# FACULTY OF AGRICULTURE

**DEPARTMENT OF ANIMAL SCIENCE**

**UNDERGRADUATE PROGRAM** **MODULE HANDBOOK**

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| Module designation | Soil Science and Fertilizer |
| Semester(s) in which the module is taught | 1st Semester |
| Person responsible for the module | Zuraida, S.P., M.Si. |
| Language | Indonesia/English |
| Relation to curriculum | Compulsory Module for Faculty of Agriculture |
| Teaching methods | Lecture, lesson, and focus group discussion |
| Workload (incl. contact hours, self-study hours) | • Lecture and discussion 100 minutes per week per semester<br>• Structured tasks 120 minutes per week per semester<br>• Personal tasks 120 minutes per week per semester |
| Credit points | 2 (lesson) = 3.2 ECTS |
| Required and recommended prerequisites for joining the module | - |
| Module objectives/intended learning outcomes | • Students understand the scope of soil science and soil fertilization, definition and history of fertilization. Concept of fertilization and fertilization, basic considerations of fertilization.<br>• Students have knowledge, understanding and are able to explain the factors of soil formation, soil formation processes, chemical and biological properties of soil, soil and plant nutrients, soil conservation, inorganic macro fertilizers, inorganic micro fertilizers, organic fertilizers, inorganic fertilizers.<br>• Students have knowledge, understanding and are able to explain the factors of soil formation, soil formation processes, chemical and biological properties of soil, soil and plant nutrients, soil conservation, inorganic macro fertilizers, inorganic micro fertilizers, organic fertilizers, inorganic fertilizers. |

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| Content | • Understanding and Composition of Soil<br>• Parent Material, topography, climate, organization and time<br>• Profile and solum, pedon and polypedon, weathering of rocks and minerals, formation of soil profiles<br>• Soil reaction, soil coloids, cation exchange, anion exchange, base saturation, essential nutrients<br>• Macroflora, microflora, macrofauna, microfauna, organic material<br>• The role of soil as a growth factor, principle of limiting factors, absorbtion of nutrients, role of nutrients<br>• Vegetative methode, mechanical methode, chemical methode<br>• Soil clasification according to PPT, soil clasification according to FAO<br>• Definition & history, classification of fertilizers, and general properties of Artificial fertilizers<br>• Definition of fertilizer, user of fertilizer, and classification of fertilizer<br>• Nutrient availability, nutrient loss, increased production<br>• Classification of inorganic macro fertilizers, general properties of inorganic macro fertilizers<br>• Definition of Micro fertilizers, Types of Micro Fertilizers<br>• Solid orgnic fertilizer, liquid organic fertilizer (NPK)<br>• Manure, green manure, and compost<br>• Rhizobium bacterial inoculum, arbuscular mycorrhizal fungi |
| Examination forms | Discipline, able to work in a team and active in class discussions. |
| Study and examination requirements | 20% participatory activities<br>30% project results<br>25% midtest examination<br>25% final examination |

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| Reading list | 1. Fujii, K., Hayakawa, C., Panitkasate, T., Maskhao, I., Funakawa, S., Kosaki, T., & Nawata, E. (2017). Acidification and buffering<br>2. mechanisms of tropical sandy soil in northeast Thailand. Soil and Tillage Research, 165, 80–87. https://doi.org/10.1016/j.still.2016.07.00<br>3. Rahim, D.A. dan M. Arifin. 2011. Klasifikasi Tanah di Indonesia. Pustaka Reka Cipta, Bandung.<br>4. Arabia, T. 2018. Ilmu Tanah dan Pemupukan Lahan. Buku AjarJurusan Ilmu Tanah. Fakultas Pertanian Universitas Syiah Kuala. Darussalam. Banda Aceh.<br>5. Arabia, T. 2018. Ilmu Tanah dan Pemupukan Lahan. Materi Kuliah (Handout). Jurusan Ilmu Tanah. Faperta Universitas Syiah Kuala. Darussalam. Banda Aceh<br>6. Farrasati, R., I. Pradiko, S. Rahutomo, and E.N. Ginting. 2021. Review : Pemupukan Melalui Tanah Serta Daun Dan. War. PPKS 26(1): 7–19. Leghari, S.J., N.A. Wahocho, G.M. Laghari, A. HafeezLaghari, G.<br>7. MustafaBhabhan, et al. 2016. Role of nitrogen for plant growth and development: a review. Adv. Environ. Biol. 10(9): 209–219.<br>8. Liu, Y.M., D.Y. Liu, Q.Y. Zhao, W. Zhang, X.X. Chen, et al. 2020. Zinc fractions in soils and uptake in winter wheat as affected by repeated applications of zinc fertilizer. Soil TillageRes.200(February).doi:10.1016/j.still.2020.104612. |