THE MODULE HANDBOOK
DOCTOR BIOLOGY STUDY PROGRAM
FACULTY OF BIOLOGY

SELECTED TOPIC FOR DISSERTATIONS

Plant Nutrition

Course code	BIDB203115
Course level	Doctoral Program
Semester/ term	Odd/even
Course coordinator	Prof. Dr. Diah Rachmawati, S.Si., M.Si.
Lecture(s)	Prof. Dr. Diah Rachmawati, S.Si., M.Si. Dr. Eka Tarwaca Susila Putra., S.P., M.P.
Language	Indonesian/English
Classification within the Curriculum	Compulsory
Teaching format/ class hours per week during the semester	This course is planned to have 14 teaching weeks and 2 weeks of examination.
Workload	90 hours
Credits	2-0 credits / 3.6 ECTS
Requirements	Receiving approval from the Supervisory Team.
Program Learning Outcome	CPL 2.1.Upon completing this program, the graduates demonstrate an understanding of of the scientific philosophy of biology which is related in depth to structure, function, diversity, reproduction, evolution and engineering of biological systems. CPL 2.2. After attending this program, graduates demonstrate an understanding of substantial and leading theory in the field of biology/biological resources in order to support education for sustainable development CPL 3.1. After completing this program, the graduates will be able to discover or develop new scientific theories/concepts/ideas in biology
Course Learning Outcome	BIDB203115.1 By the end of this course, students will be able to evaluate the roles, kinetics, dynamics, and availability of nutrients in relation to plant metabolism, growth, and development, as well as the mechanisms by which plants respond to nutrient imbalances. BIDB203115.2 By the end of this course, students will be able to integrate and evaluate issues related to plant

	nutrition and strategies for their resolution from various sources.
Course Description	This course examines the roles of essential and beneficial nutrients for plants. It covers nutrient availability, uptake, and metabolism within the plant body. The role of microbes in nutrient dynamics and availability in the soil, and their influence on plant growth, is also discussed. Nutrient status and soil fertility analysis are studied in relation to plant growth quality and resistance. Additionally, the course explores the effects of environmental stresses (drought, salinity, pH, and pollutants) on nutrient status in soil and plants, as well as plant adaptations to nutrient imbalances. Case studies focus on the relationship between nutrient availability and plant growth quality, pest and disease resistance, and the potential and prospects of organic fertilizers.
Assessments	The assessment for Selected Topic for Dissertations (Plant Nutrition) is based on two main Component, with the respective criteria and weights: A. Participatory activity (20%) • Mid-term Exam (10%) • Final-term Exam (10%) B. Project(80%) • Mid-term Exam (40%) • Final-term Exam (40%)
Study Media and Literature	1. Barker A.V. and Pilbeam D.J. 2015. Handbook of Plant Nutrition 2nd edition.CRC Press. Taylor & Francis Group. Boca Raton, London, New York. 2. Fageria, N.K., V.C. Baligar & C.A. Jones 2010. Growth and mineral nutrition of field crops. CRC Press. Taylor & Francis Group. Boca Raton, London, New York. 3. Marschner, H. 2012. Mineral nutrition of higher plants. Third Edition. Acad Press, London 4. Rengel, Z (Ed.) 1999. Mineral nutrition of crops. Fundamental mechanism and implications. Food Product Press-The Haworth Press, Inc., New York. 5. Taiz, L. and E. Zieger. 2015. Plant Physiology 5th Ed. Sinauer Associates, Inc., Publisher. Sunderland, Massachusetts