Module Description/Course Syllabi

Study Programme : Magister of Soil Science
Department of Soil Science and Land Resources
Faculty of Agriculture Universitas Andalas

1. *Course number and name*

MIT 82107 Advanced Soil Chemistry

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

3 scs (2-1) / 5,787

3. Instructors and course coordinator

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

4. Text book, title, author, and year

1. Anwar and Sudadi. 2012. Soil Chemistry Introduction, IPB Press. (PDF) Kimia Tanah (academia.edu)
2. Bohn, N.B.L. and G.A.O Connor. 2001. Soil chemistry. John Wiley and Sons, New York
   Soil chemistry : Bohn, Hinrich L., 1934- : Free Download, Borrow, and Streaming : Internet Archive
3. El Azzouzi, H., M. El Madani, M. Mekkaoui, M. A. El Belghiti, M. El M'Rabet, H. Mountacer, A. El Hourch, A. Zrineh, M. El Azzouzi. (2010).
   ResearchGate
4. *Herviyanti, Maulana, A., Lita, A.L., Prasetyo, T.B., Monikasari, M., Ryswaldi, R. (2022). Characteristics of inceptisol ameliorated with rice husk biochar to glyphosate adsorption. Sains Tanah Journal of Soil Science and Agroclimatology, 19(2): 230-240. https://dx.doi.org/10.20961/stjssa.v19i2.61614*
5. *Herviyanti, H., Maulana, A., Harianti, M., Lita, A.L., Prasetyo, T.B., Juwita, P., Kurnianto, R.T. and Yasin, S. 2024. Effect of glyphosate contamination on surface charge change and nutrients of degraded Inceptisols ameliorated with sub-bituminous coal. Journal of Degraded and Mining Lands Management 11(2):5135-5145, doi:10.15243/jdmlm.2024.112.5135.*
6. Sihotang, Rubiana (2021) Pengaruh larutan aktivator, waktu kontak dan pH larutan dalam pembuatan biosorben kulit buah

aren (*Arenga pinnata*) untuk adsorpsi timbal dalam limbah cair tekstil, *3*(5), 1181. https://doi.org/10.36418/syntax-idea.v3i5.1209

7. Stevenson, F.J. (1994). *Humus Chemistry, Genesis, Composition, Reactions*. 2nd ed. John Wiley & Sons, Inc., USA
   Humus chemistry : genesis, composition, reactions : Stevenson, F. J : Free Download, Borrow, and Streaming : Internet Archive
8. Sudirja R., Mahfud Arifin, dan Benny Joy. (2015). Adsorpsi Paraquat dan Sifat Tanah pada Tiga Subgrup Tanah Akibat Pemberian Amelioran. *Jurnal Agricultura*, *26*(1): 41-48
9. Tan K.H. 2011. Principle of Soil Chemistry, ed. IV, Marcel Dekker, N.Y
   Principles of Soil Chemistry, Fourth Edition - Kim H. Tan - Google Buku
10. Tan, KH. 2014. Humic Matter in Soil and the Environment. Marcel Dekker, N.Y.
11. Humic Matter in Soil and the Environment - Google Books

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

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, andzero of point charge (ZPC)
6&7 Soil Organic colloids: The origin of charge, characteristics, important reaction oforganic 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, buffercapacity, 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 onalteration 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 interpretate 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 andenvironment

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 thesignificance of current research about a particular topic.

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

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

d. Students will be able to use soil data to classify soils based on some methods on 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: Minutes paper