THE MODULE HANDBOOK
DOCTOR BIOLOGICAL SCIENCES STUDY PROGRAM
FACULTY OF BIOLOGY

SELECTED TOPIC FOR DISSERTATION
Vascular Plant Comparative Anatomy

Course code	BIDB243067
Course level	Doctoral Program
Semester/ term	Odd/even
Course coordinator	Dr. Maryani M.Sc.
Lecture(s)	Dr. Maryani M.Sc. Prof. Dr. L. Hartanto Nugroho M.Agr.
Language	Indonesian/English
Classification within the Curriculum	Compulsory Specialization Courses
Teaching format/ class hours per week during the semester	This course is planned to have 14 teaching weeks and 2 weeks of examination.
Workload	1,125 hours/day 5 days/week 5,625 hours/week 16 Weeks/Semester total workload : 90 hours/3,6 ECTS
Credits	2-0 credits / 3.6 ECTS
Requirements	-
Program Learning Outcome	CPL 1.2. After completing this program, the graduates will be able to demonstrate honesty, responsibility, self-confidence, emotional maturity, ethics, and awareness of being a lifelong learner; 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; CPL 3.3. After completing this program, the graduates will be able to manage and formulate valid and accountable research data

	by upholding academic integrity and prioritizing anti-plagiarism; CPL.4.3. After completing this program, the graduates will be able to apply the philosophy of biological systems in developing biological concepts in the areas of food, health, bioenergy, biomaterial and/or the environment.
Course Learning Outcome	BIDB243067.1 By the end of this course, students will be able to accurately apply the concepts and working principles of Comparative Anatomy of Vascular Plants to investigate anatomical evolution from pteridophytes to angiosperms, anatomical adaptations of plants to their environments, and anatomical sample preparation in plants through doctoral-level research. BIDB243067.2 By the end of this course, students will be able to determine the types of data and appropriate data collection methods in accordance with the objectives of Dissertation research within the scope of Comparative Anatomy of Vascular Plants. BIDB243067.3 By the end of this course, students will be able to develop, modify, or innovate research methods to achieve the objectives of Dissertation research within the scope of Comparative Anatomy of Vascular Plants. BIDB243067.4 By the end of this course, students will be able to determine and apply appropriate data analysis methods and interpret the results to address research problems and achieve the objectives of Dissertation research within the scope of Comparative Anatomy of Vascular Plants, including proficiency in the use of software for anatomical analyses at various levels of plant evaluation.
Course Description	This course focuses on the preparation of anatomical samples of plant organs, the study of vascular plant organ anatomy across evolutionary levels from pteridophytes to angiosperms, and the anatomical adaptations of vascular plants to their respective environments. Through these topics, students will gain a comprehensive understanding of structural diversity, evolutionary trends, and adaptive strategies in plant anatomy

Assessments	The assessment for Selected Topic for Dissertation (Vascular Plant Comparative Anatomy) is based on four components, with the respective criteria and weights: A. Assignment (20%) B. Presentation (20%) C. Mid-term Exam (30%) D. Final-term Exam (30%)
Study Media and Literature	**Main:** 1. Beck, C.B. 2010; An intruduction to plant strucutr and development. Cambridge University Press. Cambridge 2. Vashishta, P.C., A. K. Sinha, & A. Kumar. 2006. Botany for degree students : Gymnosperms. S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi 3. Cutter, E.G., 1970. Plant Anatomy: Experiment and interpretation. Part I: Cell and Tissues. Addison Wesley Publ. Co. Ontario. **additional:** 1. Eames, A.J. and L. H. MacDaniel. 1981. An introduction to plant anatomy. TMH Edit. Tata McGrow-Hill Publ. Comp. Ltd. Bombay 2. Esau, K., 1965, Plant Anatomy, 2nd edition, Wiley Eastern Private United, New Delhi. 3. Esau, K., 1979, Anatomy of seed plants, Wiley Eastern LTD. 4. Fahn, A., 1990, Plant anatomy, 4th edition, Pergamon Press. 5. Maherwari, P., 1955, An introdduction to the embryology of angiosperms. 1st edition, Mc Grow-Hill Book Co.Inc. New York. 6. Pandey, B.P.,1982, Plant anatomy, 3rd edition, S. Chan and Company Ltd. New York