USK UNIVERSITAS SYIAH KUALA

FACULTY OF AGRICULTURE

DEPARTMENT OF SOIL SCIENCE

UNDERGRADUATE PROGRAM **MODULE HANDBOOK**

Module designation	Soil Physic (SSOL2017)
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Prof. Dr. Ir. Darusman, M.Sc
Language	Indonesian, English
Relation to curriculum	Compulsory module for Soil Science Department
Teaching methods	Lecture, presentation, focus group discussion
Workload (incl. contact hours, self-study hours)	✔ Lecture and discussion 100 minutes per week per semester ✔ Structured tasks 120 minutes per week per semester ✔ Personal tasks 120 minutes per week per semester
Credit points	2 SKS = 3.2 ECTS
Required and recommended prerequisites for joining the module	SSOL1002
Module objectives/intended learning outcomes	✔ Students are able to identify and understand soil composition in relation to soil physics. ✔ Students are able to explain the solid, liquid, and gaseous phases of soil. ✔ Students are able to describe the interactions between soil phases. ✔ Students are able to master the concepts and applications of the interactions among water, soil, plants, and the atmosphere.
Content	This course provides students with a comprehensive understanding of soil formation processes and the components that make up the soil system. These components are categorized into solid, liquid, and gaseous phases, each with distinct characteristics that interact to influence soil behavior. The course emphasizes the fundamental concepts and applications of soil physics, including its role, scope, and relevance within the broader field of soil science, and equips students with the knowledge necessary to analyze the physical properties and functions of soil as a natural body and critical resource for sustainable land use and agriculture.
Exams and assessment formats	Quiz, assignment, mid-term exam, and final exam

Study and examination requirements	✔ Quiz: 15% ✔ Assignment: 20% ✔ Mid-term exam: 30% ✔ Final Exam: 20%
Reading list	1. Shukla, M. K. (2023). Soil physics: An introduction. CRC press. 2. Radcliffe, D. E., & Simunek, J. (2018). Soil physics with HYDRUS: Modeling and applications. CRC press. 3. Hillel, D. (2013). Fundamentals of soil physics. Academic press. 4. Glinski, J. (2018). Soil physical conditions and plant roots. CRC press. 5. McCarty, L. B., Hubbard, L. R., & Quisenberry, V. L. (2016). Applied soil physical properties, drainage, and irrigation strategies. Switzerland: Springer International Publishing. 6. Kirkham, M. B. (2023). Principles of soil and plant water relations. Elsevier. 7. Iwata, S. (2020). Soil-water interactions: mechanisms applications, revised expanded. CRC Press. 8. Bittelli, M., Campbell, G. S., & Tomei, F. (2015). Soil physics with Python: transport in the soil-plant-atmosphere system. OUP Oxford. 9. Hartge, K. H., Horn, R., Horton, R., Bachmann, J., & Peth, S. (2016). Essential soil physics. An introduction to soil processes, structure, and mechanics. Schweizerbart Science Publishers, Stuttgart, Germany. 10. Delgado, A., & Gómez, J. A. (2024). The soil: Physical, chemical, and biological properties. In Principles of agronomy for sustainable agriculture (pp. 15-30). Cham: Springer International Publishing.