



Subject Module
 Department of Agribusiness
 Faculty of Agriculture
 University of Islam Malang

Module Handbook

Module Title	Basic of Soil Science
Module Level, if available	Undergraduate Study Program of Agribusiness
Course Code	MKD60703
Headings, if available	-
Course (MK)	Basic of Soil Science
Semester	3
Course Coordinator	Prof. Dr. Ir. Suyamto
Teaching Team	Prof. Dr. Ir. Suyamto and Dr. Ir. Anis Sholihah, MS
Language of instruction	Indonesian language/English
Linkages with the Curriculum	Study Program : Agribusiness Specialization: Agribusiness Type: Compulsory/elective
Learning Methods and Duration	<ol style="list-style-type: none"> 1. Lecture: 100 minutes/meeting (14 meetings) 2. Research Based Learning through Practicum in the lab and field : 170 minutes/meeting (8 meetings) 3. Structured Assignments/individual and group Assignments presentation
Student Study Load	<ol style="list-style-type: none"> 1. Lecture: 100 minutes/meeting (14 meetings) 2. Practicum: 170 minutes/meeting (8 meetings) 3. Structured Assignments/group presentation 4. Attendance: 75% of total attendance
Credit Weight	3 credits or 5.1 ECTS
Requirements for Passing the Course	<ul style="list-style-type: none"> • Attendance $\geq 75\%$ • The final score of all the components of the learning evaluation ≥ 50 The final score component: <ul style="list-style-type: none"> • 20% Midterm Exam • 20% Final Exam • 30% Practicum • 20% Structured Assignments (individual and group) • 10% Presence
Prerequisite Courses	Basic of Agronomy
Learning Outcomes	The expected learning outcomes is: <ol style="list-style-type: none"> 1. Understanding the rules scientific principles agribusiness, social sciences, economics, and agricultural techniques as the basic for innovative agribusiness disciplines (ILO 2)
Learning Content	After completing this course students are able to: <ol style="list-style-type: none"> 1. understand and explain the definition of soil, main basic characteristics of soil, the important of soil in supporting agribusiness development 2. identify soil characteristics (physical, chemical, biological, etc)

3. understand and explain the role and function of soil as medium of plant growth and the interaction with environment
4. recommend the best soil management practices to support sustainable crop production system

The topics include:

1. Introduction

- Definition of soil and the scope of soil science
- The importance of soil in daily living and crop production
- Basic terms : Soil group, soil profile, solum, etc

2. Soil and Environment

- Soil as important natural resource for people living
- Soil is open system, soil is part of ecosystem
- Soil is also ecosystem
- Interaction of soil and environment : Nutrient cycles, Water cycle, air cycles

3. Soil components

- Mineral
- Organic
- Air
- Water

4. Soil formation and development

- Soil parent materials
- Soil pedogenesis
 - Factors of soil formation and development

5. Soil morphology

- Formation of soil profile
- Formation of soil horizon
 - Soil color

6. Soil physical properties

- Soil texture, soil structure, soil consistency,
- Volume density, particle density, soil water
- Soil porosity, soil permeability

7. Soil water and its role in crop growth

- Soil water potential, adhesion-cohesion
- Soil water classification, soil movement and retention
- Water and crop growth

8. Soil chemical properties

- Soil pH, soil colloids
- Cation exchange capacity
- Base saturation
- Soil redox potential

9. Soil fertility, fertilizer and fertilization

- Essential nutrients, form of nutrient and availability process
- The importance of fertilization, fertilizer quality, method and fertilizer calculation
- Nutrient absorption

10. Soil biological properties (1)

- Soil organisms (bacteria, fungi, actinomycetes, algae, fauna)
- Role of soil organism on soil fertility

11. Soil biological properties (2)

- Kind of soil biological process
- The importance of soil biological fertility

12. Soil and water conservation

- Soil degradation
- Types of soil erosion
- Method of soil and water conservation

	<p>13. Soil classification</p> <ul style="list-style-type: none"> • Objective and types of soil classification • USDA classification system • Soil ordo and its horizon characteristics • Structure of name in soil classification <p>14. Soil survey and land evaluation</p> <ul style="list-style-type: none"> • Definition • Soil map and soil survey • Land evaluation • Land-use classification
<p>Test Terms and Forms</p>	<p>Examination requirements: A minimum of 75 % attendance to attend the final exam</p> <p>Forms of examination: Essay</p>
<p>Learning Media</p>	<p>Projector and screen, Zoom application, Google Classroom, e-book, WA Group, Practical guide book, soil samples for research-based learning</p>
<p>References</p>	<p>Main References :</p> <ul style="list-style-type: none"> ■ Soepardi, G. 1989. Sifat dan Ciri Tanah. IPB. Bogor ■ Sutanto, R. 2005. Dasar Ilmu Tanah. Kanisius. Yogyakarta. ■ Foth, H.D. 1990. Fundamental of Soil Science. 8th edition. John Wiley & Sons ■ Soil Survey Staff. 1999. Soil Taxonomy : A Basic System of Soil Classification for Making and Interpreting Soil Surveys. 2nd Edition. ■ Weil, R.R. and N.C. Brady. 2017. The nature and properties of soils. 15th Edition. PEARSON. ■ Beek, K.J., K. De Bie and P. Driessen. 1997. Land evaluation for suitable management. International Institute for Aerospace Survey and Earth Science (ITC). The Netherland. 21 p <p>Supporting References :</p> <ul style="list-style-type: none"> ■ Brady, N.C. and R.R. Weil. 2004. <i>Elements of The Nature and Properties of Soils</i>. Second Edition. Pearson Prentice Hall. New Jersey ■ Plaster, E.J. 2003. Soil Science & Management. 4th Edition. Thomson Delmar Learning. Australia. ■ Jenny, H. 1994. Factors of Soil Formation : A System of Quantitative Pedology. Dover Publication, Inc. New York ■ C. Sys, E.V. Ranst and J. Debaveye. 1991. Principles in land evaluation and crop management. Agricultural Publication No 7. General Administration for Development Cooperation. Belgium. 280 p

