Subject Module
Department of Agrotechnology
Faculty of Agriculture
University of Islam Malang

Module Handbook

Module Title	Sustainable Agriculture
Module Level, if available	Undergraduate Study Program of Agrotechnology
Subject Code	MKW 60627
Headings, if available	-
Subject (MK)	Sustainable Agriculture
Semester	6
Course Coordinator	Anita Qur'ania, SP., M.Ling
Teaching Team	-
Language of instruction	Indonesian language/English
Linkages with the Curriculum	Study Program : Agrotechnology Specialization: Agrotechnology Type: Compulsory/~~elective~~
Learning Methods and Duration	1. Lecture: 100 minutes/meeting (14 meetings) 2. Research Based Learning through Practicum greenhouse experiment : 170 minutes/meeting (8 meetings) 3. Structured Assignments/individual and group Assignments presentation
Student Study Load	1. Lecture: 100 minutes/meeting (14 meetings) 2. Practicum: 170 minutes/meeting (8 meetings) 3. Structured Assignments/quiz/group presentation 4. Attendance: 75% of total attendance
Credit Weight	3 credits or 5.1 ECTS
Requirements for Passing the Course	• Attendance >75% • The final score of all the components of the learning evaluation >44 The final score component: • 20% Midterm Exam • 20% Final Exam • 30% Practicum • 20% Structured Assignments (individual and group) • 10% Presence
Prerequisite Courses	-
Learning Outcomes	The expected learning outcomes are: 1. Have a creative and innovative thinking attitude in their work in accordance with professional ethics in agriculture field (ILO 1) 2. Have good and deep knowledge in the field of basic agricultural science that supports Agrotechnology (ILO 3) 3. Able to apply agricultural practices based on Good Agricultural Practices (ILO 8)

	4. Able to design enterprise opportunities in the field of plant production (ILO 10)
Learning Content	After completing this course students are able to: 1. Able to understand the principles of sustainable farming systems 2. Able of developing integrated farming approaches that are based on sustainable agriculture 3. Able to assess the sustainability of an agricultural system 4. Able of analyzing an agricultural production system and making management recommendations to improve the sustainability of the agricultural system. The topics include: **1. Introduction** • Impact of climate variability and change on agricultural systems • Definition of Sustainable agriculture • Difference between Sustainable Agriculture, Organic Farming and Healthy Farming **2. Why need a system of sustainable agriculture** • The Importance of Sustainable Agricultural Systems • LEISA (*Low external Input Sustainable Agriculture*) Vs. HEIA (High External Input Agriculture) • Alternative of the agricultural system **3. Carrying capacity in Sustainable agriculture** • Principles of sustainable agriculture • Carrying capacity concept in sustainable agriculture • Sustainability indicators for agricultural systems **4. Production improvement methods and their measurement** • Efforts to increase production • Agricultural intensification measurement • The impact of agricultural intensification **5. Sustainable soil management** • Manure application • Cover crop legume • Humic acids application • Conservation tillage • Alley cropping **6. Measuring Sustainable Agriculture** • Sustainability Index • How to measure and calculate the sustainability index • Connection between sustainability index and soil quality **7. Sustainable Agriculture Model** • Agroforestry • Integrated Farming System • Organic Farming **8. Biodiversity conservation** • Technical terms often used in biodiversity conservation • characteristics, structures and factors affecting the landscape related to biodiversity conservation **9. Agroforestry and interactions between agroecosystems** • Definition of Agroforestry, Integrated Farming System, and Organic farming • Interaction of light, nutrient and cycle • Biodiversity management of agroforestry

	• The positive and negative effects of multistory systems **10. Sustainable agriculture aspects of plant protection** • Biodiversity of agricultural crops • Biodiversity of forest flora and fauna • Biodiversity of flora and fauna in agricultural land • Interaction of agricultural biodiversity and tropical forest biodiversity **11. Integrated Farming System Model** • Definition of integrated farming system • Keberlanjutan Sistem Pertanian Terpadu • Sistem pertanian konvensional • Mixed Farming vs. Integrated Farming **12. Integrated Farming System focused on Agroforestry and Livestock** • Differences of integrated farming systems and integrated organic farming systems • Agroforestry-livestock in high land area • Agroforestry-livestock-fishery in low land area **13. Case studies on sustainable agriculture** Case studies presentation of several types of sustainable agriculture, including: • Mix farming • *Mina tani* • Agroforestry in an area • Related services business of sustainable agriculture system **14. Case studies on sustainable agriculture (part 2)** Case studies presentation of several types of sustainable agriculture, including: • Mix farming • *Mina tani* • Agroforestry in an area • Related services business of sustainable agriculture system

Test Terms and Forms	Examination requirements: A minimum of 75 % attendance to attend the final exam Forms of examination: Essay
Learning Media	Projector and screen, Zoom application, Google Classroom, e-book, WA Group, Practical guide book
References	Main References: 1. Menalled, F. , Bass, T. Buschena, D., Cash, D, Malone, M, Maxwell, B., McVay,K., Miller, P., Soto, R., and Weaver, D. 2008. An Introduction to the Principles and Practices of Sustainable Farming. Montana State University Extension. 2. Earles; R., and Williams, P. .2005. Sustainable Agriculture: An Introduction. www.attra.ncat.org 3. Hairiah, K. Widianto, dan Sunaryo. 2005. Sistem Agroforestri di Indonesia.. Bahan Ajar. Fakultas Pertanian, Universitas Brawijaya. Supporting References: 1. Harris, R.F., D.L. Karlen, and D.J. Mulla. 1996 A Conceptual Framework for Assesment and management of Soil Quality and health, in Methods for Assesing Soil Quality. J.W. Doran and A.J. Jones, Eds. Soil Science Society of America, Madison, WI. 2. Havlin, J.L,J.D.Beaton, A.L.Tisdale and W.L. Nelson. 2005. *Soil Fertility and Fertilizers*. 7th edition. Pearson Prentice Hall. Upper Saddle River, New Jersey. 3. Karlen, D.L., J.C. Gardner, and M.J.Rosek. 1998. *A Soil Quality Framework For Evaluating The Impact of CRP*. J.Prod. Agric. 11 : 56-60 4. Lal, R. 1998. *Soil Quality and Agricultural Sustainability*. Ann Arbor Press. Chelsea-USA 5. Larson,W.E., and F.J. Pierce. 1994. *The Dynamic of Soil Quality as A Measure of Sustainable Management*. P.37 – 51. In J.W. Doran, et al., Defining Soil Quality for A Sustainable Environment. SSSA. Spec. Publ. 35 35. SSSA and ASA.Madison, WI. 6. Mausbach, M.J. and C.A. Seybold. 1998. *Assesment of Soil Quality*. In Soil Quality and Agricultural Sustainability. Ann arbor Press. Chelsea-USA. 7. Carter, M.R. 2002. Soil Quality for Sustainable Land Management: Organic Matter and Aggregation Interactions that Maintain Soil. Agron. J. 94:38–47, 8. M. G. Bos & H. van den Bosch & H. Diemont & H. van Keulen & J. Lahr & G. Meijerink & A. Verhagen. 2007. Quantifying the sustainability of agriculture. Irrig Drainage Syst. 21:1–15 9. Brussaard, L., de Ruiter, P.C., and Brown, G.G. .2007. Soil biodiversity for agricultural sustainability. Agriculture, Ecosystems and Environment 121 : 233–244