



Module Description/Course Syllabi

Study Programme : Magister of Soil Science
Faculty of Agriculture Universitas
Andalas

1. Course number and name

MIT 82119 Advanced Soil Chemistry

2. Credits and contact hours/Number of ECTS credits allocated

3 sks (2-1)

3. Instructors and course coordinator

Prof.Dr.Ir. Herviyanti, MS 2. Dr. Ir. Teguh Budi Prasetyo, MS 3. Dr. rer. Nat. Ir. Syafrimen Yasin, MS. M.Sc, Dr.Ir. Gusmini, SP.MP

4. Text book, title, outhor, and year

1. Bohn, N.B.L and G.A.O Connor. 1985. Soil chemistry. John Wiley and Sons, New York. 2. Tan,K.H. 2010. Principle of Soil Chemistry, ed. IV, Marcel Dekker, N.Y 3. Tan,K.H. 2001. Environmental Soil Science, ed. II, Marcel Dekker, N.Y, Basel 4. Stevenson (1984) Humus Chemistry 5. Schnitzer, M and Khan S.U. (1978) Soil Organic Matter 6. Bulletins, Journals, flyers, etc (many authors)

5. Specific course information

A. Brief description of the content of the course (catalog description) This course will provide students with a learning experience, which includes: the principles and chemical processes that occur in the soil which are very important in determining the level of soil fertility, which consists of understanding and effects of soil solutions and solids, components and activities of organic and inorganic matter in soils, characterization of colloids and ionization of components of soil substance, soil reactions and their effects, oxidation and reduction and their effects on soil reactions, chemical processes related to soil formation processes, and matters related to soil.

B. Course Content

Week Course Content

- 1 The importance of soil chemistry in terms of soil fertility: Principles of soil chemistry
- 2&3 Soil solution: water and soil solution, water potential, mass action law
- 4&5 Soil Inorganic Colloids: The origin of surface charge, the role in soil fertility, and zero of point charge (ZPC)
- 6&7 Soil Organic colloids: The origin of charge, characteristics, important reaction of organic colloids in soil
- 8 MID Term Exam
- 9 Ionic exchange in soil: Cation exchange, anion exchange 10
- Soil adsorption: Types and The strength of adsorption
- 11 Acid soil reaction: Concept of acid and base, factors affecting acid soils, buffer capacity, chemical characteristics of acid soils
- 12 Alkaline soil reaction: saline and sodic soils, formation process of saline and sodic soils, chemical characteristics of saline and sodic soils
- 13 Oxidation and reduction reaction: The importance, the potential, and the impact on alteration of soil chemical reaction
- 14&15 Soil chemical process and its impact on environment: the effect on physical performance, clay translocation, organic compound translocation, Fe, Al, Mn translocation, ionic mobility, environmental pollution
- 16 Final Exam

C. Semester when the course unit is delivered
Even Semester**D. Mode of delivery (face-to-face, distance learning)**

Face to face

6. Intended Learning Outcomes (CPL)

ILO 1: An ability to analyze and interpret nature and characteristics of many soils indetermining the potency and the threat of the land and environment resources
PI 1 : An ability to identify soil properties

PI 2 : An ability to analyze soil properties

PI 3 : An ability to interpretate soil data

ILO 2: An ability to classify soil, to evaluate land capability and suitability, as well as to determine the alternative utilization for sustainable agriculture and

environment PI 1 : An ability to classify soil properties

PI 2 : An ability to evaluate soil capability

ILO 3 : An ability to use technology in identifying and solving problems of soil, land resource, environment problems independently, eligibly, and accurately
PI 2 : An ability to work independently in determining soil properties

7. Course Learning Outcomes (CPMK) ex. The student will be able to explain the significance of current research about a particular topic.

a. Students will be able to identify properties of many soils

b. Students will be able to analyze properties of many soils

c. Students will be able to interpret data of many soils

d. Students will be able to use soil data to classify soils based on some methods of soil classification

e. Students will be able to use soil data to evaluate soil capability and land suitability

f. Students will be able to analyze soil independently either at laboratory or at field site

8. Learning and teaching methods

Cooperative Learning and Case Base Method

9. Language of instruction

Bahasa Indonesia and English (English Class)

10. Assessment methods and criteria

Summative Assessment :

1. Tasks : 5%
2. Quiz : 5 %
3. Mid Semester : 25%
4. Final Semester : 25%
5. Practicum :30%
6. Attendance : 5%

Formative Assessment:

1. Thumb up and thumb down
2. Minutes paper