THE MODULE HANDBOOK
DOCTOR BIOLOGY STUDY PROGRAM
FACULTY OF BIOLOGY

SELECTED TOPIC FOR DISSERTATION

Plant Molecular Biology

Course code	BIDB203148
Course level	Doctoral Program
Semester/ term	Odd/even
Course coordinator	Prof. Dr. Endang Semiarti, M.S., M.Sc.
Lecture(s)	Prof. Dr. Endang Semiarti, M.S., M.Sc.
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	BIDB203177.1 By the end of this course, students will be able to apply fundamental concepts, principles, and theories related to the structure, function, engineering, diversity, reproduction, and evolution of plants within biological systems at the molecular level.

	BIDB203177.2 By the end of this course, students will be able to conduct in-depth and extensive studies in the field of biology to develop original, tested, and innovative models, methods, or theoretical advancements in plant molecular biology through research employing interdisciplinary, multidisciplinary, or transdisciplinary approaches. BIDB203177.3 By the end of this course, students will be able to propose new solutions or recommending proposed solutions to address problems related to plants as biological resources in a sustainable manner through deductive and/or inductive approaches in an interdisciplinary or multidisciplinary context, based on plant molecular biology
Course Description	This course explores molecular biological mechanisms used to study and address developmental processes in both monocot and dicot plants. Topics include the molecular basis of plant development, gene structure and interaction models, and molecular approaches to studying cell division and key developmental stages such as pollination, fertilization, embryogenesis, meristem activity, organogenesis, shoot and root formation, and flowering. The course also covers hormone signaling, plant responses to biotic and abiotic stresses during in vitro culture, and regeneration processes in genetic engineering techniques.
Assessments	The assessment for Selected Topic for Dissertation (Plant Molecular Biology) is based on participatory activity, with the respective criteria and weights: • Stuctured Assigment/Task (10%) • Mid-term Examination (30%) • Final-term Examination (40%)
Study Media and Literature	**Main:** - Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K.,Watson, J.D. (2016). Molecular Biology of The Cell. 5th ed. Garland Publ. Inc., New York. - Semiarti, E., Indrianto, A.,Purwantoro, A., Machida, Y, and Machida C. (2011) Agrobacterium-Mediated Transformation of Indonesian Orchids for Micropropagation, Chapter 11 in: Scientific e-book Genetic Transformation ISBN 978-953-307-364-4, ed by M.Alvarez, InTech-Open Publisher, DOI http://dx.doi.org/10.5772/intechopen.103839 - Semiarti, E., Y.A. Purwestri, S. Rohman, and W.A. Putri (2022). Genetic Transformation in Prokaryotic and Eukaryotic Cells.

Chapter 2 in “Molecular Cloning”, p 27-46, ed.by Sadik Dincer, IntechOpen Publisher, Print ISBN 978-1-80355-450-1, ISBN 978-1-80355-451-1, DOI: http://dx.doi.org/10.5772/intechopen.103839

- Semiarti, E., Y.A. Purwestri, S. Rohman, and W.A. Putri (2023). Bioteknologi Tanaman, Gadjah Mada University Press, 1-178 halaman. ISBN: 978-623-359-167-6.

Additional

- Semiarti,E., S.Nopitasari, Y. Setiawati, M.D. Lawrie, A. Purwantoro, J. Widada, K. Ninomiya, Y. Asano, S. Matsumoto, Y.Yoshioka (2020). Application of CRISPR/Cas9 genome editing system for molecular breeding of orchids. Indones J Biotechnol 25(1), 2020, 61?68 | DOI 10.22146/ijbiotech.39485, www.jurnal.ugm.ac.id/ijbiotech
- Semiarti E., Indrianto A., Purwantoro A., Martiwi I. N. A., Feroniasanti Y. M. L., Nadifah F., Mercuriana I. S., Dwiyani R., Iwakawa H., Yoshioka Y., Machida Y. and Machida C. (2010). High-frequency genetic transformation of Phalaenopsis amabilis orchid using tomato extract-enriched medium for the pre-culture of protocorms. The Journal of Horticultural Science and Biotechnology, Vol. 85 No. 3: 205-210 (2010)
- Semiarti, E., Indrianto A, Purwantoro A., Isminingsih S., Suseno N., Ishikawa T., Yoshioka Y., Machida Y., and Machida C. 2007. Agrobacteriummediated transformation of the wild orchid species Phalaenopsis amabilis. Plant Biotechnology.Vol. 24. No.3 th