

CURRICULUM OF AGRONOMY STUDY PROGRAM

Department Head	: Dr. Susilawati, S.P., M.Si.
Department Secretary	: Fitra Gustiar, S.P., M.Si.
Agronomy Study Program Coordinator	: Dr. Ir. Yakup, M.S

A. VISION

To become a nationally superior department in the mastery and development of science and technology in the field of agronomy based on resources and local wisdom by 2025.

B. MISSION

1. To educate and create human resources who are able to master, apply and develop science and technology in the field of agronomy.
2. To develop science and technology in the field of agronomy in line with the times, environmentally friendly, and based on resources and local wisdom.
3. To apply and disseminate knowledge and technology of plant cultivation in order to achieve food security, to improve the welfare of farmer communities and succeed in agricultural development.
4. To develop and establish tridharma cooperation in the field of agronomy with national and international institutions/companies.

C. OBJECTIVE

To produce graduates who have qualifications in attitude, knowledge and skill competencies as described in learning outcomes, and produce publications and technology in the field of agronomy based on resources and local wisdom.

D. GRADUATE PROFILE

Profiles of graduates of the Agronomy Department, Faculty of Agriculture, Sriwijaya University are :

1. Entrepreneur in agriculture
2. Researcher in agriculture
3. Academics
4. Agricultural consultant
5. Facilitator for community development in agriculture
6. Bureaucrats

Which is stated and reflected in the three elements of competence, namely attitudes, knowledge and skills.

1. Attitude

- a. Faithful to God Almighty and capable of actualizing a religious attitude,
- b. Act as citizens who are proud and love their homeland, have nationalism and responsible for the State and nation,
- c. Capable of contributing in improving the quality of life in society, nation and state based on Pancasila,
- d. Upholding human values based on morals and ethics,
- e. Capable of collaborating and have social sensitivity and concern for society and the environment,

- f. Respect the diversity of cultures, views, religions, and beliefs, as well as the opinions,
- g. Obey the law and discipline in social and state life,
- h. Capable of internalizing academic values, norms and ethics,
- i. Capable of internalizing the spirit of independence and struggle,
- j. Demonstrate a responsible attitude towards work in their area of expertise independently and
- k. Internalize the spirit of independence, struggle, and entrepreneurship.

2. Knowledge

- a. Mastering the theoretical concepts and being able to develop science and technology for the cultivation of food crops, plantations and horticulture based on local wisdom and resources,
- b. Mastering the theoretical concepts of plant cultivation problems and being able to manage and solve problems in the field,
- c. Mastering the theoretical concepts of sustainable and environmentally friendly plant cultivation management,
- d. Mastering theoretical concepts in the development of appropriate technology that is applicable in the community to increase agricultural production and
- e. Mastering the theoretical concepts of the latest science and technology development in plant cultivation that can be applied to the community.

3. Skills

The competency skills of the Agronomy department are :

a. General Skills

- 1. Capable of applying logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise,
- 2. Capable of demonstrating independent, quality, and measurable performance,
- 3. Capable of examining the implications of the development or implementation of science and technology that pays attention to and applying humanities values according to their expertise based on scientific principles, procedures and ethics in order to produce solutions, ideas, designs or art criticisms,
- 4. Capable of compiling a scientific description of the results of the studies mentioned above in the form of a Research Project or final project report, and upload it on the university's website,
- 5. Capable of appropriating decisions in the context of solving problems in their area of expertise, based on the results of analysis of information and data,
- 6. Capable of maintaining and developing work networks with supervisors, colleagues, colleagues both inside and outside the institution,
- 7. Capable of responsible for the achievement of group work results and supervising and evaluating the completion of work assigned to workers under their responsibility,
- 8. Capable of conducting process of self-evaluation of the work group under their responsibility, and able to manage learning independently,
- 9. Capable of documenting, storing, securing, and recover data to ensure validity and preventing plagiarism and
- 10. Capable of adapting quickly to the world of work and the environment.

b. Specific Skills

1. Capable of applying plant cultivation in agricultural systems by utilizing biological resources creatively and innovatively,
2. Capable of applying and modifying local wisdom by using the latest science and technology to be applied in plant cultivation practices with specific locations,
3. Capable of conducting plant cultivation practices and collaborating with teams from various scientific backgrounds,
4. Capable of identifying problems, providing alternative solutions, and making decisions in the cultivation of crops in the agricultural and plantation industrial systems
5. Capable of planning and evaluating efficient and effective crop cultivation systems,
6. Capable of recognizing and taking advantage of business opportunities in the field of agricultural cultivation,
7. Capable of accessing resources including capital, labor, and technology to initiate and run a business in the field of plant cultivation,
8. Capable of actualizing creative and innovative ideas related to plant cultivation technology into commercial activities,
9. Capable of conducting basic research on the development and implementation of plant cultivation science and technology based on scientific methodologies to generate specific plant cultivation ideas or recommendations,
10. Capable of writing research results as mentioned above in the form of scientific articles and present them in scientific forums,
11. Capable of thinking analytically and synthetically regarding plant cultivation problems and be responsive to the development of related science and technology,
12. Capable of communicating aspects of plant cultivation in an attractive, efficient, effective and productive manner and
13. Capable of analyzing and evaluating potential barriers to plant cultivation on the sustainability of national biological resources.

E. LEARNING OUTCOMES (LO)

To achieve these competencies, graduate learning outcomes are arranged by following three aspects:

1. Attitudes and Values (AV)

In accordance with National Higher Education Standards (Permenristek-Dikti No. 44 Tahun 2015), Attitude competencies in Learning Outcomes of the Unsri Agronomy Department are as follows:

- LO-AV-1 : Faithful to God Almighty and capable of actualizing a religious attitude,
- LO-AV-2 : Act as citizens who are proud and love their homeland, have nationalism and are responsible for the State and nation,
- LO-AV-3 : Capable of contributing in improving the quality of life in society, nation and state based on Pancasila,
- LO-AV-4 : Upholding human values based on morals and ethics,
- LO-AV-5 : Capable of collaborating and have social sensitivity and concern for society and the environment,
- LO-AV-6 : Respect the diversity of cultures, views, religions, and beliefs, as well as the opinions,
- LO-AV-7 : Obey the law and discipline in social and state life,

- LO-AV-8 : Capable of internalizing academic values, norms and ethics,
- LO-AV-9 : Capable of internalizing the spirit of independence and struggle (DIKTI)
- LO-AV-10 : Demonstrate a responsible attitude towards work in their area of expertise independently and,
- LO-AV-11 : Internalize the spirit of independence, struggle, and entrepreneurship.

2. Knowledge Competence (KC)

- LO-KC-1 : Mastering the theoretical concepts and being able to develop science and technology for the cultivation of food crops, plantations and horticulture based on local wisdom and resources,
- LO-KC-2 : Mastering the theoretical concepts of plant cultivation problems and being able to manage and solve problems in the field,
- LO-KC-3 : Mastering the theoretical concepts of sustainable and environmentally friendly plant cultivation management,
- LO-KC-4 : Mastering theoretical concepts in the development of appropriate technology that is applicable in the community to increase agricultural production,
- LO-KC-5 : Mastering the theoretical concepts of the latest science and technology development in plant cultivation that can be applied to the community.

3. Skills

The skills element consists of general job skills and specific job skills.

3.1. General Skills (GS)

In accordance with the Permen Ristek-Dikti No. 44 tahun 2015, **General Skills** in Learning Outcomes in the Agronomy Department, Faculty of Agriculture Universitas Sriwijaya are as follows:

- LO-GS-1 : Capable of applying logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise,,
- LO-GS-2 : Capable of demonstrating independent, quality, and measurable performance,
- LO-GS-3 : Capable of examining the implications of the development or implementation of science and technology that pays attention to and applying humanities values according to their expertise based on scientific principles, procedures and ethics in order to produce solutions, ideas, designs or art criticisms,
- LO-GS-4 : Capable to compiling a scientific description of the results of the studies mentioned above in the form of a Research Project or final project report, and upload it on the university's website,
- LO-GS-5 : Capable of appropriating decisions in the context of solving problems in their area of expertise, based on the results of analysis of information and data,
- LO-GS-6 : Capable of maintaining and developing work networks with supervisors, colleagues, colleagues both inside and outside the institution,
- LO-GS-7 : Capable of responsible for the achievement of group work results, supervising and evaluating the completion of work assigned to workers under their responsibility,
- LO-GS-8 : Capable of conducting process of self-evaluation of the work group under their responsibility, and able to manage learning independently,

- LO-GS-9 : Capable of documenting, storing, securing, and recover data to ensure validity and preventing plagiarism and
- LO-GS-10 : Capable of adapting quickly to the world of work and the environment.

3.2. Specific Skills (SS)

In accordance with the profile, vision and mission of the study program, as well as the qualifications of graduates of the undergraduate program as stated in the KKNi (Perpres No. 8 Tahun 2012), **Specific Skills** in Learning Outcomes of the Agronomy Study Program, Faculty of Agriculture Universitas Sriwijaya are as follows:

- LO-SS-1 : Capable of applying plant cultivation in agricultural systems by utilizing biological resources creatively and innovatively,
- LO-SS-2 : Capable of applying and modifying local wisdom by using the latest science and technology to be applied in plant cultivation practices with specific locations,
- LO-SS-3 : Capable of conducting plant cultivation practices and collaborating with teams from various scientific backgrounds,
- LO-SS-4 : Capable of identifying problems, providing alternative solutions, and making decisions in the cultivation of crops in the agricultural and plantation industrial systems
- LO-SS-5 : Capable of planning and evaluating efficient and effective crop cultivation systems,
- LO-SS-6 : Capable of recognizing and taking advantage of business opportunities in the field of agricultural cultivation,
- LO-SS-7 : Capable of accessing resources including capital, labor, and technology to initiate and run a business in the field of plant cultivation,
- LO-SS-8 : Capable of actualizing creative and innovative ideas related to plant cultivation technology into commercial activities,
- LO-SS-9 : Capable of conducting basic research on the development and implementation of plant cultivation science and technology based on scientific methodologies to generate specific plant cultivation ideas or recommendations,
- LO-SS-10 : Capable of writing research results as mentioned above in the form of scientific articles and present them in scientific forums,
- LO-SS-11 : Capable of thinking analytically and synthetically regarding plant cultivation problems and be responsive to the development of related science and technology,
- LO-SS-12 : Capable of communicating aspects of plant cultivation in an attractive, efficient, effective and productive manner and
- LO-SS-13 : Capable of analyzing and evaluating potential barriers to plant cultivation on the sustainability of national biological resources.

F. GRADUATE LEARNING ACHIEVEMENT MAP

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	General Basic Knowledge	Religion	LO-AV-1 LO-AV-6				2		II
2		Civics	LO-AV-3 LO-AV-7				2		II
3		Indonesian	LO-AV-4 LO-AV-2		LO-GS-1 LO-GS-4	LO-SS-4 LO-SS-12	2		I
4		Pancasila	LO-AV-2 LO-AV-3 LO-AV-6		LO-GS-10		2		I
5		English	LO-AV-4		LO-GS-1 LO-GS-4	LO-SS-4 LO-SS-12	2		II
Total Credits							10		

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Scientific Concept	Agrochemicals	LO-AV-8	LO-KC-1	LO-GS-1		3		I
2		Introduction to Agriculture Science	LO-AV-8	LO-KC-3	LO-GS-1		2		I
3		Mathematics	LO-AV-8	LO-KC-1	LO-GS-1		3		I
4		Botany	LO-AV-8	LO-KC-1	LO-GS-1		3		I
5		Statistics	LO-AV-8	LO-KC-1	LO-GS-1		3		III
6		Experimental Design	LO-AV-8	LO-KC-3	LO-GS-1	LO-SS-4 LO-SS-9	3		IV
7		Research Methods	LO-AV-8	LO-KC-2	LO-GS-4	LO-SS-5 LO-SS-10	2		VI
8		Genetics	LO-AV-8	LO-KC-5	LO-GS-1	LO-SS-2	3		II
9		Fundamentals of Plant Physiology	LO-AV-8	LO-KC-2	LO-GS-1	LO-SS-1	3		II
10		Plant breeding	LO-AV-8	LO-KC-5	LO-GS-1	LO-SS-1	3		IV
11		Advanced Plant Breeding *	LO-AV-8	LO-KC-5	LO-GS-1 LO-GS-2	LO-SS-3		3	VI
12		Plant Biochemistry	LO-AV-8		LO-GS-1	LO-SS-1	3		III
13		Plant Growth Regulator*	LO-AV-8	LO-KC-4	LO-GS-1	LO-SS-8		3	II
14		Plant Physiology		LO-KC-3	LO-GS-1	LO-SS-1	3		III
15		Field Practice		LO-KC-2	LO-GS-5	LO-SS-3 LO-SS-9 LO-SS-10	3		VII
16		Field Study		LO-KC-2	LO-GS-8	LO-SS-11	1		VII
17		Research Project			LO-GS-4 LO-GS-9	LO-SS-9 LO-SS-10	6		VII
18		Seminar			LO-GS-9	LO-SS-12	1		VII
Total Credits							45	6	

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Agricultural Production	Agroclimatology		LO-KC-4	LO-GS-1	LO-SS-2	3		I
2		Fundamentals of Agronomy		LO-KC-4	LO-GS-1	LO-SS-2	3		II
3		Fundamentals of Soil Science		LO-KC-4		LO-SS-2	3		II
4		Annual Crops Cultivation	LO-AV-11	LO-KC-1		LO-SS-5	3		IV
5		Perennial Crops Cultivation	LO-AV-11	LO-KC-1		LO-SS-5	3		IV
6		Horticultural Crops Cultivation	LO-AV-11	LO-KC-1		LO-SS-5	3		IV
7		Advanced Annual Crops Cultivation	LO-AV-10	LO-KC-1 LO-KC-3	LO-GS-8	LO-SS-5	3		V
8		Advanced Perennial Crops Cultivation	LO-AV-10	LO-KC-1 LO-KC-3	LO-GS-8	LO-SS-5	3		V
9		Vegetable Crops Cultivation	LO-AV-11	LO-KC-1		LO-SS-5	3		V
10		Fruit Crops Cultivation	LO-AV-11	LO-KC-1		LO-SS-5	3		V
11		Spice, Medicinal and Industrial Crops Cultivation *	LO-AV-11	LO-KC-1		LO-SS-5		3	V
12		Ornamental Plants Cultivation*	LO-AV-11	LO-KC-1		LO-SS-5		3	V
13		Swamp Land Agriculture *	LO-AV-5	LO-KC-4	LO-GS-3	LO-SS-13		3	VI
14		Forest Crops Cultivation *	LO-AV-11	LO-KC-1		LO-SS-5		3	VI
15		Irrigation and Drainage *	LO-AV-5	LO-KC-2		LO-SS-13		3	V
Total Credits							30	15	

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Promoter of Agricultural Production Improvement	Fundamentals of Seed Science and Technology	LO-AV-8	LO-KC-1		LO-SS-1	3		III
2		Agricultural Machinery and Equipment	LO-AV-8	LO-KC-1		LO-SS-1	3		V
3		Plant Nutrition	LO-AV-8	LO-KC-2	LO-GS-8		3		IV
4		Plant Ecology	LO-AV-8	LO-KC-2	LO-GS-8	LO-SS-4	3		III
5		Soil Fertility	LO-AV-8	LO-KC-2	LO-GS-8	LO-SS-4	3		III
6		Plant Biotechnology	LO-AV-8	LO-KC-5	LO-GS-8	LO-SS-2 LO-SS-8	3		V
7		Plant Propagation *	LO-AV-8	LO-KC-4	LO-GS-8	LO-SS-11		3	VI
8		Fertilization and Fertilizers Technology *	LO-AV-8	LO-KC-2	LO-GS-8	LO-SS-11		3	V
Total Credits							18	6	

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Plant Pest Control	Fundamentals of Plant Protection	LO-AV-8	LO-KC-2		LO-SS-11	3		III
2		Weeds Science	LO-AV-8	LO-KC-2		LO-SS-4	3		III
3		Weeds Control	LO-AV-10	LO-KC-2		LO-SS-4	3		V
Total Credits							9		

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Socio-Economic and Management	Fundamentals of management	LO-AV-8 LO-AV-9	LO-KC-3	LO-GS-2 LO-GS-10	LO-SS-4 LO-SS-5	2		I
2		Introduction to Agriculture Economics	LO-AV-5 LO-AV-11		LO-GS-7	LO-SS-7	3		I
3		Rural Sociology	LO-AV-5 LO-AV-7	LO-KC-4	LO-GS-7	LO-SS-1	3		II
4		Farm Management *	LO-AV-9 LO-AV-11		LO-GS-1	LO-SS-6		3	IV
Total Credits							8	3	

*: Elective Course

No	Study Material	Course Name	Learning Outcomes				CREDITS		Semester
			Attitude	Knowledge	Skill		Compulsory	Elective	
					General	Specific			
1	Innovation and Entrepreneurship	Entrepreneurship	LO-AV-4		LO-GS-6	LO-SS-3 LO-SS-4 LO-SS-6 LO-SS-8	2		VI
2		Organic Agriculture	LO-AV-8	LO-KC-1		LO-SS-1	3		IV
3		Landscape Architecture *	LO-AV-8	LO-KC-5	LO-GS-3	LO-SS-8		3	VI
4		Seed Production Techniques *	LO-AV-8			LO-SS-8		3	VI
5		Tissue Culture*	LO-AV-8			LO-SS-8		3	IV
6		Hydroponics *	LO-AV-8			LO-SS-8		3	IV
7		Community Services Program	LO-AV-4 LO-AV-5	LO-KC-5	LO-GS-8 LO-GS-10	LO-SS-12	4		VII
Total Credits							9	12	

*: Elective Course

G. CURRICULUM STRUCTURE

Distribution of Courses per Semester

1st Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	UNI 10516	Pancasila	2 (2-0)		
2	UNI 10316	Indonesian	2 (2-0)		
3	PER 11116	Mathematics	3 (3-0)		
4	Pag 10116	Agro Chemical	3 (2-1)		
5	PER 12216	Introduction to Agriculture Science	2 (2-0)		
6	ABI 11216	Introduction to Agriculture Economics	3 (2-1)		
7	PER 12116	Botany	3 (2-1)		
8	PAG 20116	Agroclimatology	3 (2-1)		
9	ABI 11116	Fundamentals of Management	2 (2-0)		
Number of compulsory course credits			23		
Number of elective course credits				0	

*: Elective Course

2nd Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	UNI 10116	Religion	2 (2-0)		
2	UNI 10416	English	2 (2-0)		
3	PAG 108116	Genetics	3 (2-1)		
4	PAG 109116	Fundamentals of Plant Physiology	3 (2-1)		
5	PAG 202116	Fundamentals of Agronomy	3 (2-1)		
6	PTN 10116	Fundamentals of Soil Science	3 (2-1)		
7	UNI 10216	Civic	2 (2-0)		
8	ABI 11316	Rural Sociology	3 (2-1)		

9	PAG 113116	Plant Growth Regulator *	-	3 (2-1)	
Number of compulsory course credits			21		
Number of elective course credits				3	

*: Elective Course

3rd Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	PER 21116	Statistics	3 (2-1)		Passed PER 11515
2	PAG 304216	Plant Ecology	3 (2-1)		-
3	PAG 114216	Plant Physiology	3 (2-1)		Passed PAG 11515
4	PAG 112216	Plant Biochemistry	3 (2-1)		Passed PAG 11115
5	PAG 402216	Weeds Science	3 (2-1)		
6	PAG 301216	Fundamentals of Seed Science and Technology	3 (2-1)		
7	PPT 21116	Fundamentals of Plant Protection	3 (2-1)		
8	PTN 20116	Soil fertility	3 (2-1)		
Number of compulsory course credits			24		
Number of elective course credits					

*: Elective Course

4th Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	PER24116	Experimental Design	3 (2-1)		Passed PER 21115
2	PAG 110216	Plant Breeding	3 (2-1)		Passed PAG 11415
3	PAG 204216	Annual Crops Cultivation	3 (2-1)		
4	PAG 205216	Perennial Crops Cultivation	3 (2-1)		
5	PAG 206216	Horticultural Crops Cultivation	3 (2-1)		
6	PAG 303216	Plant Nutrition	3(2-1)		
7	PAG 602216	Organic Agriculture	3 (2-1)		
8	ABI 24216	Farm Management *	-	3 (2-1)	
9	PAG 605216	Tissue Culture *	-	3 (2-1)	
10	PAG 606216	Hydroponics *	-	3 (2-1)	
Number of compulsory course credits			21		
Number of elective course credits				9	

*: Elective Course

5th Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	PAG 207316	Advanced Annual Crops Cultivation	3 (2-1)		Passed PAG 24215
2	PAG 208316	Advanced Perennial Crops Cultivation	3 (2-1)		Passed PAG 24315
3	PAG 209316	Vegetable Crops Cultivation	3 (2-1)		Passed PAG 24415
4	PAG 210316	Fruit Crops Cultivation	3(2-1)		Passed PAG 24415

5	PTE 33316	Agricultural Machinery and Equipment	3 (2-1)		
6	PAG 403316	Weeds Control	3 (2-1)		Passed PAG 21215
7	PAG 306316	Plant Biotechnology	3 (2-1)		
8	PAG 211316	Spice, Medicinal and Industrial Crops Cultivation *	-	3 (2-1)	-
9	PAG 212316	Ornamental Plants Cultivation *	-	3 (2-1)	
10	PTN 36516	Irrigation and Drainage *	-	3 (2-1)	
11	PTN 36216	Fertilization and Fertilizers Technology *	-	3 (2-1)	Passed PTN 20115
Number of compulsory course credits			21		
Number of elective course credits				9	

*: Elective Course

6th Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	PER 31116	Research Methods	2 (2-0)		
2	PER37116	Entrepreneurship	2 (2-0)		
3	PAG 116316	Field Study	1 (0-1)		
4	PAG 111316	Advanced Plant Breeding *		3 (2-1)	Passed PAG 21915
5	PAG 603316	Seed Production Techniques *		3 (2-1)	
6	PAG 213316	Swamp Land Agriculture *		3 (2-1)	-
7	PAG 214316	Forest Crops Cultivation *		3 (2-1)	-
8	PAG 603316	Landscape Architecture *		3 (2-1)	-
9	PAG 307316	Plant Propagation *		3 (2-1)	-
Number of compulsory course credits			5		
Number of elective course credits				18	

*: Elective Course

7th Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	UNI 40116	Community Service Program	4 (0-4)		
2	PER49216	Field Practice	3 (0-3)		Passed PER 31115
3	PER49316	Research Project	6 (0-6)		Passed PER 31115
4	PER49416	Seminar	1 (0-1)		Passed PER 31115
Number of compulsory course credits			14		
Number of elective course credits				0	

*: Elective Course

8th Semester

No	Course Code	Course Name	Credits		Course Precondition
			Compulsory	Elective	
1	PER49316	Research Project	6 (0-6)		Passed PER 31115
2	PER49416	Seminar	1 (0-1)		Passed PER 31115
Number of compulsory course credits			7		
Number of elective course credits				0	

* : Elective Course

ELECTIVE COURSES

No	Code	Course Name	Credits	Semester
1	ABI 242109	Farm Management	3 (2-1)	Odd
2	PTN 36516	Irrigation and Drainage	3 (2-1)	Even
3	PAG 603316	Seed Production Techniques	3 (2-1)	Even
4	PAG 211316	Spice, Medicinal and Industrial Crops Cultivation	3 (2-1)	Odd
5	PAG 212316	Ornamental Plants Cultivation	3 (2-1)	Even
6	PAG 214316	Forest Crops Cultivation	3 (2-1)	Even
7	PAG 603316	Landscape Architecture	3 (2-1)	Even
8	PAG 113116	Plant Growth Regulator	3 (2-1)	Even
9	PAG 605216	Tissue Culture	3 (2-1)	Odd
10	PAG 213316	Swamp Land Agriculture	3 (2-1)	Even
11	PAG 307316	Plant Propagation	3 (2-1)	Even
12	PAG 111316	Advanced Plant Breeding	3 (2-1)	Even
13	PTN 36216	Fertilization and Fertilizers Technology	3 (2-1)	Even
14	PAG 606216	Hydroponics	3 (2-1)	Odd
Total			42	
Only selected			15	

Number of Credits Agronomy Study Program (for graduation):

No	Type of Course	CREDITS	Description
-1	-2	-3	-4
1	Compulsory Course	129	The prescribed Compulsory Courses consist of: General Basic Courses (MKDU): 10 Credits Scientific Conceptual Courses (MKKK) : 45 Credits Agricultural Production Courses (MKPP) : 30 Credits Agricultural Production Improvement Courses (MKPPPP) : 18 Credits. Plant Pest Management Courses (MKPOPP) : 9 Credits. Socio-Economic and Management Courses (MKSEK) : 8 Credits and Innovation and Entrepreneurship Courses (MKKw) : 9 Credits
2	Elective Courses	15	The elective courses that support Research Project are: Food Crop Skills, Horticultural Crops, Plantation/Industrial Crops, Weed Science, Landscape Architecture and Plant Breeding.
Total		144	

H. COURSE DESCRIPTION

- 1. UNI 10516: PANCASILA** **2(2-0)**
Lead students to develop their personalities and capable of realizing the basic values of Pancasila as well as awareness of the nation and state, in applying scientists responsibly towards humanity with competence to master the ability to think, be rational, and dynamic, broad-minded as intellectual human beings who possess; act responsibly 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 promote Indonesian unity.
- 2. UNI 10316: INDONESIAN** **2(2-0)**
This course teaches the fundamentals of language proficiency, effective sentence structure and paragraph analysis and short essays. Essay writing principles and writing practice with a specific and simple subject. Sentence form and structure training and commonly used theology in scientific communication.
- 3. PER 11516: MATHEMATICS** **3(3-0)**
Numbers and functions, limits and functions. Continuity, differentials and its applications, integrals and its applications, functions and variables, vectors, matrices and determinants.
- 4. PAG 10116: AGROCHEMICAL** **3(2-1)**
Introduction to agriculture chemistry on the principles of stoichiometry and analytical chemistry; Atoms, molecules, chemical bonds, functional groups, water, pH, acids and bases, salts, redox reactions and chemical equilibrium, concepts of concentration and molarity, colloids, electrolyte and nonelectrolyte solutions; Soil chemistry: plant nutrients, soil and colloid solutions, cation exchange capacity (CEC), pH, soil reaction; Chemical fertilizer, single fertilizer and compound fertilizer, lime, organic and biological fertilizers, pesticides, herbicides, Plant Growth Regulator; Practice of chemical titration, spectroscopy and electrophoresis.
Introduction; Atomic Structure and Electron Configuration; Chemical Bond; Nutrients and types of fertilizers; Structure and function of water; Organic chemistry: nomenclature of organic compounds & functional groups; Acid, alkaline and salt; Exam 1; pH, solution and indicator; Structure and function of lipid and lipid acids; Structure and function of carbohydrate and protein; Concentration, ppm, %, molar concept, molarity, normality; Hydroponic nutrient solution media and tissue culture; Soil, nutrients and fertilization; Pesticides and applications; Exam 2.
- 5. PER 11215: INTRODUCTION TO AGRICULTURE SCIENCE** **2(2-0)**
This course teaches students to understand the scope and development of agriculture, history and development of agriculture, progress and pioneers in agriculture, major issues in the agricultural sector, agriculture as a sub-sector of national development, the role of science and technology in agriculture, development of agribusiness and agro-industry in increasing people's income, food security, food security issues, natural resources and the environment in relation to agricultural activities, agriculture, free trade, law and policy in agriculture.
- 6. ABI 11216: INTRODUCTION TO AGRICULTURE ECONOMICS** **3(2-1)**
Economic theories and principles related to agriculture; Agricultural economic theory and principles, problems, factors of production and economic policies in agriculture and agricultural trade in Indonesia; Natural resource issues, rural development, world population and food supply.
- 7. PER 12116: BOTANY** **3(2-1)**
Cell definition, developmental history and cell theory; Cell structure, organelles, and their functions; mitosis and reproduction of plant cells; Relationships between cells; Functions of plant organs: leaves,

stems, and roots; Formation, flower type and seed development; History and principles of plant classification; Determination/identification and naming of plants.

Introduction, Definition, history and theory of cells; Structure, cell organelle and function of plant cells; Cell reproduction; Relationships between cells and tissues; Tissue according to the number of constituent cells, level of development and function; Anatomy, morphology and function of leaves, stems; Exam 1; Anatomy, morphology and function of roots; Flower organ; Fruit organ; Taxonomy and Plant Systematics; Plant nomenclature; Plant identification; Plant description; Exam 2.

8. PAG 12116: AGROCLIMATOLOGY

3(2-1)

Definitions of agroclimatology, climate and weather; Description of climate and weather elements (atmosphere, radiation, temperature, humidity, air pressure, wind, clouds, rain, evapotranspiration) and the relationship between agricultural classification, rainfall, and climate in Indonesia; Agroclimate suitability for agriculture, climate modification; Measurement of weather and climate elements; Global warming and climate change, La-nina and El-nino and their impact on agricultural production, Indonesian climate.

Scope of Agroclimatology, The Role of Climate for Agriculture, Earth's Atmosphere; Solar Radiation; Air temperature; Temperature and Plant Growth; Air Pressure and Wind; Humidity; Hydrological Cycle, Clouds, and Rain; Climate Classification; Tropical Climate; Climate in Indonesia; Global Warming; Climate Change; The Effect of Climate on Pests and Plant Diseases; Adaptation to Climate Change.

9. ABI 11116: FUNDAMENTALS OF MANAGEMENT

2(2-0)

Definition and history of management, functions and methods of management, management processes consisting planning, organizing, administering, monitoring and evaluating; Introduction to human resource management.

10. UNI 10116: RELIGION

2(2-0)

Examining the aspects related to creatures and the nature and power of Allah SWT. Studying the apostolate and Islamic law, analyzing human relationship with Allah SWT. Studying human relationships with themselves, with other humans and with nature/environment. Analyzing Islam for scientific disciplines, studying Islamic culture, and studying faith, prayer, fasting, zakat and hajj.

11. UNI 10416: ENGLISH

2(2-0)

Ability to compose sentences, vocabulary, mastery of meaning and translation from English to Indonesian freely in the field of agricultural studies/stems. Use of good and correct spoken and written words and expressions.

12. PAG 11816: GENETICS

3(2-1)

Introduction; Inheritance and diversity of traits, chromosomes as gene carriers; Chromosomal linkage and mapping; DNA structure and replication; Inheritance through the cytoplasm, the molecular structure of chromosomes; Diversity in the number and structure of chromosomes; Gene expression, mutation and mutagenesis; Control of gene activity; Genetic manipulation; Population genetics; Genetics and Quantitative Evolution.

Introduction: Scope of Genetic and History of Genetic Development; Inheritance and Diversity of Traits: a. Mendel Principle, b. Segregation on Generation, c. Dominance Patterns, d. Epistasis; Probability Theory: a. Principles of Probability, b. genetic count; Inheritance through the Cytoplasm: a. Inheritance Character through Cytoplasm, b. Inheritance on Organelle Cell, c. Male dispersal and Maternal Effect; Chromosome as Gene Carrying: a. Consistency Number of Chromosome, b. Mitosis and Meiosis c. Chromosome as Sex Determinant; Diversity of Number and Structure of Chromosome: a. Chromosome Shape, b. Polyploidy, c. Aneuploidy, d. Chromosome Aberration; Mutation and Mutagenesis: a. Biochemistry of Mutation, b. Spontaneous of Mutation, c. Induced Mutation; Mid Semester; Linkage and Chromosome Mapping: a. Gene Location on Chromosome and Recommendation. B. Cross Over; Gene

Expression: a. Relationship between Gene and polypeptide, b. Transcription, c. Genetic Code; Structure and DNA Replication: a. Chemical Structure of DNA, b. Physical Structure of DNA, c. Synthesis and Replication of DNA; Population of Genetic: a. Allele Frequency and Genotype Frequency, b. Cross system, c. Principles of Hardy-Weinberg, d. Inbreeding; Genetic Quotative and Evolution: a. Quantitative Inheritance, b. Variances, c. Heritability; Germplasm and Plant; Genetic Improvement; Germplasm and Plant Genetic Improvement; Final Exam.

- 13. PAG 11916: FUNDAMENTALS OF PLANT PHYSIOLOGY** **3(2-1)**
Basic definition; Cell structure and function, water potential, mineral nutrition, absorption, and translocation; Enzymes and pigments, respiration, photosynthesis, metabolism (N, S and lipid).
Introduction, basic concept of the lecture; Water properties and its translocation; Plant and water relationship; Transpiration 1; Transpiration 2; Mineral nutrients 1; Mineral nutrients 2; Mid test; Plant growth regulator; Plant enzyme; Photosynthesis 1; Photosynthesis 2; Respiration 1; Respiration 2; Plant growth and development; Final test.
- 14. PTN 10116: FUNDAMENTALS OF SOIL SCIENCE** **3(2-1)**
Definition of soil; The process of soil formation and development; soil properties; Basics of soil fertility; mainland in Indonesia; Fundamentals of land management.
- 15. PAG 11216: FUNDAMENTALS OF AGRONOMY** **3(2-1)**
Definition and scope of agronomy, agricultural development and the role of agronomy; area of origin and center of plant production; Grouping of agronomic plants based on structure and function; Plant growth and development; Effect of abiotic and biotic factors on plants; Sexual and asexual propagation of plants; Preparation of dry land and wetlands; Seeding/seeding and planting; Plant maintenance; Agricultural production facilities (seeds/seeds, fertilizers, pesticides, and Plant Growth Regulators/ZPT); cropping pattern; Intensification, diversification, and extensification; Conservation of environmental carrying capacity, and Utilization of agricultural waste.
Basic definitions and scopes of Agronomy; Agricultural development and the role of Agronomy; Areas of origin and centers of crop production; Agronomic plant grouping and examples; Plant growth and development; Effect of abiotic factors on plant growth and development; Effect of biotic factors on plant growth and development; Grouping and roles of growth regulator substances (GRS), enzymes, and vitamins; Plant breeding; Plant propagation (sexual and asexual), and tissue culture; Preparation of dry land, swamp land, and micro land; Nurseries, seeding, and planting; Cropping patterns and crop diversification; Agricultural intensification, and agricultural extensification; Sustainability of land resources/conservation, and utilization of agricultural waste; Agricultural production facilities.
- 16. UNI 10216: CIVIC** **2(2-0)**
Definition and the concept of an archipelagic state (archipelago), the concept of strength, insight into the archipelago, and national resilience. Exercise using an integral comprehensive approach in responding to national security issues. The framework of thinking and satrification of polstra hamkamnas. The concept of defending the country and the dual function of ABRI. Hankamrata system.
- 17. ABI 11316: RURAL SOCIOLOGY** **3(2-1)**
Definition of rural sociology, culture, social interactions and processes, social and cultural change, social institutions, social status and roles, power, authority and leadership, social stratification, social groups and social organizations, the role of women in rural areas.
- 18. PAG 12416: PLANT GROWTH REGULATOR** **3(2-1)**
Discovery of auxin, biosynthesis and metabolism, auxin transport, influence of auxin on plant development; Cytokinin discovery and identification, cell division and plant development,

biosynResearch Project, metabolism and transport of cytokinin's, biological role of cytokinin's; Discovery of gibberellins, biosynthesis and metabolism of gibberellins, influence of gibberellins on plant growth and development, physiological mechanisms of growth due to the action of gibberellins, role of gibberellins on germination; Discovery of Ethylene, structure and biosynthesis of ethylene, influence of ethylene on plant physiology and development; Identification of hormones, growth regulators, biosynthesis, metabolism and transportation of inhibitory substances, the effect of inhibitory substances on plant physiology and development.

Introduction, basic concept, role and function of PGR; Brassinosteroids dan salicylic acid hormones; Biosynthesis and metabolism of auxin; Transpiration and physiological effect of auxin; Effect of auxin on plant growth and development; Biosynthesis, metabolism and transportation of ABA; Effect of ABA on plant physiology and development; Mid test; Biosynthesis, metabolism and transportation of Gibberellin; Effect of GA on plant physiology and development; Effect of GA on plant growth and development; Discovery, identification, and biosynthesis of cytokinin; Metabolism, transportation and physiological role of cytokinin; Structure dan biosynthesis of ethylene; Effect of ethylene on plant physiology and development; Final test.

19. PER 21116: STATISTICS

3(2-1)

Definition and use of statistics in agricultura, understanding of population, simples, parameters, statistics, measures of concentration, measures of dispersion, sampling techniques, regression and correlation analysis.

General understanding of statistics; ilustration and examples to use statistics in agriculture research; Understanding and relationship between population and sample; ilustration dan examples to use in agruculture research; Understanding several variablesl (quantitative-qualitative; discreat-continue; score; nominal,ordinal, categorical, rational) ilustration and examples in agriculture; Understanding, illustration, calculation and application of several measurement of central tendency of agricultural data (arithmatic-harmonic-geometric mean; median, and modus); Understanding, illustration, calculation and application examples on agricultural data, (minimum-maximum, rank, variance, standar deviation); Understanding, illustration, calculation, and application examples of measurement of data position (percentile, quartile, etc.); Explanation and examples of several techiques and methods in data presentation in form of tables, graphics, and hystogram; Understanding, illustration, relation, and calculation of probality and binomial distribution; Understanding, ilustration, relation, and calculation probability and normal distribution and Z-table; Understanding, ilustration, relation, and calculation probability and T-Student distribution and T-table; Explanation and calcution of One sample T-test using Z-test and T-test; Explanation and calculation of Two sample comparionwise test in equal variance by using F-max ratio dan T-test; Explanation and calculation of Two sample comparionwise test in un-equal variance by using F-max ratio dan T-test; Explanation, and introduction toward understanding of Analysis Variance (Anova) conceipt; Simple explanation toward understanding and application several other methods in statistical analysis analisis (regression, correlation, covariance, and non-parametric method).

20. PAG 23416: PLANT ECOLOGY

3(2-1)

Definition, development and ecological benefits of plants; Vegetation communities, growth forms and ecotones; Description and analysis of floristic and non-floristic vegetation; Vegetation succession and climax; Adaptation and plant adaptation test, distribution of vegetation and plant ecotypes, plant introductions, vegetable germplasm and their management, plant indicators, plant interactions and environmental components (soil, water, and climate); The impact of the greenhouse effect on crops, and the perspective of agriculture on controlled environmental conditions.

Definition, development, and Plant Ecological uses; Vegetation communities, life forms, and ecotones; Description and vegetation analysis of floristic and non-floristic; Vegetation succession, concept and

theory of climax; Plant adaptation and plant adaptation test; Distribution of vegetation and plant ecotype; Definition and classification of plants, as well as plant introductions; Plant indicators and types of plant indicators; Preservation of plant germplasm; Management of plant germplasm; Natural environment and natural environmental principles; Environmental components (soil and water); Environmental components (temperature and light); The impact of the greenhouse effect on plant growth and production; Agricultural perspective in controlled environment.

21. PAG 22416: PLANT PHYSIOLOGY

3(2-1)

The rate and alteration of plant metabolic processes are related to the dynamics of environmental factors; Effect of climate elements on metabolism, growth and production of plants; Effect of chemical, physical, and biological properties of soil on metabolism, growth and yield of plants.

Introduction, basic concept, and scope of Crop Physiology; Anatomy, cell structure and plant tissue; Plant and water relationship; Physiological function of water; Plant growth regulator; Photosynthesis; Photosynthesis and plant growth; Mid test; Plant respiration; Factors affected respiration and photorespiration; Enzyme 1; Enzyme 2; Plant growth and development; Plant growth analysis; Biomass, yield and yield components, harvest index; Final test.

22. PAG 22216: PLANT BIOCHEMISTRY

3(2-1)

The plant biochemistry course discusses about aspects related to the basics of plant biochemistry and its relation to plant metabolic processes which include cell structure and function; Cellular membranes and transport; The basic chemicals that construct cells; Characteristics, structure and function of carbohydrates; characteristics, structure and function of fat; Characteristics, structure and function of proteins; Enzymes, their characteristics and functions; Nucleic acids and genetic information; Introduction of plant secondary metabolites and their functions.

Introduction and Scope of Plant Biochemistry; Structure and Function of Cell; Cell Membrane and Cellular Transport; Enzyme, Characteristic and Function; Characteristic, Structure and Protein Function as well as Nucleic Acid and genetic Information; Mid-Semester; Characteristic, Structure and Function of Lipid; Characteristic, Structure and Function of Carbohydrate; Introduction of Secondary metabolites; Secondary Metabolites and Their Functions; Final Exam.

23. PAG 24216: WEEDS SCIENCE

3(2-1)

Introduction, the role and economic meaning of weeds; Weed classification; Spread of weeds; Weed reproduction; Dormancy; Weed biotechnology; Competition; Allelopathy and weed control.

Definition of weeds and the history of weed science; The role and economic meaning of weeds; Weed classification; Weed dispersal; Sexual reproduction of weeds; Reproduction of weeds vegetatively; Weed dormancy and its role; Kinds of weed dormancy; Weed adaptation to environmental conditions; Weed life strategy (R-Selection, and K-Selection); Definition of competition, and the elements contested in competition; Factors that influence the competition between weeds and plants; Critical period in weed competition; Definition of allelopathy, allelopathic substances, and things related to allelopathy; Definition of control, various types of control and integrated weed control.

24. PAG 23116: FUNDAMENTALS OF SEED SCIENCE AND TECHNOLOGY **3(2-1)**

Definition and scope of seed technology; Definition of seeds, seeds, and seedlings; Definition of orthodox seeds and recalcitrant; Biology of seeds; Seed structure and function; Sprout structure; Seed chemistry; Seed chemical reshuffle process; Seed germination, physiology of germination, factors affecting germination; Seed, viability and vigor testing; Dormancy, definition, causes of seed dormancy and treatment of dormancy breaking; Seed storage, seed deterioration and its control.

25. PPT 21116: FUNDAMENTALS OF PLANT PROTECTION

3(2-1)

Definition of plant pests and diseases, types of pests and types of damage and losses caused, causes of plant diseases and the symptoms caused and losses incurred, plant pest control, control of plant diseases, examples cases of important pests and diseases.

- 26. PTN 20116: SOIL FERTILITY** **3(2-1)**
 The scope and problems of soil fertility; Identification of soil fertility; The relationship between soil and plants; plant nutrients; Soil fertility management; Evaluation of soil fertility.
- 27. PER 24116: EXPERIMENTAL DESIGN** **3(2-1)**
 Definition and scope of experiment, experimental design classification, mean difference test, single error design, split plot design, analysis of variance and covariance, and data problems in agro-ecotechnology experiments.
 Introduction: Basic principle, assumption, application, and experimental design models; Single faktor experimental design: Completely Random Design. Application and calculation example; Single faktor experimental design: Randomized Complete Block Design; Application and calculation example; Mean comparison methods: LSD, HSD, Duncann, and Contrast analysis; Application and calculation example; Factorial Design in Apriculture; Application and calculation examples; Factorial Split plot Design in Apriculture; Application and calculation examples; Simple regression, and correlation analysis in agricultural research; Application and calculation examples; General problem, precession, accuration, and bias in agricultural research; prevention and remediantion (case study); General example in calculation of Anova, LSD, HSD, Duncann, and contrast analysis by using computer program (Excel and SAS).
- 28. PAG 22116: PLANT BREEDING** **3(2-1)**
 Definition and role of plant breeding in crop production; Methods of plant reproduction; Principles of genetics in plant breeding; Cumulative trait inheritance and heritability; Genotype x environment interactions; Inbreeding and heterosis; Parent selection; Introduction of plants and genetic diversity; Establishment of a selection population through crosses; Various methods for conducting advanced selection; Several methods of plant breeding to obtain varieties based on the character of the plant.
 Introduction, review in modern genetic, role, general conceipt in plant breeding procedures.; Basic conceipt, understanding, dan creating variation as basic capital in plant breeding; Capita selecta in screening methods, selection methods utilized in modern plant breeding; Capita selecta and case study in plant breeding program for cross pollinated plants; Capita selecta and case study in plant breeding program for self-pollinated plants.
- 29. PAG 22416: ANNUAL CROPS CULTIVATION** **3(2-1)**
 The economic value of the plant; history of plant development, systematics, anatomy, and morphology of plants; Plant Ecology and aspects of Breeding (Climate Factors, Soil, Pests and Diseases), plant breeding and several types or varieties of plants); Aspects of Cultivation and Production Management (Land Preparation, Seeds or Seedlings, Plant Maintenance, Harvest and Post-Harvest).
- 30. PAG 22516: PERENNIAL CROPS CULTIVATION** **3(2-1)**
 Introduction (History, origin, center, production, economic meaning of rubber plants); Introduction of the characteristics of rubber plants and their ecology; Procurement of planting material and preparation of planting; Planting and Maintenance of plants; Exploitation and processing results; Oil Palm Plants (Ecophysiology, Procurement of planting materials, preparation of planting, planting, maintenance, harvest and post-harvest); Coffee and Pepper Plants (history, botany, growing conditions, planting material and plant propagation, planting preparation, planting, maintenance, fruit picking and product processing).
 Introduction; Plant breeding and superior clone of rubber; Cultivation of Rubber Plant; Plant breeding and superior variety of oil palm; Cultivation of oil palm; Plant breeding and superior clone of coffee; Cultivation of coffee; Mid Test; Plant breeding and superior variety of coconut; Cultivation of coconut; Cultivation of pepper; Cultivation of cacao; Cultivation of Clove; Cultivation of Areca palm; Cultivation of Aren; Semester Exams.

- 31. PAG 22616: HORTICULTURAL CROPS CULTIVATION** **3(2-1)**
 Definition, development, nutritional and economic value of horticultural crops; Horticultural plant classification; Growth factors and development of horticultural crops: Vegetables, Fruits, Ornamental and Biopharmaceuticals.
- 32. PAG 23316: PLANT NUTRITION** **3(2-1)**
 Definition and classification of plant nutrients, mechanism of ion uptake by individual cells and roots; Distribution of nutrients through the xylem and phloem vessels; Uptake of elements through leaves or by plants other than roots; Macro and micro nutrients; non-essential elements but beneficial for plants; The relationship between nutrients and plant resistance to pests and pathogens; Diagnosis of nutrient deficiency and toxicity; Plant adaptation to suboptimal soil chemical conditions.
- 33. PAG 26216: ORGANIC AGRICULTURE** **3(2-1)**
 Concept of Organic Farming System (SOP); Benefits of SOPs in conventional and sustainable farming systems; Nutrient cycle in SOP; Alley cropping as one of the elements of SPO; Effect of SOP on soil and food health; Effect of SOP on improvement of plant characteristics; Effect of SOP on residues of using agrochemicals; Utilization of biofertilizer and biopesticide at farm level.
- 34. ABI 24216: FARM MANAGEMENT** **3(2-1)**
 Basic definition, relationship between farming science and other sciences (production economics, microeconomics, basics of agronomy), farming classification, basic elements of farming, problems in farming production, farming cost concept, farming bookkeeping, farming analysis, planning and financing business.
- 35. PAG 26516: TISSUE CULTURE** **3(2-1)**
 Introduction: definition and benefits of propagation by tissue culture; The sciences that underlie plant tissue culture; The basic principles of tissue culture and the history of the development of plant tissue culture; Requirements for tissue culture laboratories and methods of sterilizing tools and materials; Various kinds of tissue culture media and their composition and modifications; The effect of internal factors of plants used as a source of explants on growth and development in vitro; Techniques in tissue culture and formed structures; Types of plant tissue culture, benefits and ultimate goals; Application of in vitro culture in agriculture and pharmacy; Cryopreservation technique in germplasm storage.
 Introduction; Understanding and Benefits of Tissue Culture; Principles of Tissue Culture; The Scopes of Tissue Culture; Tissue Culture: a. Cell Totipotency, b. Proliferation, Diffrensiation and Dedifrensiation cell, c. Growth; Factors that benefit for In Vitro Cell Culture; Laboratorium of Tissue Culture and Principle of Sterilization; Tissue culture media; The influence of Eksplan to the Growth and Development of Tissue; Several Technique in Tissue Culture; Micropropagation; Mid-Semester; Tissus Culture to produce the plant that has new Trait; Embryo Culture; Embryo Culture; Aplication of Tissue Culture in Vitro I; Aplication of Tissue Culture in Vitro I; Aplication of Tissue Culture in Vitro II; Aplication of Tissue Culture in Vitro III; Final Exam.
- 36. PAG 26616 : HYDROPONICS** **3(2-1)**
 History, definition and development of hydroponic techniques in Indonesia; Hydroponic systems on a large and small scale; Tools and materials needed in a hydroponic system; Nutrients needed in a hydroponic system; How to make a nutrient solution in a hydroponic system; Factors affecting plant growth and development in hydroponic systems; The stages of work on the hydroponic system.
 Introduction; Hydroponic development; Method Hydroponics; Medium of Hydroponics; Production System Hydroponics; Macro nutrients; Micro nutrients; Exam 1; Nutrients in Hydroponics; Growth

Factor 1; Growth Factor 2; Hydroponic Cultivation Techniques 1; Hydroponic Cultivation Techniques 2; Hydroponic Equipment; Application of hydroponic; Exam 2.

- 37. PAG PAG 32716: ADVANCED ANNUAL CROPS CULTIVATION 3(2-1)**
Production physiology (based on its life cycle, adapted to the water and nutrient requirements of each phase of plant life); Technological developments and breeding of several important annual crops (maximum 3 types of plants); Independent Work Practicum on Seasonal Crop Cultivation Technology. Introduction of the lecture; Environmental factors of plant growth in seasonal crop cultivation systems; Morphology of rice plant; Rice cultivation technology; Morphology and cultivation technology of corn; Group discussion 1; Group discussion 2; Mid test; Morphology and cultivation technology of soybean; Morphology and cultivation technology of cassava; Surjan system of cultivation technology; Wetlands cultivation technology – agrosylvofishery; Crop cultivation at high land; Group discussion 3; Group discussion 4; Final test.
- 38. PAG 32816: ADVANCED PERENNIAL CROPS CULTIVATION 3(2-1)**
Introduction of maintenance and control techniques for pests and diseases and problems in plantation crops; Introduction of tapping techniques and giving stimulants to rubber plants; Pruning, pests control and diseases control on coffee and pepper plants; Pest and disease control in oil palm plantations. Introduction; Optimization of oil palm plantations; Oil palm plantation management; Impact of drought on oil palm; Oil Palm and ISPO; Good Agricultural Practice of coffee; Drought and; Coffee Flowering; Mid test; Leaf fall and rubber plant production; Rubber tapping and stimulant; Deficiency nutrient of Rubber; Pepper Plant Nutrient Deficiency; Stimulants for plant seeds tea; Pruning and harvesting tea plants; Cocoa plant polyculture; semester exams.
- 39. PAG 32916: VEGETABLE CROPS SCIENCE 3(2-1)**
Introduction (Limitation and scope of vegetable crops); Nutritional content and benefits of vegetable crops; Vegetable plant breeding; Patterns of growth and development of vegetable crops; Grouping of vegetable crops; Vegetable plant growth factors; Vegetable cultivation techniques in macro and micro fields; Chili and potato cultivation techniques; Cucumber and cabbage cultivation techniques. Definition, scope, and benefits of vegetables; Classification of vegetables based on organs/plant parts consumed, suitable agroecosystem conditions; Cultivation of Javanese ginseng as a vegetable; Floating cultivation and vegetable wet-culture; Cultivation of genjer vegetables in wetlands; Pagoda mustard cultivation; Harvesting and preparing fresh vegetables; Exam I; Vegetable plant breeding; Conventional vegetable propagation and cultivation techniques; Chili cultivation; Hydroponic vegetable plants; Application of essential nutrients to plants: organic vs inorganic; Plant maintenance and protection during growth; Shallot Cultivation; Exam II.
- 40. PAG 33116: FRUIT CROPS CULTIVATION 3(2-1)**
Introduction (Limitation and scope of fruit crops); Nutritional content and benefits of fruit plants; Aspects of fruit plant breeding; Propagation of fruit plants; Flower and fruit organs and the process of flowering and fertilization; Development of commercial fruit orchards; family Rosaceae; Meliaceae family; Bromeliaceae family; Bombacaceae family. RPS Explanation, Contract Lectures; Limitations of fruit crops, economic meaning and nutritional value of fruit plants, development of fruit crops; fruit plant propagation techniques; fruit plant propagation techniques; Duku cultivation and cultivation techniques; fruit plant classification; fruit plant classification; midterm; watermelon plants and cultivation techniques; citrus plants and cultivation techniques; fruit plant growth factors; fruit plant growth factors; papaya plants and cultivation techniques; strawberry plants and cultivation techniques; pineapple plants and cultivation techniques; semester exam.
- 41. PTE 33316: AGRICULTURAL MACHINERY AND EQUIPMENT 3(2-1)**
Knowledge of agricultural cultivation tools and machines, including: various types of soil processing equipment, planting tools, fertilization tools, plant maintenance tools and transportation. The discussion

is more focused on modern equipment which discusses the construction, function and working capacity of the tool in a selective/appropriate.

42. PAG 34316: WEEDS CONTROL

3(2-1)

The role of weed control in crop cultivation; Conception and development of weed control; Various weed control methods/methods (preventive methods, mechanical/physical methods, technical culture, biological methods, and chemical methods); Weed control with herbicides, weed control in various types of commodities/plants (rice crops, secondary crops, horticultural crops, and plantation crops); Integrated weed control, and economic threshold in weed control.

Introductions; Preventive control; Mechanical control; Control in technical culture; Biological control; Chemical control (Role, classification and formulation of herbicides); Chemical control (Selectivity, properties and effects on the environment); Chemical control (Herbicide application process); Weed control in rice plants (upland and upland rancak); Weed control in rice crops (paddy fields and tidal fields); Weed control in secondary crops; Weed control in horticultural crops; Weed control in plantation crops; Integrated weed control (IWM); Economic threshold (ET) in weed control.

43. PAG 33616: PLANT BIOTECHNOLOGY

3(2-1)

Introduction: definition of biotechnology; the scope of plant biotechnology; DNA, function, structure and principle of isolation; DNA-modifying restriction enzymes; cloning vector, DNA and genetic engineering; analysis techniques at the DNA level; tissue culture and hybrid techniques (biotech supporting tissue culture); cell fusion, protoplast fusion; introduction of the “Marker” method for plant breeding activities; application of biotechnology in agricultural development: yield and quality improvement, technology and production of chemical compounds and consequences of using biotechnology.

Definition, scope and Application of Biotechnology; DNA, Function, Structure and Isolation ; Enzymes of DNA Modification ; Principles of Genetic Engineering; Cloning Vector; Technique of DNA Analysis; Tissue Culture and Hybrid Technique; MIDTERM; Cell and Protoplasm Fusion; Introduction of Marker Method for Plant Breeding; Introduction of Marker Method for Plant Breeding; Application of Biotechnology in Agriculture; Transgenic Plant for Yield and Quality Improvement; Transgenic Plant for Technology and increase of Chemical Compound; Consequences of using Genetic Engineering; Final Exam.

44. PAG 33216: SPICE, MEDICINAL AND INDUSTRIAL CROPS CULTIVATION

3(2-1)

Introduction; The Spice, Medicinal and Industrial Plant Cultivation course is an application course that facilitates students in understanding the value of herbs, drugs and phytopharmacology as well as logos and markings; Grouping of spice, medicinal and industrial plants; The benefits of herbal, medicinal and industrial plants and herbal concoctions; Brief history, systematics, morphology, benefits, growing conditions, cultivation and post-harvest techniques as well as farming analysis (Turmeric, Cloves, Aloe Vera, Mahkota Dewa, Temulawak, Cat Whiskers, Dlingo, Fragrant Lemongrass, Quinine, Ginger and Gambir).

Introduction, Definition and Benefits of herbs, drugs and phytopharmaceuticals as well as logos and marker; Grouping and Benefits of Spice, Medicinal and Industrial Plants; History, systematics, morphology, benefits, growing conditions Aloe vera, Quinine; Cultivation and post-harvest techniques and analysis of Aloe Vera farming, Quinine; Exam I; History, systematics, morphology, benefits, growing conditions The crown of the god, Gambir; Cultivation and post-harvest techniques and farming analysis Mahkota dewa, Gambir; History, systematics, morphology, benefits, conditions for growing Dlingo, Lemongrass; Cultivation and post-harvest techniques and analysis of farming Dlingo, Lemongrass; Exam II; History, systematics, morphology, benefits, growing conditions Turmeric, Ginger; Cultivation and post-harvest techniques and farming analysis Turmeric, Ginger; History, systematics, morphology, benefits, conditions for growing Cloves, Temulawak; Cultivation and post-harvest techniques as well as farming analysis Cloves, Temulawak; Exam III.

45. PAG 33316: ORNAMENTAL PLANTS CULTIVATION

3(2-1)

Exploring horticultural aspects of ornamental plants, orchids, roses, gladiolus, chrisantemums and others (in pots, silver form, trees) intensively includes adaptation, tolerance, and resistance both in the greenhouse and in the field.

- 46. PTN 36516: IRRIGATION AND DRAINAGE** **3(2-1)**
Definition, objectives and scope of irrigation and drainage, irrigation water needs for crops, conception of irrigation efficiency and quality of irrigation water, planning systems for various types/irrigation methods, water pumps for irrigation: systems and planning, financial analysis of pumps. Classification of irrigation systems, operational management and maintenance of irrigation networks, and farmer institutions in supporting OP, basic planning techniques.
- 47. PTN 36216: FERTILIZATION AND FERTILIZERS TECHNOLOGY** **3(2-1)**
Introduction; Fertilizer classification; Fertilizer manufacturing technology; Behavior of fertilizers in soil; Fertilization methods and recommendations.
- 48. PER 31116: RESEARCH METHODS** **2(2-0)**
Philosophy of science and approach to get to the truth; the nature of research, the definition of types, objectives, and research principles; Steps of the scientific method and research procedures (research questions, problem formulation, research objectives and benefits, hypotheses, research variables, theoretical framework and research design); Data and methods of collection, population and sample, measurement in research, validity, and reliability, use of statistics in research, analysis of research results and drawing conclusions; Writing and presenting scientific papers.
Three cardinal sins in research & scientific writings; Sistematic steps in searching of research topics; Research & publication as a continuum; Publications and academic profession; Discussion of student-selected issues.
- 49. PER 37116: ENTREPRENEURSHIP** **2(2-0)**
The importance of entrepreneurship, understanding and characteristics of entrepreneurship, stages in entrepreneurship, aspects of organization and work procedures, technical and production aspects, creativity and innovation, formation and growth of new businesses, elements and formats of business plans, entrepreneurial practices.
Best practices of several professional entrepreneurship in agriculture created and managed by young generation; Understanding and definition of role and source of innovation and creativity to build and improve entrepreneurship; Capita selecta in creativity and innovation developed by young generation; Entrepreneurship creation, characters, steps, and challenges to develop entrepreneurship in agriculture; Pre-proposal creation: Inspiration, innovation, and creativity to initiate entrepreneurship unit in agriculture; Explanation and example on administration, organization, operational, and financial balance sheet in agriculture entrepreneurship; Explanation and example of procedures and documents required to build agricultural entrepreneurship; Explanation best practices on innovation, creativity, and its characters to develop entrepreneurship; Explanation and examples of business proposal to develop agricultural entrepreneurship to get financial support from the bank; Practice, discussion, and report to make business proposal; Instructional task to visit local entrepreneurship unit; Group discussion on innovation and creativity to improve visited entrepreneurship unit; Report and presentation on innovation and creativity to improve visited entrepreneurship unit (1); Report and presentation on innovation and creativity to improve visited entrepreneurship unit (2).
- 50. PAG 32516: FIELD STUDY** **1(0-1)**
Conducted field visitations (agricultural research centers); government agencies in the field of information and data resources for agriculture (agronomy), private plantations for food crops, horticulture, plantations and industry; large laboratories with national qualifications, reputable farmer gardens and agricultural

businesses that can provide added value to courses in the Agronomy Study Program; Field Lectures are carried out collectively for all students taking related courses, in collaboration with supervisors.

Introduction to the agricultural sector/agencies; Introduction and explanation of agricultural research institutes; Introduction to agricultural laboratory; Introduction and explanation of biological resource management institutions; Definition and types of land for food crops; Definition and types of horticultural planting land; Definition and types of plantation and industrial land; Visits to the agricultural sector/agencies; Visits to agricultural research institutes; Visits to agricultural laboratories; Visits to biological resource management institutions; Visits to food crops; Visits to horticultural plantations; Visits to plantation and industrial plantations; Preparation of reports and analysis of the results of field visits

51. PAG 32216: ADVANCED PLANT BREEDING

3(2-1)

Definition of sub-optimal land; Plant breeding for resistance to environmental stresses: submerged stress, drought stress, salinity stress, aluminum stress; Release and distribution of cultivars. Controversy over germplasm patents.

Introduction, general review in theory, procedures, and field plot in plant breeding research; Selection theory, selection response, and heritability estimate; Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in maize breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in rice breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in soybean breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in palm oil breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in vegetable breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in ornamental plant breeding program (case study); Capita selecta: Plant breeding concept and procedures in important plant in Indonesia: Genetic sources, hybridization, screening, and selection methods in fruit plant breeding program (case study).

52. PAG 36416: SEED PRODUCTION TECHNIQUE

3(2-1)

Legislation and seed production terminology; Plant reproduction; types and characteristics of plants based on their mode of reproduction (cross-pollination and self-pollination); Government regulations on seeds; Certified seed production requirements and processes; Certified seed grade; Seed production between fields and between seasons; genetic integrity; Techniques to protect genetic purity in field seed production; Purity analysis and determination of seed moisture content; Land requirements and selection for seed production; Rice seed production; Field study to BPSB, Rambutan village; Soybean seed production; Oil palm seed production; Lectures on the garden field and Sampoerna Agro's seed processing unit; Seed harvesting and conditioning; Threshing and cleaning of seeds; Seed drying and storage.

53. PAG 33416: SWAMP LANDS AGRICULTURE

3(2-1)

Swampland concept; Potential and deployment; Land classification and characteristics; Land typology; characteristics, soil properties and land biogeochemistry; Functions and benefits as a source of energy, food, feed and environmental functions; swamp ecosystem, flora and fauna ecosystem; Community of annual crops, food, vegetable and fruit feed; Cultivation technology, water and land management, seeds and varieties, seeding and nurseries, planting and maintenance, harvesting and post-harvesting; Development of farming systems, cultivation technology, production facilities and infrastructure, harvest and post-harvest indexes.

Introduction of Agriculture in Swamplands; Typology of Tidal Swamps and its Soil Characteristics; Nontidal Swamp Land Typology and its Soil Characteristics; Pyrite Formation and Effects of Pyrite Oxidation; Formation of Peat Soil, Characteristics and Damage Impact; Water Management in Tidal and Nontidal Swamplands; Reclamation of Water Management; Network in Swamplands; Mid test; Crop

Management in Tidal Swampland; Crop Management in Nontidal Swampland; Nursery System in Nontidal Swampland; Plant Management on Peat; Mangrove Ecosystem on the Coastal area; Mangrove Ecosystem Restoration; Restoration of Degraded Peatland Ecosystem; Final test

- 54. PAG 33516: FOREST CROPS CULTIVATION** **3(2-1)**
Definition; benefits; Forest management paradigm; Classification of forest types; forest productivity; Introduction of forestry plant types; The principles of forest crops cultivation, technical planting and maintenance of forest plantations; Technical for forest exploitation and protection of forest plants, Disrupted forest rehabilitation techniques, Plantation forest development planning, and Future production projection.
Introduction; Ecology of acacia; Cultivation of acacia; Ecology of eucalyptus; Cultivation of eucalyptus; Ecology of teak plant; Cultivation of teak plant; Mid Test; Cultivation of Jelutung; Cultivation of Mahogani; Cultivation of bamboo; Cultivation of Merbau; Cultivation of Kemenyan; Cultivation of Sengon; Development of silviculture in Indonesia; Semester exams.
- 55. PAG 36316: LANDSCAPE ARCHITECTURE** **3(2-1)**
Introduction to the field/scope of landscape architecture; The problem-solving process of recognizing and developing an aesthetic recognition of the unique aspects of a site; Process design, site analysis, programming; Concept formation and presentation in the field of landscape architecture and tourism.
Definition and profession in the field of landscape architecture; History of the development of landscape architecture; Garden classification, garden forms and styles; Types of gardens based on their nature; Getting to know art in landscape architecture; Aspects of forming space, circulation, and visual aspects of landscape architecture; Introduction to design elements and their uses; Design principles, balance, rhythm, repetition and emphasis; Design in landscape architecture; Introduction and arrangement of various forms of open space; Introduction to garden elements; Ornamental plants in landscape architecture; Green planning in garden design; Park cost budget plan analysis; Get to know various garden designs and analyze their designs.
- 56. PAG 33716: PLANT PROPAGATION** **3(2-1)**
Introduction, definition; values of plant propagation and aspects of plant propagation; Principles of plant propagation (generative and vegetative); Anatomy and physiology of plant propagation (by cuttings, grafting, grafting and grafting); Principles of propagation by tissue culture; Propagation of plants by special organs.
- 57. UNI 40116: COMMUNITY SERVICE PROGRAM (KKN)** **4(0-4)**
Community service program includes debriefing in the form of skills training and practical knowledge in the fields of agriculture, health, rural socio-culture, education, village government and the economy as well as manpower. Community service program conducted for two months in a programmed village in the South Sumatra region and continued with report writing.
- 58. PER 49216: FIELD PRACTICE** **3(0-3)**
Application of science and technology as well as skills training in the field of agro-ecotechnology under the guidance of a supervisor; Writing reports in the form of results of technology applications, training experiences, findings or solving specific problems in the field approved by the supervisor.
- 59. PER 49316: RESEARCH PROJECT** **6(0-6)**
Research exercise or research design that covers various aspects thoroughly from preparation that requires discussion, to writing research reports; Research must be done by students as a final project under the direction of a supervisor; The series of activities carried out include the preparation of a research plan or design, implementation, data processing, and presentation of

the results in the form of a research project that meets the writing criteria applicable at the Faculty of Agriculture and must be defended in front of the examiner team.

60. PER 49416: SEMINAR

1(0-1)

Submission of research results in the context of preparing a research project or field practice report that is supervised directly by a research project supervisor or field practice.