THE MODULE HANDBOOK

Magister Biology Study Program

FACULTY OF BIOLOGY

DEVELOPMENTAL ANATOMY OF VASCULAR PLANTS (APTV)

Course code	BIMB202214
Course level	Magister
Semester/ term	Even or Odd
Course coordinator(s)	Dr. Maryani, M.Sc.
Lecture(s)	1. Dr. Maryani, M.Sc. 2. Prof. Dr. L. Hartanto Nugroho, M.Agr.Sc
Language	Indonesia
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	Estimated working hour: 2 credits of theory and 1 credit of laboratory work.
Credits	2-1 credits
Requirements	(-)
Program Learning Outcome	AT1. Students are expected to be able to internalize academic values, norms, and ethics as well as demonstrate an independent and responsible attitude in their field of expertise related to the anatomical anatomy of vascular plant (Attitude); K1. The graduates are able to demonstrate knowledge and understand biological theories, about the anatomical structure of vascular plants (Knowledge); K2. Graduates are able to demonstrate knowledge and understanding of biological systems and anatomical methods of vascular plant development to solve problems in the field of biology (Knowledge); GS1. Graduates are able to develop logical, critical, systematic, and creative thinking through scientific concepts and research (General Skills); GS2. Graduates are able to manage research data and make decisions in solving biological problems based on analytical or experimental studies and critical analysis of information (General Skills); GS3. Graduates are able to formulate and communicate scientific ideas effectively (written and oral) with at least one international language based on scientific principles, procedures, and ethics in the form of academic writing (General Skills);

	GS5. Using information technology in scientific development and applying it in the field of anatomical engineering expertise in vascular plant development (General Skills) SS1. Graduates are able to conduct research in the field of biology independently or in groups, and are able to solve various problems related to the anatomy of the development of vascular plants (Specific Skills);
Course Learning Outcome	CLO1 Students have the ability to identify, mention, explain, compare, demonstrate and analyze their knowledge of the anatomical structure of vascular plants and their development, the characteristics of each taxon, starting from Pteridophyta, Gymnosperms and Angiosperms. CLO2 Students have the ability to plan, implement, and report an observation/experiment and research related to vascular plant anatomy CLO3 Students have managerial and knowledge transfer skills to communicate effectively in writing, verbally and related images and have managerial skills to study independently or in groups and have a curious attitude about thedevelopmental anatomy of vascular plant
Course Description	The Vascular Plant Developmental Anatomy Course (APTV) is one of the mandatory Laboratory Courses for Master Program students in the Biology Study Program, Faculty of Biology UGM. This course consists of 2 credits of theory and 1 credit of practicum. The substance in this course covers the characteristics of tissues that make up the organs of vascular plants and compares them to low-level vascular plants to higher-level vascular plants. Plant taxa under discussion include primitive ferns (Pteridophyta) and advanced ferns, open seed plants (Gymnosperms: Cycadopsida, Coniferopsida, Gnetopsida); closed seed plants (Angiospermae: Dicotyledonae and Monocotyledonae).
Assesments	Student Assigments (10%), Students presentation (20%), Mid Semester Examination (35%), Final Semester Examination (35%), Theory, Laboratory practical
Study Media	Lecturing Slides, Jurnal via Internet, E-Book
Literature	Buvat.R., 1989. Ontogeny, Cell Differentiation, and Structure of Vascular Plants, Springer-Verlag, Berlin. Eames, A.J. and L.H. Mac Daniels. An Introduction to Plant Anatomy. 2nd Edition. Tata McGraw Hill Publ. Comp. LTD; Bombay, New Delhi Esau, K. 2006. Plant Anatomy, The 3rd Edition. Wiley Eastern Private United, New Delhi. Esau, K. 1978. Anatomy of Seed Plants. 2 nd Edition. Wiley Eastern LTD. Fahn, A. 1990. Plant anatomy, 4th Edition. Pergamon Press. Oxford

	Foster, A.S. and E.M. Gifford. 1984. Comparative Morphology of Vascular Plants. 2nd Edition. Freeman. New York Mauseth, J.D. 1995. Botany, An Introduction of Plant Biology, 2nd edition, Saunders College Publishing USA. Pandey, B.P.1982. Plant anatomy. The 3 rd Edition, S. Chan and Company Ltd. New York Perry. J.W. and D. Morton. 1998. Photo Atlas for Botany, Wadsworth Publishing Company, USA. Raven, P.H., R.F. Ever, and S.E. Eichorn. 1999. Biology of Plants, 6th edition, W.H. Freeman and Company Worth Publisher, USA. Robert, A. 2002. Plant Anatomy (online) Rudal, P. 20027. Anatomy of flowering plants: An introduction to structure and development. Third Edition. Cambridge University Press. Vashishta, P.C. 1972. Botany for degree students Vol IV, Vascular Cryptogams (Pteridophyta). 2nd Edition. S. Chand & Co. (Pvt) LTD, Ram Nagar, New Delhi-55 Vashishta, P.C. 1985. Botany for Degree Students: Pteridophyta. S. Chand & Company Ltd, Ram Nagar, New Delhi-55 Vashishta, P.C. 1985. Botany for Degree Students: Gymnospermae. S S. Chand & Company Ltd,, Ram Nagar, New Delhi-55