



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

Module Handbook

Module Title	Basic of Soil Science
Module Level, if available	Undergraduate Study Program of Agrotechnology
Course Code	MKD60703
Headings, if available	-
Course (MK)	Basic of Soil Science
Semester	3
Course Coordinator	Dr. Ir. Anis Sholihah, MP.
Teaching Team	Prof. Dr. Ir. Suyamto and Dr. Ir. Anis Sholihah, MS
Language of instruction	Indonesian language/English
Linkages with the Curriculum	Study Program : Agrotechnology Specialization:Agrotechnology Type: Compulsory/elective
Learning Methods and Duration	1. Lecture:100 minutes/meeting (14 meetings) 2. Practicum in the laboratory and field : 170 minutes/meeting (8 meetings) 3. Structured Assignments/individual and group Assignments presentation
Student Study Load	1. Lecture:100minutes/meeting (14 meetings) 2. Practicum: 170minutes/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>75% • The final score of all the components of the learning evaluation >44 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	-
Learning Outcomes	The expected learning outcomes is: <ol style="list-style-type: none"> 1. Having a good and deep knowledge in the disciplines of basic agricultural sciences that support Agro-technology field (ILO 1) 2. Able to plan, solve problems, and manage crop production systems (ILO 6) 3. Able to use suitable devices, processes, and methods to solve various field problems in agriculture (ILO 8) 4. Able to work independently and team, as well as using a variety of methods to communicate (ILO 9)
Learning Content	After completing this course students are able to: <ol style="list-style-type: none"> 1. understand the definition of soil, soil pedogenesis, the main basic

properties of soil, soil function in agro-ecosystem, and the importance of soil in supporting the agriculture production system

2. identify soil properties (physical, chemical, and biological) and determine the soil properties in the laboratory and at the field
3. understand and explain the role of soil properties as a medium of plant growth and its interaction with the environment
4. identify and classify various soil types in agricultural land related to an agricultural 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 affecting 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)

- Kinds of soil biological process

	<ul style="list-style-type: none"> • The important of soil biological fertility <p>12. Soil and water conservation</p> <ul style="list-style-type: none"> • 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 order 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
Test Terms and Forms	<p>Examination requirements: A minimum of 75 % attendance to attend the final exam</p> <p>Forms of examination: Multiplechoice and Essay</p>
Learning Media	<p>Projector and screen, Zoom application, Google Classroom, e-book, WA Group, Practical guide book, soil samples for practicum in laboratory</p>
References	<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