested by the examiner. The research carried out is preceded by a research proposal that is seminared before conducting the research. The results of the research were also seminared before being written in the form of a report that met the criteria for writing a thesis of the Faculty of Agriculture, Mulawarman University.	
Certified Internship/Village Building/Entrepreneurship	**20 (20-0)**
A form of learning activity that provides insight and practical experience to students regarding real activities in the world of industry, business, and work (IDUKA) which is carried out for 1 semester.	

BACHELOR PROGRAM
AGRICULTURAL PRODUCT TECHNOLOGY


+621-1993-0460


thp@faperta.unmul.ac.id


thpfapertaunmul


THP Unmul


yin.thp.unmul.ac.id