

# CURRICULUM OF AGRICULTURAL PRODUCT TECHNOLOGY STUDY PROGRAM DEPARTMENT OF AGRICULTURAL TECHNOLOGY AT FACULTY OF AGRICULTURE SRIWIJAYA UNIVERSITY IN 2017

## A. Vision

An excellent study program in the field of Agricultural Product Technology that is able to apply and develop technology, especially those based on local resources and wisdom.

## B. Mission

1. To produce graduates who believe in the Almighty God;
2. To educate and foster human resources to be able to apply agricultural technology and skill in using local resources and wisdom, as well as to have entrepreneurial abilities and work hard;
3. To develop agricultural product technology through research by paying attention to local resources and wisdom;
4. To disseminate and implement the technology of agricultural product in order to actively participate in improving the welfare of the community.

## C. Objective

1. To produce graduates who believe in the Almighty God also qualified, independent, and tough.
2. To create the Agricultural Product Technology Study Program as a reference center for the development of science, technology, and policies, especially in the field of Agricultural Product Technology.
3. To increase an active role in community development.

## D. GRADUATE PROFILE

Profile of graduates of Agricultural Product Technology Study program, Agricultural Technology Department, Faculty of Agriculture, Sriwijaya University are **Professionals** in the field of Agricultural Product Technology (managers, supervisors, consultants, etc.) as follows:

### 1. Attitude

- a. Fear of God Almighty and able to show a religious attitude; upholding human values in carrying out duties based on religion, morals, and ethics.
- b. Contribute to improving the quality of life in society, nation, state, and the advancement of civilization based on Pancasila; act as citizens who are proud and love their homeland, have nationalism and a sense of responsibility to the country and nation.

- c. Appreciate the diversity of cultures, views, religions, and beliefs, as well as the opinions or original findings of others; cooperate and have social sensitivity and concern for society and the environment.
- d. Obey the law and discipline in the life of society and the state; internalize academic, norms, and ethics.
- e. Demonstrate a responsible attitude towards work in their area of expertise independently; internalize the spirit of independence, struggle and entrepreneurship.

## **2. Knowledge**

- a. Mastering the theoretical concepts and application of agricultural technology, microbiology and food safety, as well as guaranteeing the quality of agricultural products.
- b. Mastering the principles of engineering and processing, chemistry, analytical methods, biochemistry, packaging and storage technology, characteristics of agricultural products and nutrition science.
- c. Mastering general theoretical concepts of scientific methods, decision making, management of operations and production of agricultural products, as well as entrepreneurship and business based on agricultural technology.

## **3. Skills**

- a. Able to design production processes based on the principles of technology and processing of agricultural products in an effective, efficient and precise manner; development of standardized agricultural products that meet the quality criteria of agricultural products, are safe, nutritious and useful based on the principles of agricultural product technology; as well as designing agricultural product packaging in order to protect and maintain product durability and quality, as well as safe, with informative labels for consumers in accordance with regulations and laws related to agricultural products.
- b. Able to conduct research on the combination of operations for processing agricultural products in accordance with the characteristics of agricultural products and analyze problems using agricultural technology approaches in solving production problems and agricultural and agricultural products so that they are efficient, safe, and with guaranteed quality.
- c. Able to provide added value to agricultural products with Indonesian characteristics, especially the Southern part of Sumatera with locally-based agricultural products and optimal utilization of Indonesia's biological diversity through production process that are safe, standardized, efficient, and effective.
- d. Able to demonstrate independent, quality, measurable performance; apply logical, critical, systematic, and innovative thinking in the context of the development of science and technology that pays attention to and applies the values of the humanities according to their field of expertise; in order to produce a solution, idea, design or art critique.
- e. Able to compile a scientific description of the results of the studies mentioned above in the form of a thesis or final project report, and upload it on the University's website; make appropriate decisions in the context of solving problems in their area of expertise, based on the results of analysis of information and data; and documenting, storing, securing, and retrieving data to ensure validity and prevent plagiarism.

- f. Able to maintain and develop a network with supervisors, colleagues, colleagues both inside and outside the institution; is responsible for achieving the results of group work and supervising and evaluating the completion of the work assigned to workers under his responsibility; conducting a self-evaluation process for the work group under his responsibility, and being able to manage learning independently.

## **E. LEARNING OUTCOME (LO)**

### **1. Attitudes and Values (AV)**

- LO-AV-1 : fear Good Almighty and be able to show a religious attitude  
LO-AV-2 : upholding human values in carrying out duties based on religion, morals, and ethics  
LO-AV-3 : contribute to improving the quality of life in society, nation, state, and the progress of civilization based on Pancasila  
LO-AV-4 : act as citizens who are proud and love their homeland, have nationalism and a sense of responsibility to the country and nation  
LO-AV-5 : respect the diversity of cultures, views, religions, and beliefs, as well as the opinions or original findings of others  
LO-AV-6 : work together and have social sensitivity and concern for society and the environment  
LO-AV-7 : obey the law and discipline in social and state life  
LO-AV-8 : internalize academic values, norms, and ethics  
LO-AV-9 : demonstrate a responsible attitude towards work in their field of expertise independently  
LO-AV-10 : internalize the spirit of independence, struggle, and entrepreneurship

### **2. Knowledge Ability (KA)**

#### LO-KA-1: Chemistry and Agricultural Product Analysis

- LO-KA-1.1 : explain the main chemical events that underline the properties and reactions of various components of agricultural production  
LO-KA-1.2 : explain how to control chemical reactions that occur in agricultural products  
LO-KA-1.3 : explain the relationship between chemical reactions and the mechanism of damage and shelf life of agricultural products  
LO-KA-1.4 : explain the principles of techniques and methods of analysis of food/agricultural products  
LO-KA-1.5 : have skills in performing various basic and applied chemical analysis techniques on agricultural products

LO-KA-2 : Microbiology and Agricultural Product Safety

LO-KA-2.1: identify pathogenic microbes and causes of damage to agricultural products and their growing conditions

LO-KA-2.2: explain environmental factors that affect microbial growth

LO-KA-2.3: identify conditions for inactivating and killing spoilage and pathogenic microbes

LO-KA-2.4: describe the principles of preservation and processing of agricultural products by the fermentation process

LO-KA 2-5: explain and have skills in performing microbiological analysis techniques in agricultural products

LO-KA-3 : Biochemistry, Nutrition and Health

LO-KA-3.1: explain biochemical processes, basic concepts of nutrition science and the relationship between food consumption and nutritional status, and health

LO-KA-3.2: describe the process of digestion and metabolism of nutrients

LO-KA-3.3: explain the differences between nutrients and functional foods in relation to health and fitness

LO-KA-3.4: describe changes in nutrients during processing and storage

LO-KA-3.5: describe laboratory techniques commonly applied in biochemistry and evaluation of the biological value of food

LO-KA-4 : Engineering and Processing of Agricultural Products

LO-KA-4.1: describe the characteristics of raw materials, ingredients and food additives and their effect on the characteristics agricultural production

LO-KA-4.2: describe the mechanism of damage to agricultural product and identify how to control it

LO-KA-4.3: describe mass and energy balance in the processing of agricultural product

LO-KA-4.4: describe principles of heat and mass transfer process of agricultural product processing

LO-KA-4.5: describe the principle of unit operation and unit process in the agricultural product industry

LO-KA-4.6: identify the appropriate operating unit and process equipment in the processing of agricultural products

LO-KA-4.7: describe the principles and techniques of handling and processing agricultural products, as well as the influence of process parameters on quality, safety and shelf life of agricultural product

LO-KA-4.8: describe the characteristics and uses of packaging materials.

LO-KA-4.9: describe water requirements for processing agricultural products and how to manage waste from processing products agriculture

#### LO-KA-5 : Applied Agricultural Product Science

- LO-KA-5.1: applying and incorporating the principles of agricultural products science in practice and real conditions in the produce industry agriculture
- LO-KA-5.2: mastering the basic principles of sensory evaluation/sensory assessment of agricultural product
- LO-KA-5.3: choose packaging and storage techniques for agricultural products in extending the shelf life of agricultural products
- LO-KA-5.4: apply the principles of statistics and computers in the field of agricultural product.
- LO-KA-5.5: develop agricultural products based on the principles of agricultural science
- LO-KA-5.6: implement a quality assurance system in the agricultural product processing chain
- LO-KA-5.7: apply the principles of cleaning and sanitation in the processing of agricultural products
- LO-KA-5.8: apply food safety regulations and management
- LO-KA-5.9: understand the latest issues in the field of agricultural products

#### LO-KA-6 : Life Skills

- LO-KA-6.1: demonstrate oral and written communication skills related to the technical and non-technical aspects
- LO-KA-6.2: think critically, identify the root of the problem and solve it comprehensively,, and make the right decisions based on analysis of information and data
- LO-KA-6.3: has professional integrity and is committed to ethical values
- LO-KA-6.4: have an attitude to life-long learning
- LO-KA-6.5: lead and work in a team, independent and responsible for his work.
- LO-KA-6.6: cooperate with individuals who have diverse social and cultural backgrounds
- LO-KA-6.7: searching, tracing, extracting scientific and non-scientific information independently and critically
- LO-KA-6.8: adapt to the situation at hand and handle various activities simultaneously in various condition

### **3. Specific Capability (SC)**

- LO-SC-1 : able to design agricultural product production process based on the application of technology principles and agricultural product processing in an effective, efficient, and precise manner so as to produce a well-standardized production process
- LO-SC-2 : able to design the development of agricultural products that meet the quality criteria of agricultural products, are safe, nutritious and/or useful based on the principles of agricultural technology

- LO-SC-3 : able to conduct research on the combination of operations for processing agricultural products, so that they can produce safe and quality agricultural products along the agricultural production chain, and can provide added value to agricultural products
- LO-SC-4 : able to analyze problems with agricultural products technology approach in solving production problems and agricultural products so that they are efficient, safe, and with guaranteed quality
- LO-SC-5 : able to design agricultural product packaging in order to protect and maintain product durability and quality, as well as safe, with informative labels for consumers in accordance with regulations and laws related to agricultural products
- LO-SC-6 : able to provide added value to agricultural products with Indonesian characteristics, especially the Southern part of Sumatera with locally-based agricultural products and optimal utilization of Indonesia's biological diversity through production processes that are safe, standardized, efficient, and effective

#### **4. General Capability (GC)**

- LO-GC-1 : able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pay attention to and applies humanities values in accordance with their field of expertise
- LO-GC-2 : able to demonstrate independent, quality, and measureable performance
- LO-GC-3 : able to examine the implications of developing or implementing science and technology that pay attention to and applies humanities values according to their expertise based on scientific principles, procedures and ethics in order to produce solutions, ideas, designs or art criticism
- LO-GC-4 : able to compile a scientific description of the results of the studies mentioned above in the form of a thesis or final project report, and upload it on the university website
- LO-GC-5 : able to make appropriate decisions in the context of solving problems in their area of expertise, based on the results of analysis of information and data
- LO-GC-6 : able to maintain and develop a network with supervisors, colleagues. Colleagues both inside and outside the institution
- LO-GC-7 : able to be responsible for the achievement of group work results and supervise and evaluate the completion of work assigned to workers under their responsibility
- LO-GC-8 : able to carry out the process of self-evaluation of the work group under their responsibility, and able to manage learning independently
- LO-GC-9 : capable of documenting, storing, securing, and retrieving data to ensure validity and prevent plagiarism

**F. LEARNING OUTCOME MAP OF STUDY PROGRAM GRADUATES**

No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Semester
1	CHEMISTRY AND AGRICULTURAL PRODUCT ANALYSIS	PER 102117	<i>Inorganic Chemistry</i>	AV-2; AV-8;	KA 1-1; KA 1-2; KA 1-4; KA 1-5	SC-1;	GC-1; GC-2;	3	Mandatory	1
		PER 103117	<i>Organic Chemistry</i>	AV-2; AV-8;	KA 1-1; KA 1-2; KA 1-4; KA 1-5	SC-1;	GC-1; GC-2; GC-3;	3	Mandatory	2
		PTH 101117	<i>Analytical Chemistry</i>	AV-6; AV-9;	KA 1-4; KA 1-5; KA 1-6	SC-3;	GC-2; GC-5;	3	Mandatory	2
		PTH 102217	<i>Physical Chemistry</i>	AV-8	KA 1-1; KA 1-4 KA 6-2; KA 6-4;	SC-1; SC-4;	GC-1; GC-2;	2	Mandatory	3
		PTH 103217	<i>Agricultural Product Chemistry</i>	AV-9; AV-10;	KA 1-1; KA 1-2; KA 1-3; KA 4-1;	SC-1; SC-2; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5;	3	Mandatory	3
		PTH 104217	<i>Agricultural Product Analysis</i>	AV-8; AV-9; AV-10;	KA 1-4; KA 1-5; KA 1-6; KA 3-5;	SC-1; SC-2; SC-4;	GC-1; GC-2; GC-3; GC-5;	3	Mandatory	4
		PTH 105317	<i>Physiology and Post-Harvest Technology</i>	AV-6; AV-9; AV-10;	KA 1-1; KA 1-2; KA 1-3; KA 1-4; KA 4-2; KA 4-7; KA 5-3	SC-1, SC-2; SC-4; SC-5, SC-6;	GC-1; GC-2; GC-3; GC-5;	3	Mandatory	5
		PTH 106317	<i>Food Enzyme Technology*</i>	AV-8; AV-9;	KA 1-1; KA 1-2; KA 4-1; KA 5-9	SC-1; SC-2; SC-4 SC-6;	GC-1; GC-4; GC-5	2	Optional	6

No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Semester
2	MICROBIOLOGY AND AGRICULTURAL PRODUCT SAFETY	PTH 201217	<i>General Microbiology</i>	AV-2; AV-8;	KA 2-1; KA 2-2; KA 2-5;	SC-4;	GC-2;	3	Mandatory	3
		PTH 202217	<i>Food and Processing Microbiology</i>	AV-2; AV-8; AV-9; AV-10;	KA 2-1; KA 2-3; KA 2-4; KA 2-5	SC-1; SC-2; SC-4; SC-6;	GC-1;	3	Mandatory	4
		PTH 203217	<i>Hygiene, Sanitation and Food Industry Safety</i>	AV-8; AV-9;	KA 2-2; KA 4-7; KA 4-9; KA 5-7; KA 5-8;	SC-1; SC-4;	GC-1	3	Mandatory	4
		PTH 205317	<i>Fermentation Technology</i>	AV-8;	KA 2-2; KA 2-4; KA 4-1; KA 4-5; KA 4-6; KA 5-9	SC-1; SC-3;	GC-1; GC-3; GC-5;	3	Mandatory	6
		PTH 204317	<i>Thermo bacteriology*</i>	AV-9;	KA 2-2; KA 2-3; KA 4-4;	SC-4; SC-6;	GC-1; GC-3; GC-5;	2	Optional	5



No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Semester
3	BIOCHEMISTRY OF AGRICULTURAL PRODUCT, NUTRITION, AND HEALTHY	PTH 301117	<i>Food and Nutrition</i>	AV-6; AV-7; AV-8;	KA 3-1; KA 3-3; KA 6-4; KA 6-6	SC-1	GC-2.	2	Mandatory	1
		PTH 302217	<i>Biochemistry I</i>	AV-8	KA 3-1; KA 3-5;	SC-4;	GC-2	3	Mandatory	3
		PTH 303217	<i>Biochemistry 2</i>	AV-8;	KA 3-1; KA 3-2;	SC-4;	GC-2	2	Mandatory	4
		PTH 304317	<i>Nutritional Science</i>	AV-6; AV-8;	KA 3-1; KA 3-2; KA 3-5; KA 5-9;	SC-4;	GC-1	3	Mandatory	5
		PTH 305317	<i>Functional Food and Food Phytochemistry*</i>	AV-8;	KA 1-1; KA 3-1; KA 3-2; KA 3-3; KA 5-9	SC-4; SC-6;	GC-1; GC-3	3	Optional	5
		PTH 306317	<i>Nutrition Evaluation in Processing*</i>	AV-6; AV-8; AV-9;	KA 3-1; KA 3-4; KA 3-5	SC-2; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5	3	Optional	6
		PTH 307317	<i>Food Fortification Technology*</i>	AV-8;	KA 3-3; KA3-4; KA 4-1; KA 4-7; KA 5-5; KA 6-2;	SC-1; SC-2; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5	2	Optional	6

No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Semester
4	ENGINEERING AND PROCESSING OF AGRICULTURAL PRODUCTS	PTH 401117	<i>Operation Unit I</i>	AV-2;	KA 4-3; KA 4-4; KA 4-5; KA 4-6	SC-4,	GC-1	3	Mandatory	2
		PTH 402217	<i>Material Science</i>	AV-6; AV-9	KA 4-1; KA 4-2; KA 4-7; KA5-1; KA 6-2	SC-4;	GC-3	3	Mandatory	3
		PTH 403217	<i>Operation Unit II</i>	AV-2;	KA 4-4; KA4-5; KA 4-6	SC-4,	GC-1	3	Mandatory	3
		PTH 404217	<i>Principles of Agricultural Products Processing</i>	AV-6; AV-9	KA 4-1; KA4-5; KA 4-6; KA 4-7; KA 5-9	SC-1;	GC-1	3	Mandatory	4
		PTH 405217	<i>Food Crops Processing Technology</i>	AV-6; AV-9; AV-10;	KA 4-1; KA 4-2; KA 4-7; KA 5-1; KA 5-5; KA 5-9	SC-1; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5;	2	Mandatory	4
		PTH 406217	<i>Plantation Crops Processing Technology</i>	AV-6; AV-9; AV-10;	KA 4-1; KA 4-2; KA 4-7; KA 5-1; KA 5-5; KA 5-9	SC-1; SC-2; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5;	2	Mandatory	4
		PTH 407317	<i>Waste Handling Technology</i>	AV-6; AV-8;	KA 4-7; KA 4-9; KA 5-1; KA 5-9	SC-4;	GC-1	2	Mandatory	5
		PTH 408317	<i>Agricultural Product Process Engineering</i>	AV-5; AV-6; AV-8; AV-9; AV-10	KA 4-3; KA 4-4; KA 4-5; KA 4-6; KA 4-7; KA 6-2	SC-1; SC-2; SC-4	GC-1 GC-2 GC-3 GC-5	3	Mandatory	5

		PTH 410317	<i>South Sumatera Traditional Food Processing Technology*</i>	AV-4; AV-5; AV-6; AV-10;	KA 4-1; KA 4-2; KA 4-7; KA 5-1; KA 5-9; KA 6-2; KA 6-6	SC-2; SC-4; SC-6;	GC-2; GC-3; GC-5;	3	Optional	5
		PTH 409317	<i>Tropical Horticulture Processing Technology*</i>	AV-6; AV-9; AV-10;	KA 4-1; KA 4-2; KA 4-7; KA 5-1; KA 5-5; KA 5-9 KA 6-2;	SC-1 SC-2 SC-4	GC-1; GC-2; GC-3; GC-5;	2	Optional	6
		PTH 411417	<i>Oil Palm Downstream Technology*</i>	AV-6; AV-9; AV-10;	KA 4-1; KA 4-2; KA 4-7; KA 5-1; KA 5-9; KA 6-2.	SC-1; SC-2; SC-4; SC-6;	GC-1; GC-2; GC-GC-5;	2	Optional	7
		PTH 412417	<i>Polymer Technology*</i>	AV-6; AV-9; AV-10;	KA 4-1; KA 4-7; KA 4-8; KA 5-9; KA 6-2.	SC-1; SC-2; SC-4; SC-6;	GC-1; GC-2; GC-3; GC-5;	2	Optional	7
		PTP 404317	<i>Postharvest Tool and Machine*</i>	AV-9	KA 4-5; KA 4-6; KA 5-9	SC-4	GC-1 GC-5	3	Optional	5

No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Semester
5	APPLIED AGRICULTURAL PRODUCTS	PTH 501217	<i>Sensory Evaluation</i>	AV-6; AV-8; AV-9;	KA 5-2; KA 5-4; KA 5-9	SC-1, SC-3;	GC-1; GC-2; GC-4; GC-5, GC-9.	3	Mandatory	4
		PTH 502317	<i>Quality Assurance</i>	AV-3; AV-5; AV-7; AV-9;	KA 5-6; KA 5-8; KA 5-9;	SC-1, SC-2; SC-4;	GC-1; GC-2;	3	Mandatory	5
		PTH 503317	<i>Preservation Technology</i>	AV-2; AV-8; AV-10;	KA 1-3; KA 2-4; KA 4-2; KA 4-7; KA 5-1; KA 5-9;	SC-2; SC-4; SC-6;	GC-1.	3	Mandatory	5
		PTH 504317	<i>Packaging and Storage</i>	AV-8;	KA 4-7; KA 4-8; KA 5-3; KA 5-9;	SC-1; SC-2; SC-4; SC-5; SC-6;	GC-1; GC-3; GC-5;	3	Mandatory	5
		PTH 505317	<i>Product Development</i>	AV-10;	KA 5-1; KA 5-5; KA 5-9; KA 6-2; KA 6-4;	SC-1; SC-2; SC-4; SC-6;	GC-3; GC-5	3	Mandatory	6
		PTH 506317	<i>Agricultural Industry Management</i>	AV-8;	KA 5-1; KA5-6; KA 5-8;	SC-1; SC-4;	GC-1; GC-5	3	Mandatory	6

		PTH 507317	<i>Halal Assurance System*</i>	AV-1; AV-2; AV-5; AV-6; AV-9;	KA 5-1; KA 5-6; KA 5-8; KA 6-2; KA 6-3; KA 6-4	SC-3; SC-4;	GC-1; GC-5;	2	Optional	5
		PTP 508317	<i>System Analysis*</i>	AV-8	KA 5-1; KA 6-2; KA 6-4	SC-4	GC-1 GC-2	2	Optional	6
		PTH 510317	<i>Applied Computer*</i>	AV-8	KA 5-1; KA 5-4; KA 5-9	SC-1 SC-4	GC-1 GC-2 GC-5	3	Optional	6
		PTH 509317	<i>Agricultural Industry Biotechnology*</i>	AV -8; AV -9;	KA 3-5; KA 5-5 KA 5-9; KA 6-2;	SC-1; SC-2; SC-4	GC-1; GC-3	3	Optional	6

No	Field of Study	Code	Course	LO-AV	LO-KA	LO-SC	LO-GC	Credit	Status	Sem ester
6	LIFE SKILLS	UNI 001117	<i>Religion</i>	AV-1; AV-2; AV-5; AV-6; AV-8; AV-9;	KA 6-3; KA 6-4		GC-1; GC-3	2	Mandatory	2
		UNI 002117	<i>Pancasila</i>	AV-3; AV-4; AV-5; AV-7; AV-8; AV-9;	KA 6-3; KA 6-4		GC 1	2	Mandatory	1
		UNI 003117	<i>Indonesian</i>	AV-5; AV-6; AV-8; AV-9;	KA 6-1; KA 6-4;		GC-4 GC-6	2	Mandatory	1
		UNI 004117	<i>English</i>	AV-5; AV-6; AV-8; AV-9;	KA 6-1; KA 6-4;		GC-4 GC-6	2	Mandatory	2
		UNI 005117	<i>Civics</i>	AV-3; AV-4; AV-7; AV-9;	KA 6-3; KA 6-4;		GC 1	2	Mandatory	2
		PER 601117	<i>Mathematics</i>	AV-5; AV-6; AV-8;	KA 6-2; KA 6-3; KA 6-4;		GC 1 GC 2	3	Mandatory	1
		PER 604117	<i>Biology</i>	AV-6;	KA 6-2; KA 6-3; KA 6-4;		GC 1 GC 2 GC 3	3	Mandatory	1
		PER 605117	<i>Physics</i>	AV-6;	KAP 6-2; KA 6-3; KA 6-4;		GC 1 GC 2 GC 3	3	Mandatory	1
		PTP601117	<i>Introduction to Agricultural Technology</i>	AV-2; AV-3; AV-6; AV-8; AV-9; AV-10	KA 5-9; KA 6-4; KA 6-6		GC 1 GC 2	2	Mandatory	1

		PER 606117	<i>Statistics</i>	AV-8; AV-9,	KA 5-4; KA 6-2	SC- 4	GC 1 GC 2 GC 4	3	Mand atory	2
		PTP 607117	<i>Calculus</i>	AV-5; AV-6; AV-8;	KA 5-4; KA 6-2	SC-4	GC 1 GC 2	3	Mand atory	2
		PER 607217	<i>Experimental Design</i>	AV-2; AV-8;	KA 5-4; KA 6-2	SC-1 SC-4	GC 1 GC 2 GC 3 GC 4 GC 5	3	Mand atory	3
		ABI 601217	<i>Agribusiness Communication</i>	AV-6 AV-8	KA 6-1; KA 6-4; KA 6-6	SC-4	GC 1 GC 2	3	Mand atory	3
		PER 608217	<i>Research Methods</i>	AV-2 AV-5 AV-8 AV-9	KA 6-1; KA 6-2; KA 6-3; KA 6-7; KA 6-8	SC-4	GC-1 GC-2 GC-4 GC-5 GC-9	2	Mand atory	4
		PTP 605317	<i>Engineering Economics</i>	AV-8	KA 6-2; KA 6-4;	SC-2	GC-1 GC-5	2	Mand atory	5
		PTP 606317	<i>Technopreneurship</i>	AV-2; AV-8; AV-10;	KA 6-2; KA 6-3; KA 6-4; KA 6-5; KA 6-6; KA 6-8.	SC-4 SC-6	GC-1; GC-2	3	Mand atory	6
		UNI 606417/ PER 611417	<i>Community Service Program</i>	AV-1 AV-2 AV-3 AV-6 AV-7 AV-8 AV-9 AV-10	KA 6-1; KA 6-2; KA 6-3; KA 6-4; KA 6-5; KA 6-6; KA 6-7; KA 6-8	SC-3 SC-4;	GC-1; GC-2; GC-3; GC-5; GC-6; GC-7; GC-8;	4	Mand atory	7

		PER 609417	<i>Field Practice</i>	AV-2 AV-6 AV-8 AV-9	KA 6-1; KA 6-2; KA 6-3; KA 6-4; KA 6-5; KA 6-6; KA 6-7; KA 6-8	SC-3 SC-4	GC-1; GC-2; GC-3; GC-4; GC-6; GC-9;	3	Mand atory	7-8
		PER 610417	<i>Research Project</i>	AV-1 AV-2 AV-3 AV-4 AV-5 AV-6 AV-7 AV-8 AV-9 AV-10	KA 1-1; KA 1-2; KA 1-3; KA 1-4; KA 1-5; KA 1-6; KA 2-1; KA 2-2; KA 2-3; KA 2-4; KA 2-5; KA 3-1; KA 3-2; KA 3-3; KA 3-4; KA 3-5; KA 4-1; KA 4-2; KA 4-3; KA 4-4; KA 4-5; KA 4-6; KA 4-7; KA 4-8; KA 4-9; KA 5-1; KA 5-2; KA 5-3; KA 5-4; KA 5-5; KA 5-6; KA 5-7; KA 5-8; KA 5-9; KA 6-1; KA 6-2; KA 6-3; KA 6-4; KA 6-5; KA 6-6; KA 6-7; KA 6-8	SC-1 SC-2 SC-3 SC-4 SC-5 SC-6	GC-1; GC-2; GC-3; GC-4; GC-5; GC-6; GC-4; GC-5; GC-6;	6	Mand atory	7-8



## G.CURRICULUM OF AGRICULTURAL PRODUCTS TECHNOLOGY STUDY PROGRAM

### ODD SEMESTER COURSE

No	Code	Course	Credit	Prerequisite
1	UNI 002117	<i>Pancasila</i>	2 (2-0)	
2	UNI 003117	<i>Indonesian</i>	2 (2-0)	
3	PER 601117	<i>Mathematics</i>	3 (3-0)	
4	PER 102117	<i>Inorganic Chemistry</i>	3 (2-1)	
5	PER 604117	<i>Biology</i>	3 (2-1)	
6	PER 605117	<i>Physics</i>	3 (2-1)	
7	PTP601117	<i>Introduction to Agricultural Technology</i>	2 (1-1)	
8	PTH 301117	<i>Food and Nutrition</i>	2 (2-0)	
9	PER 607217	<i>Experimental Design</i>	3 (2-1)	PER 606117
10	PTH 102217	<i>Physical Chemistry</i>	2 (2-0)	
11	PTH 302217	<i>Biochemistry I</i>	3 (2-1)	PER 102117 PER 103117
12	PTH 201217	<i>General Microbiology</i>	3 (2-1)	
13	PTH 402217	<i>Material Science</i>	3 (2-1)	
14	PTH 403217	<i>Operation Unit II</i>	3 (2-1)	PTH 401117
15	PTH 103217	<i>Agricultural Product Chemistry</i>	3 (2-1)	
16	ABI 601217	<i>Agribusiness Communication</i>	3 (2-1)	
17	PTP 605317	<i>Engineering Economics</i>	2 (2-0)	
18	PTH 304317	<i>Nutritional Science</i>	3 (2-1)	PTH 301117 PTH 303217
19	PTH 105317	<i>Physiology and Post-Harvest Technology</i>	3 (2-1)	PTH 302217
20	PTH 502317	<i>Quality Assurance</i>	3 (2-1)	

21	PTH 503317	<i>Preservation Technology</i>	3 (2-1)	PTH 402217
22	PTH 407317	<i>Waste Handling Technology</i>	2 (2-0)	
23	PTH 504317	<i>Packaging and Storage</i>	3 (2-1)	PTH 404217
24	PTH 204317	<i>Thermo bacteriology</i>	2 (2-0)	PTH 201217
25	PTH 305317	<i>Functional Food and Food Phytochemistry</i>	3 (2-1)	PTH 303217
26	PTH 410317	<i>South Sumatera Traditional Food Processing Technology</i>	3 (2-1)	
27	PTH 507317	<i>Halal Assurance System</i>	2 (2-0)	
28	PTP 404317	<i>Postharvest Tool and Machine</i>	3 (2-1)	PTP 601117
29	PER 609417	<i>Field Practice</i>	3 (0-3)	
30	PTH 411417	<i>Oil Palm Downstream Technology*</i>	2 (2-0)	
31	PTH 412417	<i>Polymer Technology*</i>	2 (2-0)	
32	UNI 606417 /PER 611417	<i>Community Service Program</i>	4 (0-4)	
33	PER 610417	<i>Research Project</i>	6 (0-6)	

#### **EVEN SEMESTER COURSE**

No	Code	Course	Credit	Prerequisite
1	UNI 001117	<i>Religion</i>	2 (2-0)	
2	UNI 004117	<i>English</i>	2 (2-0)	
3	UNI 005117	<i>Civics</i>	2 (2-0)	
4	PER 103117	<i>Organic Chemistry</i>	3 (2-1)	
5	PER 606117	<i>Statistics</i>	3 (2-1)	PER 601117
6	PTH 101117	<i>Analytical Chemistry</i>	3 (2-1)	
7	PTH 401117	<i>Operation Unit I</i>	3 (2-1)	
8	PTP 607117	<i>Engineering Physics</i>	3 (2-1)	PER 601117
9	PER 608217	<i>Research Methods</i>	2 (2-0)	
10	PTH 303217	<i>Biochemistry II</i>	2 (2-0)	PTH 302217
11	PTH 202217	<i>Hygiene, Sanitation and Food Industry Safety</i>	3 (2-1)	PTH 201217

12	PTH 203217	<i>Food and Processing Microbiology</i>	3 (2-1)	PTH 201217
13	PTH 404217	<i>Principles of Agricultural Products Processing</i>	3 (2-1)	PTH 402217
14	PTH 501217	<i>Sensory Evaluation</i>	3 (2-1)	
15	PTH 104217	<i>Agricultural Product Analysis</i>	3 (2-1)	PTH 101117
16	PTH 405217	<i>Food Crops Processing Technology</i>	2 (2-0)	
17	PTH 406217	<i>Plantation Crops Processing Technology</i>	2 (2-0)	
18	PTH 205317	<i>Fermentation Technology</i>	3 (2-1)	PTH 201217
19	PTP 606317	<i>Technopreneurship</i>	3 (2-1)	PTP 605317
20	PTH 505317	<i>Product Development</i>	3 (2-1)	PTH 402217 PTH 404217
21	PTH 506317	<i>Agricultural Industry Management</i>	3 (2-1)	
22	PTH 408317	<i>Agricultural Product Process Engineering</i>	3 (2-1)	PTP 607117 PTH 403217
23	PTP 508317	<i>System Analysis*</i>	2 (1-1)	
24	PTH 409317	<i>Tropical Horticulture Processing Technology</i>	2 (2-0)	
25	PTH 306317	<i>Nutrition Evaluation in Processing*</i>	3 (2-1)	
26	PTH 509317	<i>Agricultural Industry Biotechnology</i>	3 (2-1)	PTH 303217
27	PTH 508317	<i>Applied Computer</i>	3(2-1)	
28	PTH 307317	<i>Food Fortification Technology</i>	2 (2-0)	
29	PTH 106317	<i>Food Enzyme Technology</i>	2 (2-0)	
30	PER 602417	<i>Field Practice</i>	3 (0-3)	
31	PER 603417	<i>Research Project</i>	6 (0-6)	

## H. DISTRIBUTION OF COURSES EVERY SEMESTER

### First Semester

No	Code	Course	Credit	Prerequisite
1	UNI 002117	<i>Pancasila</i>	2 (2-0)	
2	UNI 003117	<i>Indonesian</i>	2 (2-0)	
3	PER 601117	<i>Mathematics</i>	3 (3-0)	
4	PER 102117	<i>Inorganic Chemistry</i>	3 (2-1)	
5	PER 604117	<i>Biology</i>	3 (2-1)	
6	PER 605117	<i>Physics</i>	3 (2-1)	
7	PTP601117	<i>Introduction to Agricultural Technology</i>	2 (1-1)	
8	PTH 301117	<i>Food and Nutrition</i>	2 (2-0)	
Total			20 Credits	<b>Mandatoy 20 Credits</b> <b>Optional 0 Credits</b>

### Second semester

No	Code	Course	Credits	Prerequisite
1	UNI 001117	<i>Religion</i>	2 (2-0)	
2	UNI 004117	<i>English</i>	2 (2-0)	
3	UNI 005117	<i>Civics</i>	2 (2-0)	
4	PER 103117	<i>Organic Chemistry</i>	3 (2-1)	
5	PER 606117	<i>Statistics</i>	3 (2-1)	PER 601117
6	PTH 101117	<i>Analytical Chemistry</i>	3 (2-1)	
7	PTH 401117	<i>Operation Unit I</i>	3 (2-1)	
8	PTP 607117	<i>Engineering Physics</i>	3 (2-1)	PER 601117
Total			21 Credits	<b>Mandatoy 21 Credits</b> <b>Optional 0 Credits</b>

Third Semester

No	Code	Course	Credit	Prerequisite
1	PER 607217	<i>Experimental Design</i>	3 (2-1)	PER 606117
2	PTH 102217	<i>Physical Chemistry</i>	2 (2-0)	
3	PTH 302217	<i>Biochemistry I</i>	3 (2-1)	PER 102117 PER 103117
4	PTH 201217	<i>General Microbiology</i>	3 (2-1)	
5	PTH 402217	<i>Material Science</i>	3 (2-1)	
6	PTH 403217	<i>Operation Unit II</i>	3 (2-1)	PTH 401117
7	PTH 103217	<i>Agricultural Product Chemistry</i>	3 (2-1)	
8	ABI 601217	<i>Agribusiness Communication</i>	3 (2-1)	
Total			23 Credits	<b>Mandatory 23 Credits</b> <b>Optional 0 Credits</b>

Fourth Semester

No	Code	Course	Credit	Prerequisite
1	PER 608217	<i>Research Methods</i>	2 (2-0)	
2	PTH 303217	<i>Biochemistry II</i>	2 (2-0)	PTH 302217
3	PTH 202217	<i>Hygiene, Sanitation and Food Industry Safety</i>	3 (2-1)	PTH 201217
4	PTH 203217	<i>Food and Processing Microbiology</i>	3 (2-1)	PTH 201217
5	PTH 404217	<i>Principles of Agricultural Products Processing</i>	3 (2-1)	PTH 402217
6	PTH 501217	<i>Sensory Evaluation</i>	3 (2-1)	
7	PTH 104217	<i>Agricultural Product Analysis</i>	3 (2-1)	PTH 101117
8	PTH 405217	<i>Food Crops Processing Technology</i>	2 (2-0)	
9	PTH 406217	<i>Plantation Crops Processing Technology</i>	2 (2-0)	

No	Code	Course	Credit	Prerequisite
1	PER 608217	<i>Research Methods</i>	2 (2-0)	
Total			23 Credits	<b>Mandatory 23 Credits Optional 0 Credits</b>

Fifth semester

No	Code	Course	Credit	Prerequisite
1	PTP 605317	<i>Engineering Economics</i>	2 (2-0)	
2	PTH 304317	<i>Nutritional Science</i>	3 (2-1)	PTH 301117 PTH 303217
3	PTH 105317	<i>Physiology and Post-Harvest Technology</i>	3 (2-1)	PTH 302217
4	PTH 502317	<i>Quality Assurance</i>	3 (2-1)	
5	PTH 503317	<i>Preservation Technology</i>	3 (2-1)	PTH 402217
6	PTH 407317	<i>Waste Handling Technology</i>	2 (2-0)	
7	PTH 504317	<i>Packaging and Storage</i>	3 (2-1)	PTH 404217
8	PTH 204317	<i>Thermo bacteriology*</i>	2 (2-0)	PTH 201217
9	PTH 305317	<i>Functional Food and Food Phytochemistry*</i>	3 (2-1)	PTH 303217
10	PTH 410317	<i>South Sumatera Traditional Food Processing Technology*</i>	3 (2-1)	
11	PTH 507317	<i>Halal Assurance System*</i>	2 (2-0)	
12	PTP 404317	<i>Postharvest Tool and Machine*</i>	3 (2-1)	PTP 601117
Total			32 Credits	<b>Mandatory 19 Credits Optional 13 Credits</b>
Maximum optional courses taken 2 - 3 credits				

Notes: \* Optional courses

## Sixth semester

No	Code	Course	Credit	Prerequisite
1	PTH 205317	<i>Fermentation Technology</i>	3 (2-1)	PTH 201217
2	PTP 606317	<i>Technopreneurship</i>	3 (2-1)	PTP 605317
3	PTH 505317	<i>Product Development</i>	3 (2-1)	PTH 402217 PTH 404217
4	PTH 506317	<i>Agricultural Industry Management</i>	3 (2-1)	
5	PTH 408317	<i>Agricultural Product Process Engineering</i>	3 (2-1)	PTP 607117 PTH 403217
6	PTP 508317	<i>System Analysis*</i>	2 (1-1)	
7	PTH 409317	<i>Tropical Horticulture Processing Technology*</i>	2 (2-0)	
8	PTH 306317	<i>Nutrition Evaluation in Processing*</i>	3 (2-1)	
9	PTH 509317	<i>Agricultural Industry Biotechnology*</i>	3 (2-1)	PTH 303217
10	PTH 508317	<i>Applied Computer*</i>	3(2-1)	
11	PTH 307317	<i>Food Fortification Technology*</i>	2 (2-0)	
12	PTH 106317	<i>Food Enzyme Technology*</i>	2 (2-0)	
Total			32 Credits	<b>Mandatory 15 Credits</b> <b>Optional 17 Credits</b>
Maximum optional courses taken 6 - 7 credits				

Notes: \* Optional courses

Seventh semester

No	Code	Course	Credit	Prerequisite
1	PER 609417	<i>Field Practice</i>	3 (0-3)	
2	PTH 411417	<i>Oil Palm Downstream Technology*</i>	2 (2-0)	
3	PTH 412417	<i>Polymer Technology*</i>	2 (2-0)	
4	UNI 606417 /PER 611417	<i>Community Service Program**</i>	4 (0-4)	
5	PER 610417	<i>Research Project</i>	6 (0-6)	
Total			17 Credits	<b>Mandatory 13 Credits</b> <b>Optional 4 Credits</b>
Maximum optional courses taken 2 credits				

Notes: \* Optional courses\*\*) select one

Eighth semester

No	Code	Course	Credit	Prerequisite
1	PER 602417	<i>Field Practice</i>	3 (0-3)	
2	PER 603417	<i>Research Project</i>	6 (0-6)	
Total			9 Credits	<b>Mandatory 9 Credits</b> <b>Optional 0 Credits</b>

No	Description	Needed	Available
1.	Total credit up to graduate	144 credits	
2	Total credits		168 Credits
3	Total credit mandatory	134 credits	
4	Total credits optional		34 credits
5	Total credits optional	10 credits	



## **I. COURSE SYLLABUS**

### **1. UNI 001117 RELIGION 2(2-0)**

To bring students in professional development and religious personalities who are faithful and pious, knowledgeable and have noble character, and make religious as the basis for thinking and behaving in professional development.

### **2. UNI 002117 PANCASILA 2(2-0)**

Delivering students to develop their personalities capable of realizing the basic values of Pancasila as well as awareness of the nation and country, in applying their knowledge responsibly towards humanity with the competence to master the ability to think, be rational, and dynamic, broad-minded as intellectual human beings who possess; a responsible attitude according to his conscience; identify problems of life and well-being and ways to solve them; recognize changes and developments in science and technology; interpret historical events and cultural values of the nation in order to mobilize the unity of Indonesia.

### **3. UNI 003117 INDONESIAN 2(2-0)**

Understanding of the position and function of Indonesian as a National Language and Country Language so that it can be used properly and correctly, especially in formal situations. Guidance on understanding and mastering good and correct Indonesian grammar so that students can use it in writing scientific papers. Grammar, syntax, spelling, language logic, systematic writing of scientific works, used of standard terms, absorption from foreign and local languages learned as the basic for effective sentence structure, paragraph arrangement, and the use of Indonesian in scientific communication.

### **4. UNI 004117 ENGLISH 2(2-0)**

Grammar or Structure can be used in English sentences, trained through Reading Comprehension and Writing language skills, to get understanding in various English References and support the acquisition and application of the knowledge learned in the study program.

### **5. UNI 005117 CIVICS 2(2-0)**

Understand the concept of HANKAMNAS, insight of archipelago, politics of national strategy, politics of the HANKAMRATA system, and broaden the way of students think as cadres of the nation's struggle. To lead students to develop their personalities as citizens who play an active role in upholding democracy towards civil society and to help students as citizens to be able to realize the basic values of the struggle of the Indonesian nation and awareness of the nation and country in applying their knowledge responsibly towards humanity with competence in mastering the ability to think, behave rational, and dynamic, broad-minded as intellectuals who have; country awareness insight, to defend the

country with patriotic behavior; national insight, national awareness for national security; a comprehensive mindset, attitude, integral to all aspects of national life.

**6. UNI 606417 COMMUNITY SERVICE PROGRAM 4 (0-4)**

Community service program is activities in certain areas, carried out in groups, integrated between departments/faculties, coordinated at the University level, which include: the meaning, goals and objectives of real work lectures, knowledge and deepening of central government policies and regions, knowledge and strengthening of several methods of communication, knowledge and practical skills of several aspects that support regional development, both physical and non-physical; knowledge and strengthening of methods of observation, identification, problem solving and work programs. In general, community service program aims to help the community to increase the level of knowledge and skills so that it is expected to improve their welfare. Real work lecture activities are divided into 4 activity stages, namely debriefing, implementation of activities at the location, implementation reports, and evaluations.

**7. PER 601117 MATHEMATICS 3 (3-0)**

This course provides the basic principles of numbers and variables, matrices and determinants, limits and functions, continuity, function derivatives, basic differential and integral, basic theory of calculus, transcendent functions: logarithms, exponentials and trigonometry.

**8. PER 102117 ANORGANIC CHEMISTRY 3 (2-1)**

This course come up with properties, classification of matter, measurement, SI units, atomic structure, Stoichiometry in chemical reactions, concepts of chemical bond formation related to molecular geometry and the properties of chemical substances, Stoichiometry and gases.

**9. PER 103117 ORGANIC CHEMISTRY 3 (2-1)**

This course deals with the core subjects like Structural theory, molecular orbitals, ionic bonds, covalent bonds, molecular geometry, electronegativity, dipole moment, molecular orbital theory, acid base theory, functional groups, structure, nomenclature, physical properties, isomers making, chemical reactions and mechanisms of alkanes, alkenes, alkynes, alkadienes, alkylhaides, alcohols, ethers and aromatic compounds, stereochemistry of hydrocarbons and stereoisomers of compounds with chiral C atoms.

**10. PER 604117 BIOLOGY 3 (2-1)**

This course provides diversity of living things, classifications in the biology and order of the world of animals, plants and protists, functions and structures of plants and animals, organization of life, individuals, community populations, and ecosystems. Biosphere Pattern: Organisms and

their environment, microbial life, terrestrial and aquatic life. Physiology: cells, tissues and organs in animals and plants. Bioenergy: respiration and biosynthesis, reproductive system, molecular biology. The role of biology in agriculture, industry and natural resources, environmental impact analysis, conservation and development

**11. PER 605117 PHYSICS 3 (2-1)**

Understanding in analyzing problems related to the application of Newton's laws, regarding the types of electric charges and their interpretation in field materials, as well as interactions related to the charge in question. Describing electric fields using Gauss's law, interpreting the notion of ES potential, electrical components, circuits with resistance and direct current sources, magnetic fields, Faraday and Lenz laws, applying calculations to the application of RL, LC and RLC.

**12. PER 606117 STATISTICS 3 (2-1)**

Understand the basics of applied statistics as a tool/means to collect, organize, present and describe data (descriptive statistics) as well as the basics of formulating hypotheses and hypothetical data as a discourse on hypothesis testing on empirical data both for analysis of variance and mean, as well as for regression analysis and correlation, interpretation/conclusion of results (statistical inference) as well as parametric and non-parametric.

**13. PER 607217 EXPERIMENTAL DESIGN 3 (2-1)**

This course discusses understanding the principles of experiments and experimental designs so as to be able to select and use experimental designs as a tool/means to carry out experiments and be able to organize, present, interpret or evaluate experimental results effectively, efficiently, and correctly so as to produce correct and correct conclusions. appropriate as the basis for compiling recommendations for research results to be applied.

**14. PER 608217 RESEARCH METHODS 2 (2-0)**

This course discusses the meaning of the scientific method, scientific thought processes, communication and scientific protection. This course also discusses various research methods, formulation of problems and hypotheses, population and samples, processes and variables of observation and drawing conclusions. This course also discusses and prepares scientific writing (papers, proposals, and final project reports), the appearance of data in scientific writings, the use and writing of literature, presentation techniques and how to express opinions/ideas scientifically in a presentation of papers or active seminar participants. and prevention of plagiarism.

**15. PER 611417 INTERNSHIP 4 (0-4)**

Internship activities are expected to provide direct experience to students about the real world of work so that students can develop mastery of science and knowledge and skills that have been obtained in college with real conditions in the world of work. Internship activities are carried out in order to prepare graduates of agricultural technology graduates who are strong in facing competition in the world of work, by introducing real problems that will later be faced. The Internship Program is a form of non-conventional learning that provides opportunities for students to complete a job or project determined by the company. Internships can be carried out both in Government and Private Agencies that are relevant to the scientific field that students are interested in.

**16. PER 609417 FIELD WORK 3 (0-3)**

The form of field work practice is observation of work in government or private agencies/companies that are relevant to the scientific field that students are interested in for a certain period of time under the guidance of a supervisor. Before doing field work, students are required to submit activity proposals and after that students compile reports regarding the entire series of activities that have been carried out and must obtain approval from the supervisor

**17. PER 610417 FINAL PROJECT 6 (0-6)**

Final project is part of a student's final project in the form of research results in the laboratory and or in the field, compiled according to scientific rules and presented in written form and bound according to applicable regulations. Final project is a series of activities that includes the preparation of a research plan (proposal) which is bound and presented, the implementation of research and data processing, and the preparation of research results in the form of a report written in accordance with the applicable rules at the Faculty of Agriculture and presented in a seminar on research results and accountable in front of test team in the final exam. Thesis activities are specially guided by 2 lecturers

**18. PTP 601117 INTRODUCTION TO AGRICULTURAL TECHNOLOGY 2 (1-1)**

This course introduces the basic concepts of agricultural technology and its elements as fields of technology and professions and their relationship to technology and other professions. In addition, it also discussed the concepts of the agricultural industry, agricultural development, the role of agricultural technology in agro-industry and agribusiness, the role of agricultural technology in development, food security and sovereignty, local food development; and the role of science and technology development.

**19. PTP 605317 ENGINEERING ECONOMICS 2 (2-0)**

Understanding of technical economics and its environment, time value of money, components and cost analysis of agricultural equipment/machinery, annual costs and flow of funds, concept of analysis model and application of technoeconomics for planning, feasibility

assessment and implementation of agro-industry/agribusiness with NPV criteria, B/C ratio, break even point and internal rate of return, Sustainable project planning, and environmental reasons.

#### **20. PTP 606317 TECHNOPRENEURSHIP 3 (2-1)**

This course discusses the basic concepts of technopreneur, creative and innovative thinking processes, identification of opportunities, strategies for starting a business, marketing to start a business, sources of capital, and compiling a business plan. The course covers the basic concepts of technopreneurship/entrepreneurship and its applications, added value (tangible and intangible), income (conventional and unconventional), leadership and technopreneurship/entrepreneurship logic, self-development methods and the business environment, and business communication applications (oral and written). The lectures also cover the design (design) of a startup business/industry, the provision and use of working capital and security funding, business management and development, marketing systems and network utilization, analysis of technology potential for entrepreneurial bases, business simulations, business decision-making methods, proposal preparation. business based on the selected technology base, and the development of unconventional income through the use of patents, franchises, and the like,.

#### **21. PTP 607317 CALCULUS 3 (2-1)**

This course provides derivative functions and their applications, function integrals, transcendent functions, integration techniques along with the application of integrals and introduction to differential equations with more emphasis on computational aspects.

#### **22. PTH 101117 ANALYTICAL CHEMISTRY 3 (2-1)**

Students understand and apply the principles of measurement and how to use chemical analysis equipment in the laboratory, the principles and methods of tritymetric analysis (acidimetry, alkalimetry, iodometry, argentometry), volumetric, gravimetry, chemical balance, spectrophotometry and chromatography and understand errors and analytical data processing.

#### **23. PTH 102217 PHYSICAL CHEMISTRY 2 (2-0)**

Understanding the material presented includes an introduction to physical chemistry, physical properties of a liquid, solid and gas (among others the structure of a liquid, solubility, surface tension, vapor pressure, viscosity, gas laws, gas mixtures, specific gravity and diffusivity), chemical equilibrium, electrolyte and non-electrolyte solutions (among others Raoult's law, distillation, conductivity, colligative properties), colloids and surface chemistry, and emulsion properties. This lecture also discusses adsorption, absorption, surface tension, emulsion and foam systems, osmosis, diffusion, aggregate/precipitate, nucleation, crystallization and glass transition as well as the basic concepts of rheology along with their properties and applications.

**24. PTH 103117 AGRICULTURAL PRODUCT CHEMISTRY 3 (2-1)**

This course discusses the chemical properties of agricultural ingredients such as carbohydrates, proteins, fats, organic acids, vitamins, enzymes, pigments and flavors. The process of changing each of these substances during processing and storage

**25.PTH 104117 AGRICULTURAL PRODUCT ANALYSIS 3 (2-1)**

This course provides general method of preparing samples for the purposes of chemical and physical analysis, how to determine the content of protein, carbohydrates, fats and oils, water, vitamins, minerals, anti-nutritional ingredients and additives, extraction techniques, filtration, centrifugation, spectrophotometry and chromatography.

**26. PTH 105317 POST-HARVEST TECHNOLOGY 3(2-1)**

This course comes up with the importance of post-harvest in the development of post-harvest technology for agricultural products. Characteristics of post-harvest crop yields. Respiration and ethylene metabolism of post-harvest crops. Post-harvest physiological, physical and chemical changes which include changes in respiration, ethylene, color, hardness, aroma and flavor. Physiological, physicochemical changes that occur due to chemical post-harvest damage control, cooling and atmospheric storage and post-harvest technology in some agricultural products.

**27. PTH 201217 GENERAL MICROBIOLOGY 3 (2-1)**

This course delivers history of microbiology development, cell structure of prokaryotic, ukaryotic and bacterial spores, yeasts, fungi and bacteriophages. Morphology and physiology of bacteria, yeast, fungi, sporulation events, germination and sublethal injury. Microbial growth curve and the factors that influence its growth. Metabolism and transport of microbial nutrients and microbial classification methods.

**28. PTH 202217 FOOD AND PROCESSING MICROBIOLOGY 3 (2-1)**

This course provides characteristics of the growth of microorganisms in food, the role of microbes in microbiological damage to foodstuffs. Pathogenic microbes in food and the diseases they cause. Characteristics of microorganisms during processing and factors affecting the resistance of microorganisms during processing.

**29. PTH 203217 HYGIENE, SANITATION AND FOOD INDUSTRY SAFETY 3 (2-1)**

Understanding of the importance of industrial hygiene and sanitation, types and sources of contaminants and the factors that influence them. Hygiene and sanitation of the factory environment, raw materials and auxiliary materials, equipment and factory buildings, tools and methods of cleaning factory equipment, dental and work safety, Hazard Analysis on Critical Control Point (HACCP). Aspects of food safety in terms of microbiological, chemical and physical hazards in relation to cases of food poisoning.

**30. PTH 205317 FERMENTATION TECHNOLOGY 3 (2-1)**

This course discusses fundamentals of the fermentation process, kinetics of the fermentation process, isolation and development of potential cultures, inoculum development, medium preparation, sterilization, process optimization, fermenter design, harvesting, and purification of fermented products, scale-up techniques for the fermentation process and examples of industrial-scale fermentation processes (alcohol, citric acid and beer).

**31. PTH 301117 FOOD AND NUTRITION 2 (2-0)**

This course comes with the explanation of the relationship between agriculture and food supply and its impact on population nutrition. The discussion focused on food and nutrition issues and their consequences, especially on health and population. In addition, it discusses basic concepts including food and nutrition in the era of globalization, food consumption patterns, nutritional status, food security, food and nutrition regulations and policies.

**32. PTH 302217 BIOCHEMISTRY I 3 (2-1)**

This course provides molecular organization of substances in cells and their relationship to cell function. Bioorganic compounds such as carbohydrates, fats, proteins, nucleic acids and high energy compounds. Enzymes and their functions in living cells or bodies include how to control them.

**33. PTH 303217 BIOCHEMISTRY II 2 (2-0)**

This course delivers the principle of extracting and storing energy derived from materials and from sunlight through several pathways. Energy use, especially for biosynthetic processes and biodegradation of carbohydrates, proteins and fats.

**34. PTH 304217 NUTRITIONAL SCIENCE 3 (2-1)**

This course discusses source, function and role of nutrients in carbohydrates, proteins, fats, vitamins, minerals and water. Metabolism of nutrients, digestion and absorption by body organs and their distribution into cells where further metabolic processes take place. The enzymes and hormones involved as well as the facilitating and inhibiting factors of metabolism. Problems with deficiency and excess of nutrients and metabolic errors.

**35. PTH 401117 OPERATION UNIT I 3 (2-1)**

Discussing the understanding of principles in food processing. The discussion focuses on heat transfer, fluid flow, drying, shrinkage and mixing. In addition, it also discusses basic concepts which include mass and energy balance, units and sizes, and units and dimensions.

**36. PTH 402217 MATERIAL SCIENCE 3(2-1)**

Studying the types and properties of agricultural products as well as typical tasters related to the intended use and the process through which they are used. Characteristics of the materials studied according to the type of materials in the form of vegetable and animal agricultural products (including fishery and animal husbandry products). The scope of learning includes physical properties (form / structure, shape-size, static and dynamic / mechanical properties, viscosity, elasticity, texture, thermal properties, optical, magnetic, electrical, and the like), physico-chemical properties (color, brownish index, and the like), and non-physical characteristics that characterize agricultural products. The lecture also discusses the changes in physical and non-physical properties needed in relation to the intended use of materials and the process to be carried out, measurement methods, methods of adjusting materials for processes/uses and estimating models of material characteristics in various environmental conditions of use

**37. PTH 403217 OPERATION UNIT II 3 (2-1)**

Discussing the understanding of principles in food processing. The discussion focuses on grain drying, rheology, evaporation, cooling and separation processes.

**38. PTH 404217 PRINCIPLES OF AGRICULTURAL PRODUCTS PROCESSING 3 (2-1)**

This course provides an explanation of the basic methods of converting agricultural materials into products needed by consumers, including conversion into food and non-food materials. Fundamental conversion methods studied include singular conversion (physical, chemical, biological/microbiological, bicochemical) and plural/compound conversions or simultaneous conversions from physical-chemical-biological or biochemical). The scope of the study from conventional and non-conventional processing approaches includes basic aspects of upstream and downstream sector processing, based on the type/nature of the commodity to be produced. The lecture also discusses formulating and material-product suitability analysis (input-output). Further discussion of this course is deepened according to the sector of the material group specifically in the next semester, among others in the form of courses on Food Crop Product Technology, Plantation Product Technology, Oil Palm Downstream Technology, Post Harvest Technology, Enzyme Technology, Polymer Technology and the like.

**39. PTH 405217 FOOD CROPS PROCESSING TECHNOLOGY 2 (2-0)**

This course provides an overview of botany and a detailed description of the characteristics of raw materials starting from harvesting and post-harvest handling, processing processes accompanied by physicochemical changes and controlling during the processing of cereal commodities (rice, corn), tubers (sweet potato, cassava, potato). and beans (soy).

**40. PTH 406217 PLANTATION CROPS PROCESSING TECHNOLOGY 2 (2-0)**

This course provides an explanation of the history of plantations and the role of the plantation sector in development, a brief description of cultivation and a detailed description of harvesting, post-harvest handling, processing and industry of plantation commodities, namely rubber, coconut, pepper, tea, coffee and cocoa.



**41. PTH 407317 WASTE HANDLING TECHNOLOGY 2 (2-0)**

Learn about the basics of handling waste, especially those related to agriculture and agriculture-based industry. Explanation of the concept of waste, types of waste, technical aspects and design of waste management, environmental aspects and pollution due to waste, several cases of waste utilization and to broaden students' horizons equipped with a capita selection in the form of: basics of waste research and an introduction to advance by product management .

**42. PTH 408317 AGRICULTURAL PRODUCT PROCESS ENGINEERING 3 (2-1)**

The course comes with the concept of design and build regarding the processing of agricultural products. The main focus is on determining process time, storage time, delay (tempering, handling delay), quality lost and performance based on a representative model by considering material factors, process conditions, available energy/environment and the defined process goals/targets. Control of process factors and variables, scale-up, and simulation, as well as optimization of processing processes so that an effective and efficient system can be obtained. The types of processes studied include conventional processes (drying, boiling, frying, and the like) and non-conventional processes (extrusion processes, aseptic processes, calendering, microwave energy, infrared / ohmic heating and the like). Mathematical engineering review is carried out at the beginning of the lecture, and is followed by basic concepts of process efficiency and effectiveness, yield, material and energy balance, modeling basis (approach to transport phenomena and kinetics), rate of change and the like.

**43. PTH 501217 SENSORY EVALUATION 3 (2-1)**

This course provides the use of human senses to assess the quality and acceptability (acceptability) of food products. Recognition of the nature and types of sensory evaluation and the factors that influence it during sensory evaluation. Sensory evaluation mechanism, data processing method and conclusion drawing.

**44. PTH 502317 REGULATION DAN QUALITY STANDARD 3 (2-1)**

The emphasis of the lecture material is the concept of quality, quality management and the role of quality control in industry, the basics of applying quality control statistics, process evaluation and quality improvement, and measuring quality performance and customer satisfaction. This course also provides an understanding of various food regulations including various food regulations (eg food law, SNI, CODEX, ISO) and various international agreements in the food sector as well as international trade procedures (export-import procedures) in the food sector.

**45. PTH 503317 PRESERVATION TECHNOLOGY 3 (2-1)**

This course provides the basic philosophy and systematics of preservation technology, typology of spoilage of agricultural products and how to control it, the basics of preservation technology and its mechanisms which include preservation using low temperatures (cooling and freezing),

high temperatures (pasteurization, canning and microwaves), chemicals, irradiation, reduction of  $A_w$  (drying and semi-wet), fermentation and modern preservation technology and determination or estimation of shelf life of food products.

**46. PTH 504317 PACKAGING AND STORAGE 3 (2-1)**

This course provides the meaning and purpose of packaging agricultural products. Criteria in packaging. Various packaging materials, packaging methods, packaging design and packaging selection basis, storage and warehousing, cold and frozen storage, modification and control of warehouse atmosphere and pests. This course also studies the determination of the shelf life of food products using reaction prediction methods and shelf life plots (Arrhenius, linear, and Q10).

**47. PTH 505317 PRODUCT DEVELOPMENT 3 (2-1)**

This course discusses new product development management principles, new product design, technology and engineering in new product development, business aspects in new product development which includes financial forecasting and market opportunities for new product development. Exploration of new product ideas and designs covering structure, functional roles and product characteristics as well as basic product comparison analysis. In addition, it also discussed how to market and protect new products as well as packaging design development and optimization methods for new product development, as well as examples of developing new products from various marginal materials and traditional foods.

**48. PTH 506317 OPERATION AND AGRICULTURAL INDUSTRY PRODUCTION MANAGEMENT 3 (2-1)**

This course delivers decision-making techniques in relation to agro-industry operations and production, including linear programming methods, estimation, inventory management, queuing theory, assignment and transportation methods as well as computer and information technology in Agricultural Industrial Production and Operations management. Application of industrial management principles to crucial and distinctive aspects of agro-industry. Topics covered in agricultural industry management include market-oriented agricultural industry management, technology management, raw material management, supply chain and value chain management, and agro-industry technoeconomic evaluation.

**49. PTH 106317 FOOD ENZYME TECHNOLOGY\* 2 (2-0)**

This course discusses the properties of enzymes as biocatalysts, naming systems and classification of enzymes. The role of enzymes in biological systems. Enzyme structure, enzymatic reaction kinetics and mechanism of action of enzymes. Enzyme activity control. Enzyme purification and characterization. Enzyme immobilization principles and techniques. Utilization of enzymes in the processing of agricultural products.

**50. PTH 204317 THERMOBACTERIOLOGY\* 2 (2-0)**

This course discusses the characteristics of microbes that are thermophilic, bacterial spores, various bacterial inactivation processes using a thermal process. Probability of microbial life, optimal process criteria, concept of thermal death time, D value, Z value and F value. Various ways to determine commercial sterilization time.

**51. PTH 305317 FUNCTIONAL FOOD AND FOOD PHYTOCHEMISTRY\* 3 (2-1)**

This course contributes the introduction of functional food and food phytochemicals in relation to human life, including the relationship between food, nutrition and health, food phytochemicals (meaning, source and processing) and technological aspects and evaluation of bioavailability, classification and types of functional foods, nutritional aspects (relationship of dietary fiber and health, modification of food products, antioxidants and their effects on health), safety and efficacy aspects, government regulations on functional foods.

**52. PTH 306317 NUTRITION EVALUATION IN PROCESSING\* 2 (2-0)**

This course covers the factors that affect the nutritional value of food (antinutrient compounds, handling, processing, nutrification and others). Effect of processing, use of high temperature, low temperature, drying, irradiation, fermentation, and use of chemicals on the presence of nutritional components in foodstuffs and their effect on nutrient bioavailability.

**53. PTH 307317 FOOD FORTIFICATION TECHNOLOGY\* 2(2-0)**

Learn how to increase the nutritional value of agricultural products through various fortification techniques that include fortification of vitamins and minerals, fortification of substances other than vitamins and minerals (polyphenols, carotenoids, fatty acids and phytosterols), stability and analysis of fortificants, as well as knowing the regulation and safety of fortifications

**54. PTH 409317 TROPICAL HORTICULTURE PROCESSING TECHNOLOGY\* 2 (2-0)**

This course discusses the process of processing tropical vegetables and fruits into various food and beverage products, which includes minimal processing, juice, canning and drying to produce raisins, instant powder, jam and jelly, pasta and others. Physical and chemical changes during processing and process control, as well as microbes and additives in processed fruit and vegetable products.

**55. PTH 410317 SOUTH SUMATERA TRADITIONAL FOOD PROCESSING TECHNOLOGY\* 3 (2-1)**

This course contains processing of agricultural products, especially traditional food processing, food preservation and safety, quality assurance, and food packaging. Including the development of non-fermented traditional food processes such as pempek and its derivatives, eight-hour cakes, maxubah, tekwan and their derivatives, and food fermentation using indigenous microorganisms based on local substrates, such as:

tempoyak, bekasam, rusip, vegetable salted (asan), process control, and factors that affect process efficiency, physical, chemical, biological, and sensory qualities.

**56. PTH 411417 OIL PALM DOWNSTREAM TECHNOLOGY\* 2 (2-0)**

This course contains processing of agricultural products, especially traditional food processing, food preservation and safety, quality assurance, and food packaging. Including the development of non-fermented traditional food processes such as pempek and its derivatives, eight-hour cakes, maxubah, tekwan and their derivatives, and food fermentation using indigenous microorganisms based on local substrates, such as: tempoyak, bekasam, rusip, vegetable salted (asan), process control, and factors that affect process efficiency, physical, chemical, biological, and sensory qualities.

**57. PTH 412417 POLYMER TECHNOLOGY\* 2(2-0)**

This course provides insight and understanding to students about the basic concepts of polymers, polymer definitions, polymerization mechanisms, polymer properties, types of industrial polymers, various types of natural rubber, natural rubber processing technology and its applications, biodegradable polymers, starch-based polymers, biocomposites. , cell and enzyme-generated polyesters, cashew nut shell liquid (CNSL) polymers, lactic acid (PLA) polymers, pectins and carrageenans.

**58. PTP 404317 POSTHARVEST MACHINERY AND EQUIPMENT\* 3 (2-1)**

This course discusses post-harvest tools and machinery for agricultural products which include various types of tools used at harvest time, threshing, shelling, frying, sorting, peeling/crushing, grinding, packaging and storage. The discussion is more focused on modern equipment which discusses the construction, function and working capacity of tools selectively/effectively.

**59. PTH 507317 HALAL ASSURANCE SYSTEM\* 2 (2-0)**

This course provides and explores several aspects related to the analysis system and management of halal food management. The description of the material/subject of this course focuses more on the philosophical review of halal food, the basics of Islamic law relating to halal/haram food, institutional systems and food certification, production operational standards for halal food, Standard Operating Procedures for Halal Assurance, and food management in the industrial environment as well as process technology related to the analysis of the critical point of food halalness.

**60. PTP 508317 SYSTEM ANALYSIS\* 2 (1-1)**

This course delivers the introduction to systems (scope, definition, development of systems science, system classification, systems perspective, basic system behavior, systems approach, system development). Model and modeling concepts, model classification, model development (problem formulation, system definition, system analysis, model formulation, verification, model validation and parametrization, model solutions and model implementation, systems thinking and systems methodology

**61. PTH 509317 AGRICULTURAL INDUSTRY BIOTECHNOLOGY\* 3 (2-1)**

This course provides definition, scope and application of biotechnology, structure and function of DNA, DNA isolation and manipulation, cloning vehicles, DNA modifying enzymes, PCR techniques, microbial genetic engineering, ataman and transgenic animals, immobilized enzymes, fermentation technology, collection management of microorganism cultures, biotechnology, swirling and biotransformation processes

**62. PTH 510317 APPLIED COMPUTER IN AGRICULTURAL PRODUCT TECHNOLOGY\* 3 (1-2)**

This course aims to help students skillfully use computers, especially for word and number processing, statistical processing and analysis of research data, and the internet that can be used to search for data and information. General introduction to computers and studying computers and their functions, hardware and software, operating systems, basic application programs, basic programming, databases, and their application to problem solving analysis in the field of Agricultural Product Technology and operating systems that support skills in the use of software for processing optimization in the processing of Agricultural Products, precise processing planning, and so on.

**63. ABI 601217 AGRIBUSINESS COMMUNICATION\* 3 (2-1)**

Understanding organizational communication, organizational concepts, organizational theory, organizational culture, organizational communication networks and research on organizational communication and reciprocal relationships within organizations as a manifestation of organizational communication