



USK
UNIVERSITAS
SYIAH KUALA

FACULTY OF AGRICULTURE
DEPARTMENT OF SOIL SCIENCE

UNDERGRADUATE PROGRAM

MODULE HANDBOOK

Module designation	Practicum of Soil Biology (SSOL2027)
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Dr. Ir. Hifnalisa, M.Si.
Language	Indonesian, English
Relation to curriculum	Compulsory module for Soil Science Department
Teaching methods	Practice, lecture, presentation
Workload (incl. contact hours, self-study hours)	✓ 170 minutes of practice per week (field/laboratory 50 minutes; structured learning 60 minutes; 60 minutes self-study)
Credit points	1 SKS = 1.6 ECTS
Required and recommended prerequisites for joining the module	SSOL1002
Module objectives/intended learning outcomes	<ul style="list-style-type: none">✓ Students are able to identify, understand the functions of, and operate tools commonly used in a soil biology laboratory. Students are able to understand and perform soil and root sampling and storage techniques for soil biological analysis.✓ Students are able to determine microbial activity levels through soil respiration measurement and quantify total soil microbial populations.✓ Students are able to prepare microbial culture media, isolate and purify soil microorganisms, and observe them using both macroscopic and microscopic techniques.
Content	This course provides practical training in soil biology laboratory techniques, including soil and root sampling methods for biological analysis and proper sample handling prior to analysis. Students learn the functions and use of common laboratory instruments in soil biology, methods for measuring soil respiration to assess microbial activity levels, and sterilization techniques using autoclaves to support aseptic work. The course also covers media preparation for various types of microbial growth, techniques for microbial isolation, population counting, purification, and observation of microorganisms both macroscopically and microscopically.
Exams and assessment formats	Case method, team based project, quiz, assignment, exam

Study and examination requirements	<ul style="list-style-type: none"> ✓ Case method: 25% ✓ Team based project: 50% ✓ Quiz: 5% ✓ Assignment: 10% ✓ Exam: 10%
Reading list	<ol style="list-style-type: none"> 1. Van Elsas J.D. et al. (Ed) 2019. Modern Soil Microbiology. Third Edition. CRC Press Taylor & Francis Group. 2. Datta, R. et al. (Ed). 2020. Carbon and Nitrogen Cycling in Soil. Springer Nature Singapore Pte Ltd. 3. Souza T. 2022. Soil Biology in Tropical Ecosystem. Springer International Publishing AG. 4. Paul, E., & Frey, S. (Eds.). (2023). Soil microbiology, ecology and biochemistry. Elsevier. 5. Coleman, D. C., Callahan, M. A., & Crossley Jr, D. A. (2017). Fundamentals of soil ecology. Academic press. 6. Zou, Y. N. (2017). Arbuscular mycorrhiza and stress tolerance of plants (pp. 25-41). Q. S. Wu (Ed.). Singapore: Springer. 7. Singh, D. P., Singh, H. B., & Prabha, R. (Eds.). (2016). Microbial inoculants in sustainable agricultural productivity (Vol. 2, p. 308). New Delhi: Springer. 8. Bach, E. M., Williams, R. J., Hargreaves, S. K., Yang, F., & Hofmockel, K. S. (2018). Greatest soil microbial diversity found in micro-habitats. Soil biology and Biochemistry, 118, 217-226. 9. Ahammed, G. J. & Hajiboland, R. (Ed). 2024. Arbuscular Mycorrhizal Fungi and Higher Plants. Fundamentals and Applications. Springer Nature Singapore Pte Ltd.