

## STUDY PROGRAM : **Soil Science**

Reorganization of the study program based on the Decree of the Minister of Research, Technology and Higher Education number: 333/M/Kp/V/2015 dated May 4, 2015.

### 1. VISION

**To be the center of excellence for Soil Science education and swampland-based research in Indonesia.**

### 2. MISSION:

- a. Organizing quality Soil Science education by utilizing advances in science and technology in managing natural resources and the environment;
- b. Develop quality research and broad results to optimize the use and conservation of land resources in a sustainable manner;
- c. Applying the results of the development of soil science education and research for the welfare of the community; and
- d. Continuously develop mutually beneficial cooperation with various domestic and foreign institutions.

### 3. PURPOSE:

The Educational Objective of the Unsri Soil Science Program is based on the intellectual and professional development of students. Graduates of the Unsri Soil Science Study Program are expected within a few years of graduation to have:

- a. Ability as a professional practitioner or carry out advanced studies in a relevant field;
- b. Ability to work successfully as a professional and take responsibility effectively on a professional team.

In order to fulfill the Education Program Objectives, graduate students from the Unsri Soil Science Study Program must be able to

- a. Apply knowledge of Soil Science to solve problems;
- b. Design and conduct experiments, and analyze and interpret data;
- c. Function on a multidisciplinary team;
- d. Identify, formulate, and solve agricultural and environmental problems;
- e. Understand professional and ethical responsibilities;
- f. Communicate effectively interpersonally, formally, and technically, both orally and in writing;
- g. Understand the impact of environmental solutions in a global and social context.
- h. Recognizes the need for, and has the ability to engage in, lifelong learning;
- i. Identify important issues in basic and applied soil science and formulate a scientific approach to these issues; and

- j. Demonstrate an appreciation of land as a fundamental natural resource that deserves to be used wisely and protected;

#### 4. PROFILE OF GRADUATES

- a. ACTORS IN AGRICULTURE (actor)
- b. MANAGER (planner, designer, organizer, evaluator, mediator)
- c. ENTREPRENEURS (entrepreneurs, initiators, adapters, cooperators)
- d. RESEARCHER (researcher)
- e. EDUCATION (educator)

#### 5. COMPETENCY

Main competencies Learning outcomes (Learning Outcomes) of the Soil Science Study Program formulated on February 25, 2012 (meeting with HITI and Soil Science Study Programs throughout Indonesia).

##### **Level 6 generic description (first paragraph)**

Able to utilize science and technology in their field of expertise and able to adapt to situations encountered in solving problems.

##### **Specific description**

Able to describe soil properties, classify soil, choose the best alternative land use in agriculture, and maintain it for the sustainability of soil functions through field observations, laboratory and landscape analysis.

##### **Level 6 generic description (second paragraph)**

Mastering the theoretical concepts of specialist and in-depth knowledge in certain fields, and able to formulate procedural problem solving

##### **Specific description**

Mastering knowledge of Morphology and Soil Classification, Soil Survey and Mapping, Soil Physics, Soil Mineralogy, Soil Chemistry, Soil Biology, Soil Fertility and Plant Nutrition, Land Evaluation and Soil Management, Soil and Water Conservation, Fertilizer and Fertilizer to be used in the utilization and sustainable soil maintenance.

##### **Level 6 generic description (third paragraph)**

Able to make strategic decisions based on analysis of information and data, and provide guidance in choosing various alternative solutions:

##### **Specific description**

Able to determine the level of surveys in soil mapping, determine land use planning, determine the choice of types and doses of fertilizers, determine soil management and soil and water conservation actions, as well as determine ways to maintain, improve and improve soil quality.

**Level 6 generic description (fourth paragraph)**

Responsible for their own work and can be given responsibility for the achievement of the organization's work.

## Specific description

Able to manage activities within the scope of his work and be responsible for the achievement of his work and open to interact scientifically for the achievement of organizational work.

**6. CURRICULUM BASED ON COMPETENCE**

The courses arranged in this curriculum adopt the principles in the Soil Science Core Body of Knowledge (Field, McBratney, and Koppi, 2013).

No.	Core Body of Knowledge	Study coverage
1	<i>pedology</i>	<i>Soil landscape and forming processes Describe and classify soil</i>
2	<i>Soil Physics</i>	<i>Understand soil physical properties Measure soil physics (lab/field) Assessment of soil water</i>
3	<i>Soil Chemistry</i>	<i>Understand soil chemical components/properties Soil chemistry cycles</i>
4	<i>Soil Biology</i>	<i>Measure soil biology lab/field techniques Understand soil ecology</i>
5	<i>Environmental Science</i>	<i>Function of soil in natural and constructed world Soil chemistry affecting soil problems, eg acid sulfate soil Understand how soil chemistry is managed Understand the consequences of soil degradation and its management</i>
6	<i>Education and Extension</i>	<i>Importance of soils in natural and constructed environments Relate soil types and landscapes to different users Be able to explain soil measurements/results to different audiences</i>

Soil Science Curriculum

Type of course	Credits	Course description
Compulsory Courses	126	Consists of 19 courses (56 credits) as the core curriculum (national) that distinguishes it from other study programs and plus 70 credits of the national agricultural curriculum
Elective courses	18	Institutional curriculum. Selected courses from 54 credits provided with considering

		the basis of regional advantages and potential. This curriculum is expected to be able to foster creativity, analytical skills and real reasoning of students, in accordance with the vision and mission of the Study Program.
Total number	144	

#### I. Group of personality development courses (MPK)

No.	Code	Subject	Credits	Precondition
1.	UNI 10109	Religion	2 (2-0)	
2.	UNI 10209	Civic	2 (2-0)	
3.	UNI 10309	Indonesian	2 (2-0)	
4.	UNI 10409	English	2 (2-0)	
5.	UNI 17109	Pancasila	2 (2-0)	
Amount			10 credits	

#### II. Scientific and skill subject group (MKK)

No.	Code	Subject	Credits	Precondition
1	ABI 11109	Fundamentals of management	2 (2-0)	
2	ABI 11209	Introduction to Agricultural Economics*	3(2-1)	
3	ABI 11309	Rural Sociology*	3 (2-1)	
4	AET 11109	Agricultural Chemistry	3 (2-1)	
5	AET 11409	Principles of Agronomy	3 (2-1)	
6	AET 11509	Agroclimatology	3 (2-1)	
7	AET 21309	Plant Physiology	3 (2-1)	
8	AET 21509	Principles of Plant Protection	3 (2-1)	
9	PER 11109	Mathematics	3 (3-0)	
10	PER 11508	Fundamental Physics	2(2-0)	
11	PER 12109	Botany	3 (2-1)	
12	PER 12209	Introduction to Agricultural Science	2 (2-0)	
13	PER 21109	Statistics	3 (2-1)	
14	PER 31109	Research method	2 (2-0)	
15	PTN 10115	Introduction to Soil Science	3(2-1)	
16	PTN 12115	Agrogeology	3(2-1)	
17	PTN 12215	Floating Agriculture*	2(2-0)	

18	PTN 23115	Soil Biology	3(2-1)	
19	PTN 23215	Soil Chemistry	3(2-1)	
20	PTN 23315	Soil Physics	3(2-1)	
21	PTN 23415	Soil Microbiology*	3(2-1)	
22	PTN 24215	Soil Morphology and Classification	3(2-1)	
23	PTN 24315	Geodetic Surveying and Cartography	3(2-1)	
24	PTN 24415	Soil and Water Conservation	3(2-1)	
25	PTN 35115	Agrohydrology	3 (2-1)	
26	PTN 35515	<i>Soil Amendments*</i>	3(2-1)	
27	PTN 10215	Introduction to Environmental Science	2(2-0)	
Amount			74 credits	

### III. Craft Skills Course Group (MKB)

No.	Code	Subject	Credits	Precondition
1	PTN 20115	Soil fertility	3(2-1)	
2	PTN 24115	Soil and Water Conservation	3(2-1)	
3	PTN 36515	Irrigation and Drainage	3(2-1)	
4	PTN 35215	Soil Biotechnology	3(2-1)	
5	PTN 35415	Soil, Water and Plant Analysis*	3(1-2)	
6	PTN 36215	Fertilizer and Fertilization Technology	3(2-1)	
7	PTN 47115	Regional Planning and Development	3(2-1)	
8	PTN 47315	Spatial and Land Use Planning*	2(2-0)	
9	PTN 47515	Natural Resources and Environmental Management	2(2-0)	
10	PER 24109	Experiment Design	3 (2-1)	
11	ABI 34409	Agricultural Extension	3(2-1)	
12	ABI 24209	Farm Management*	3(2-1)	
13	ABI 24319	Agribusiness Marketing Management*	3(2-1)	
14	PBA 24208	Water Quality Management*	3(2-1)	
15	ABI 31209	Resource Economics*	2(2-0)	
16	PAG xxxxx	Plantation Crops Production (Rubber and Oil Palm). **	3(2-1)	
17	PAG xxxxx	Vegetable Crop Production**	3(2-1)	
18	PAG xxxxx	Food Crops Production**	3(2-1)	
19	PAG 32509	Management of Annual Crops in Swamplands**	3(2-1)	
20	PBA 34108	Aquaculture Engineering*	3(2-1)	
21	PTN 35315	Soil Survey and Land Evaluation	3(2-1)	
22	PTN 36115	Landscape Analysis	3(2-1)	

23	PTN 36315	Land Resources Information System	3(2-1)	
Amount			66 credits	

#### IV. Work Behavior Course (MPB)

No.	Code	Subject	Credits	Precondition
1	PTN 24515	Land Ecology	3(2-1)	
2	PTN 36415	Soil and Water Management	3(2-1)	
3	PTN 36615	Organic Farming System*	2(2-0)	
4	PTN 36715	Swampland Management	2(2-0)	
5	PTN 36815	Swamp Land Management Practicum	2(0-2)	
6	PTN 47215	Watershed Management	2(2-0)	
7	PTN 47415	Land Degradation and Reclamation*	2(2-0)	
8	PTN 35615	Agricultural Waste Management	3(2-1)	
9	PER 37109	Entrepreneurship	2(2-0)	
10	PTN 47515	Land and Agrarian Law*	2(2-0)	
11	PTN 47615	Organic Material Management*	2(2-0)	
Amount			25 credits	

#### V. Community Life Course (MBB)

No.	Code	Subject	Credits	Precondition
1.	UNI 40109	Community Service Program	4 (0-4)	
2.	PER 49209	Practice field	3 (0-3)	
3.	PER 49309	Essay	6 (0-6)	
4.	PER 49409	Seminar	1 (0-1)	
5.	PER 47108	Apprenticeship*	3(0-3)	
Amount			17 credits	

#### 7.DISTRIBUTION OF COURSES EVERY SEMESTER

Compulsory course structure is 133 credits and a minimum choice of 11 credits from the 59 credits provided.

##### a. Semester 1

No	Code	Subject	Credits	Precondition
1	PER 11108	Mathematics	3(3-0)	
2	PER 11208	Agricultural Chemistry	3(2-1)	
3	PER 12109	Botany	3(2-1)	
4	PER 11508	Fundamental Physics	2(1-1)	

5	UNI 10308	Indonesian	2(2-0)	
6	UNI 10208	Civic	2(2-0)	
7	UNI 17109	Pancasila	2(2-0)	
8	PER 11209	Introduction to Agricultural Science	2(2-0)	
		<b>Amount</b>	<b>19-0</b>	
			<b>credits</b>	

b. Semester 2

No	Code	Subject	Credits	Precondition
1	UNI 10108	Religion	2(2-0)	
2	PTN 10215	Introduction to Environmental Science	2 (2-0)	
3	UNI 10409	English	2(2-0)	
4	ABI 11209	Introduction to Agricultural Economic*	3(2-1)	
5	ABI 11109	Fundamentals of Management	2(2-0)	
6	ABI 11309	Rural Sociology*	3(2-1)	
7	PTN 10115	Introduction to Soil Science	3(2-1)	
8	PTN 12115	Agrogeology	3(2-1)	
9	PTN 12215	Floating Agriculture*	2(2-0)	
		<b>Amount</b>	<b>17-5</b>	
			<b>credits</b>	

c. 3rd semester

No	Code	Subject	Credits	Precondition
1	ABI 34409	Agricultural Extension	3(2-1)	
2	AET 21509	Principles of Plant Protection	3(2-1)	
3	AET 11409	Principles of Agronomy	3(2-1)	
4	PER 21109	Statistics	3(2-1)	
5	<b>PTN 23115</b>	<b>Soil Biology</b>	<b>3(2-1)</b>	
6	<b>PTN 23215</b>	<b>Soil Chemistry</b>	<b>3(2-1)</b>	
7	<b>PTN 23315</b>	<b>Soil Physics</b>	<b>3(2-1)</b>	
		<b>Amount</b>	<b>21-0</b>	
			<b>credits</b>	

d. Semester 4

No	Code	Subject	Credits	Precondition
1	AET 11509	Agroclimatology	2(2-0)	
2	<b>PTN 20115</b>	<b>Soil Fertility</b>	<b>3(2-1)</b>	
3	<b>PTN 24115</b>	<b>Soil and Water Conservation</b>	<b>3(2-1)</b>	
4	<b>PTN 24215</b>	<b>Soil Morphology and Classification</b>	<b>3(2-1)</b>	

5	<b>PTN 24315</b>	<b>Geodetic Surveying and Cartography</b>	<b>3(2-1)</b>	
6	<b>PTN 24415</b>	<b>Soil and Water Quality</b>	<b>3(2-1)</b>	
7	<b>PTN 24515</b>	<b>Land Ecology*</b>	<b>3(2-1)</b>	
8	<b>PTN 23415</b>	<b>Soil Microbiology*</b>	<b>3(2-1)</b>	
		<i>Options outside the Soil Science PS</i>		
9	ABI 24209	Farm Management*	3(2-1)	
10	ABI 24319	Agribusiness Marketing Management	3(2-1)	
11	PBA 24208	Water Quality Management*	3(2-1)	
		<b>Amount</b>	<b>17-6</b>	<b>credits</b>

e. 5th semester

No	Code	Subject	Credits	Precondition
1	AET 21309	Fundamentals of Plant Physiology	3(2-1)	
<b>2</b>	<b>PTN 35615</b>	<b>Agricultural Waste Management</b>	<b>3(2-1)</b>	
3	PER 24109	Experimental Design	3(2-1)	
4	PTN 35115	Agrohydrology	3(2-1)	
5	PTN 35215	Soil Biotechnology	3(2-1)	
6	PTN 35315	Land Survey and Evaluation	3(2-1)	
7	PTN 35415	Soil, Water and Plant Analysis	3(1-2)	
8	PTN 35515	Soil Amendments	3(2-1)	
		<i>Options outside the Soil Science PS</i>		
9	PAG xxxxx	Plantation Crops Production (Rubber and Oil Palm)**	3(2-1)	
10	PAG xxxxx	Vegetable Crops Production**	3(2-1)	
11	PBA 34108	Aquaculture Engineering*	3(2-1)	
12	ABI 31209	Natural Resource Economic	2(2-0)	
		<b>Amount</b>	<b>18-6</b>	<b>credits</b>

f. 6th semester

No	Code	Subject	Credits	Precondition
1	PAG xxxxx	Food Crops Production (Paddy, Corn, Soybean)**	3(2-1)	
2	AAG 32509	Management of Perennial Crops in Low land**	3(2-1)	
3	PER 31109	Research Methods	2(2-0)	
4	PTN 36115	Landscape Analysis	3(2-1)	
5	PTN 36215	Fertilizer and Fertilization Technology	3(2-1)	



6	PTN 36315	Land Resource Information System	3(2-1)	
7	PTN 36415	Soil and Water Management	3(2-1)	
8	PTN 36515	Irrigation and Drainage	3(2-1)	
9	PTN 36615	Organic Farming System*	2(2-0)	
10	PTN 36715	Lowland Management	2(2-0)	
11	PTN 36815	Practical of Lowland Management	2(0-2)	
		<b>Amount</b>	<b>21-2/3</b>	<b>credits</b>

g. 7th semester

No	Code	Subject	Credits	Precondition
1	PER 37109	Entrepreneurships	2(2-0)	
2	PTN 47115	Regional Planning and Development	3(2-1)	
3	PTN 47215	Watershed Management	2(2-0)	
4	PTN 47315	Spatial and Land use Planning*	2(2-0)	
5	PTN 47415	Land Degradation and Reclamation*	2(2-0)	
6	PTN 47515	Land and Agrarian Law*	2(2-0)	
7	PTN 47615	Organic Matter Management*	2(2-0)	
8	PTN 47715	Land Resource and Environmental Managment	2(2-0)	
		<b>Amount</b>	<b>9+8</b>	<b>credits</b>

h. Semester 8

No	Code	Subject	Credits	Precondition
1	UNI 40109	Community Service Program	4(0-4)	
2	PER 49209	Field Practice	3(0-3)	
3	PER 49309	Research Project	6(0-6)	
4	PER 49409	Seminar	1(0-1)	
5	PER 47108	Internship*	3(0-3)	
		<b>Amount</b>	<b>14-3</b>	<b>credits</b>

8.COURSE SYLLABUS

1. **UNI 10109 Islamic Religious Education2 (2-0)**

Examine aspects related to creatures and the nature and power of Allah SWT. Studying the apostolate and Islamic sharia, analyzing the relationship between humans and 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.

**2. UNI 10209 Citizenship Education2 (2-0)**

The definition and concept of an archipelagic state (archipelago), the concept of strength, insight into the archipelago, national security. The exercise uses an integral comprehensive approach in responding to national security issues. Framework for thinking and satrification of the National Security Police. The concept of defending the country and the dual function of ABRI. Defense system.

**3. UNI 10309 English2 (2-0)**

Fundamental basics of language skills, effective sentence construction and analysis of paragraphs and short essays. the principles of writing essays accompanied by exercises for writing papers with specific and simple subjects. Training in the form and structure of sentences and thestimology commonly used in scientific communication.

**4. UNI 10409 English2 (2-0)**

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

**5. PER 11109 Math2 (2-0)**

Numbers and functions, limits and functions. Continuity, differentials and their applications, integrals and their applications, functions and variables, vectors, matrices and determinants.

**6. PER 12209 Introduction to Agricultural Science2 (2-0)**

Understanding the scope and development of agriculture, history and development of agriculture, the role of figures and pioneers in the agricultural sector, main 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, problems of natural resources and the environment in relation to agricultural activities, agriculture and free trade as well as various laws and policies in the agricultural sector.

**7. ABI 11109 Fundamentals of Management2 (2-0)**

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

**8. ABI 11209 Introduction to Agricultural Economics2 (2-0)**

The theories and principles of economics related to agriculture. Theories and principles of agricultural economics, problems, factors of production and economic policies in agriculture and agricultural trade in Indonesia. Problems with natural resources, rural development, world population and food supply.

**9. ABI 11309 Rural Sociology3 (2-1)**

Understanding rural sociology, culture, social interactions and processes, social and cultural change, social institutions, social status and roles, power and authority and leadership, social stratification, social groups and social organizations, the role of women in rural areas.

**10. AET 11109 Agricultural Chemistry3 (2-1)**

The aspects discussed include aspects of the basics of chemistry (inorganic, organic) ranging from atoms, molecules, functional groups, metals (alkali, alkaline earth, heavy metals), acids and bases, redox reactions and their application in agriculture such as organic materials, pesticides, fertilizer and lime

**11. AET 11409 Fundamentals of Agronomy3 (2-1)**

Definition and scope of agronomy. Agricultural development, area of origin, center of crop production. The relationship of plants to the biotic and abiotic environment. Stages of plant cultivation. Plant growth and development system

**12. AET 11509 Agroclimatology3 (2-1)**

Definition and scope of agroclimatology. Climate and weather. Evapotranspiration, water balance, and climate classification of Indonesia. The influence of climate on plants.

**13. PTN 10115 BASIC SOIL SCIENCE 3(2-1)**

Definition of land; The process of soil formation and development; Basic properties of the soil; Basics of soil fertility; Main lands in Indonesia; Fundamentals of land management.

**14. PTN 12115 AGROGEOLOGY 3(2-1)**

Understanding of geology from the agricultural aspect; Formation of the earth's crust and its composition; Definition of rock; Types of rock and the process of their formation; Mineral Weathering; Soil constituent minerals.

**15. PTN 23115 SOIL BIOLOGY 3(2-1)**

Soil biology perspective; Soil ecology; Soil microorganisms; Soil macroorganisms; Soil biological processes; Basics of biofertilizers.

**16. PTN 232115 SOIL CHEMISTRY 3(2-1)**

Basic principles of soil chemistry; Soil solution; soil colloids; Ion exchange; Soil reaction and redox potential; Interaction of metals, organic matter and clay; Specific soil chemical properties.

**17. PTN 23315 SOIL PHYSICS 3(2-1)**

The scope of soil physics; Soil as a three-phase system; Soil physical characteristics; Soil Water and Air; Soil Mechanics; Relationship between physical properties of soil and plant growth.

**18. PTN 24215      SOIL MORPHOLOGY AND CLASSIFICATION      3(2-1)**

Understanding soil morphology; Genesis of the land; Diagnostic horizons; Soil classification and development; Soil classification system; Distribution of land in Indonesia.

**19. PTN 24315      SOIL MEASUREMENT AND CARTOGRAPHY      3(2-1)**

Understanding of soil surveying and cartography; Geometry and cartography in agriculture; Data collection technique; Data analysis and presentation; data interpretation.

**20. PTN 23415      SOIL MICROBIOLOGY\*      3(2-1)**

Definition, types and examples of soil microbes; N fixation microbes; Mycorrhizae; Solvent microbes P; BO Destroying Microbes; Microbes break down pesticides.

**21. PTN 24415      SOIL QUALITY      3(2-1)**

Definition of soil quality; Relationship between soil quality and living things; Soil quality indicators and benchmarks; Soil quality test; Technology for anticipating land degradation.

**22. PTN 35115      AGROHYDROLOGY      3(2-1)**

Introduction and scope of agrohydrology; Agrohydrological variables; water balance; Farm-level water management planning; Management of water resources for plants.

**23. PTN 35315      LAND SURVEY AND LAND EVALUATION      3(2-1)**

Definition of land survey and evaluation; Survey approach method; Basic framework for land evaluation; Land evaluation system; Data interpretation; Land suitability class.

**24. PTN 36115      LANDSCAPE ANALYSIS      3(2-1)**

Principles and scope of landscape analysis (landscape); The basic concept of landscape analysis (landscape); Factors and landscape formation; Landscape types; Landscape application.

**25. PTN 36315      LAND RESOURCES INFORMATION SYSTEM      3(2-1)**

SDL information principles; Land database system; GIS concepts and procedures; Application of GIS; SISDL Analysis and Presentation.

**26. PTN 20115      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. PTN 24115            SOIL AND WATER CONSERVATION            3(2-1)**

Definition and scope of soil and water conservation; Soil erosion and its problems; prediction and evaluation of soil erosion; soil and water conservation methods; soil and water conservation planning strategy.

**28. PTN 36515            IRRIGATION AND DRAINAGE            3(2-1)**

Definition, objectives and scope of irrigation and drainage, Need for irrigation water 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, pump financial analysis, Classification of irrigation systems, management operation and maintenance of irrigation networks, and farmer institutions in supporting OP, basic techniques of land drainage planning, cost analysis of irrigation and drainage projects, tidal irrigation.

**29. PTN 35215            SOIL BIOTECHNOLOGY            3(2-1)**

Development of soil biotechnology; Microorganism basics; Microorganism engineering; Biofertilization; Bioremediation; Composting technology.

**30. PTN 35415            SOIL, WATER AND PLANT ANALYSIS\*            3(1-2)**

Introduction, Laboratory: function, organization and safety, Laboratory equipment: tool function, Chemical principles: reagent, standard solution, concentration, Principles of sampling soil, water and plants, Soil, water and plant analysis: Total elemental analysis and plant graying, BO and N, P, S, pH, SAR, DHL, H-dd, Al-dd, Al saturation, CEC, K, NA, CA, Mg, Data interpretation and recommendations.

**31. PTN 36215            FERTILIZER AND FERTILIZER TECHNOLOGY            3(2-1)**

Introduction; Fertilizer classification; Fertilizer manufacturing technology; Behavior of fertilizers in soil; Fertilization methods and recommendations.

**32. PTN 47115            REGIONAL PLANNING AND DEVELOPMENT            3(2-1)**

The basic concept of territory and spatial planning; Area potential analysis method; Regional development theory and planning; Application of planning methods; Spatial planning method.

**33. PTN 47315            SPATIAL PLANNING AND LAND USE\*            2(1-1)**

The basics of land relations and how they are used in land use planning, data inventory and analysis, land use allocation policies based on suitability and regional planning.

**34. PTN 47515            NATURAL AND ENVIRONMENTAL MANAGEMENT\*            2(2-0)**

Definition, objectives and purposes of natural resource and environmental management, definition and environmental factors and natural resources, environment and population, natural resource classification, conception of environmental and natural resource management, environmental management tools, natural resource and environmental management cases, land and land resource management , Management of water resources and the environment.

**35. PTN 24515      LAND ECOLOGY\*      2(2-0)**

Understanding soil ecology and ecosystem; Relationship between soil biota; Relationship of soil biota-macroflora-macrofauna; Healthy soil bioindicator; The role of biota in the ecosystem; the role of biota in soil and water bioremediation.

**36. PTN 36415      SOIL AND WATER MANAGEMENT      3(2-1)**

Introduction; PTA concept; Potential and constraints in PTA; PTA basics; Sustainable PTA fundamentals; PTA technique. Management of saline and sodic soils, Continuous cultivation of dry land for soil physical, chemical and biological properties, Management of water for paddy fields and sustainable tidal lands

**37. PTN 36615      ORGANIC AGRICULTURE SYSTEMS\*      2(2-0)**

The scope of organic farming systems, Organic farming systems and conventional farming systems, Definition of ISO, ecolabeling, and environmental friendliness in agricultural systems, Application of organic farming systems in the tropics, Technology of organic farming systems, Nutrient cycle in organic farming systems, Alley cropping as an element organic farming systems have the potential to overcome land degradation, agroforestry as a technology option for agricultural cultivation in dry land, biofertilizer as a harmonizer and refertilizer for nutrient-poor and toxic heavy metal and amphoteric soils, characteristics of agricultural products from organic farming systems, application of zero waste agriculture systems on organic farming systems for agricultural efficiency, Relationship of organic farming systems with soil health, The relationship between organic farming systems and environmental quality. The relationship between organic farming systems and sustainable farming systems.

**38. PTN 36715      SWAMP LAND MANAGEMENT      2(2-0)**

Introduction: terminology, identification, natural environment, Phenomenon: agronomic problems, engineering problems, environmental problems, Classification of swamps: Classification of typology of tidal swamplands, Chemistry, physics and biology: Soil reactions, TSM oxidation and reduction, Soil biology, Soil management swamps: Alternative management, Agricultural uses, Non-agricultural uses, Capita Selekt: Land surveys and evaluation, Reclamation of reclamation network development, Research results (crop cultivation)

**39. PTN 47215      RIVER FLOW AREA MANAGEMENT      2(2-0)**

Basic understanding of watershed; Watershed management targets; Watershed characteristics; Watershed Management Techniques; Watershed Management Monitoring and Evaluation.

**40. PTN 47415      LAND DEGRADATION AND RECLAMATION\*      2(2-0)**

Introduction: scope of land degradation and reclamation, Effect of mining activities on physical and chemical soil, Reclamation of damaged land due to mining, Damage to land due to construction, roads, bridges, and dams, Land reclamation due to construction of roads, bridges and dams, Land damage due to cultivation and forest fires, post-field land reclamation and forest fires, pollution of pesticides and toxic materials, reclamation of land contaminated with pesticides and toxic materials.

**41. PER 21109 Statistics3 (2-1)**

Understanding and usefulness of statistics in agriculture, understanding of population, samples, parameters, statistics, concentration measures, dispersion measures, sampling techniques, regression and correlation analysis.

**42. PER 12109 Botany3 (2-1)**

Provide an understanding of cells, cell structure, cell organelles and their functions and the relationship between cells. Functions of plant organs, formation and development of flowers and seeds. Principles of plant classification and identification of plant nomenclature.

**43. PER 24109 Experimental Design3 (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.

**44. AET 21309 Plant Physiology3 (2-1)**

Understanding and the role of plant physiology and its relationship with other sciences. Characteristics of water, absorption, movement and transpiration. Photosynthesis and photosynthate translocation. plant respiration. Photorespiration. The basic principles of plant growth and development

**45. AET 21509 Fundamentals of Crop Protection3 (2-1)**

Provide an understanding of the basis of plant protection which involves a description of the process of emergence of plant pest and disease problems, pest bionomy, environmental factors that affect the development of pests Single approach in controlling plant pest organisms. Introduction to integrated pest control.

**46. PER 31109 Research Methodology2 (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, the use of statistics in research, analysis of research results and drawing conclusions. Writing and presenting scientific papers in writing and orally.

**47. PER 37109 Entrepreneurship2 (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.

**48. UNI 49109 Real Work Lecture4 (0-4)**

This real work course 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. Work practice for two months in a programmed village in the South Sumatra region and continued with report writing.

**49. PER 49209 Field Practice3 (0-3)**

Application of science and technology and 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.

**50. PER 49309 Thesis6 (0-6)**

Research exercise or design that covers various aspects thoroughly from preparation that requires discussion, to writing research reports. Thesis 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 thesis that meets the writing criteria applicable at the Faculty of Agriculture and must be defended in front of the examiner team.

**51. PER 49409 Seminar1 (0-1)**

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



## 9. LECTURER

NO.	NIP	NAME	SPECIALIST FIELD
1.	19511207197903100 3	Dr. HA Halim PKS, MS	Soil fertility
2.	19521006198012100 2	Ir. H. Djak Rahman, M.Sc.	Soil Conservation & Land Evaluation
3.	19560809198303100 4	Ir. Yaswan Karimuddin, MS	Remote Sensing
4.	19561230198503200 1	Dr. Ir. Siti Masreah Bernas., M.Sc.	Physics & Soil Conservation
5.	19580918198403200 1	Dra. Hj. Dwi Probowati Sulistyani, MS	Remote Sensing
6.	19590902198603100 3	Prof. Dr. Ir. M. Edi Armanto	Land Survey & Evaluation
7.	19600714198503100 5	Dr. Ir. H. Marsi, M.Sc.	Soil Chemistry
8.	19610405198503100 7	Prof. Dr. Ir. H. Robiyanto Hendro Susanto, M.Agr.Sc.	Soil & Water Management
9.	19610920199001100 1	Dr. Ir. Muh Bambang Prayitno, M.Agr.Sc.	Geomorphology, Soil & Water Management
10.	19611005198703102 3	Dr. Ir. A. Madjid, MS	Soil Chemistry
11.	19620412198703100 1	Ir. Warsito, MP	Mineralogy/Pedology
12.	19620421199003100 2	Dr. Ir. A. Napoleon, MP	Soil Biology
13.	19630517198903100 2	Dr. Ir. Sabaruddin, M.Sc.	Soil Ecology
14.	19630614198903100 3	Prof. Dr. Ir. Dedik Budianta, MS	Chemistry, Soil Fertility
15.	19640115198903100 2	Dr.Ir. Satria Jaya Priatna, MS	Soil Conservation
16.	19640226198903100 4	Dr. Ir. Dwi Setyawan, M.Sc.	Pedology and Mine Land Rehabilitation
17.	19640804198903200 2	Prof. Dr. Ir. Nuni Gofar, MS	Soil Biology

18.	19660625199303100 1	Ir. Bakri, MP.	Irrigation & Drainage
19.	19670111199103200 2	Ir. Siti Nurul Aidil Fitri, M.Sc.	Soil fertility
20.	19680829199303100 2	Dr. Ir. Agus Hermawan, MT	Soil & Environmental Management
21.	19711031199702100 6	Dr. Momon Sodik Imanuddin, SP, M.Sc.	Irrigation & Drainage
22.	131804240	Ir. M. Syamsul Bahri Alwie	Soil Physics