THE MODULE HANDBOOK
DOCTOR BIOLOGY STUDY PROGRAM
FACULTY OF BIOLOGY

SELECTED TOPIC FOR DISSERTATIONS

Natural Product Metabolism

Course code	BIDB203108
Course level	Doctoral Program
Semester/ term	Odd/even
Course coordinator	Prof. Dr. L. Hartanto Nugroho M.Agr.
Lecture(s)	Prof. Dr. L. Hartanto Nugroho M.Agr. Dr. Tri Rini Nuringtyas 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 1.1. Upon completing this program, the graduates demonstrate an attitude of being able to contribute to improving the quality of life in society, nation and state, and the progress of civilization based on Pancasila 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 3.2. After completing this program, the graduates will be able to contribute to the development and practice of the field of biology through scientific research based on scientific principles and ethics through interdisciplinary, multidisciplinary, or transdisciplinary approaches in solving problems in the field of biology CPL 4.3 After participating in this program, 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	BIDB203108.1 By the end of this course, students will be able to accurately apply the concepts and principles of natural product metabolism to elucidate the biosynthetic pathways of various secondary metabolites, analyze the characteristics of each metabolite group, and evaluate the benefits of secondary metabolites for the producing organisms and for humans, through doctoral-level research. BIDB203108.2 By the end of this course, students will be able to determine appropriate data types and data collection methods in accordance with the objectives of their dissertation research within the scope of natural product metabolism. BIDB203108.3 By the end of this course, students will be able to demonstrate the ability to develop, modify, and innovate research methodologies to effectively achieve dissertation research objectives in the field of natural product metabolism BIDB203108.4 By the end of this course, students will be able to demonstrate the ability to select and apply appropriate data analysis methods and interpret the results to address research problems and achieve the objectives of dissertation research in the field of natural product metabolism, including proficiency in using software tools for secondary metabolite profiling.
Course Description	This course explores the metabolism of natural products with a focus on secondary metabolites. Topics include the classification of secondary metabolites based on their molecular structures and metabolic pathways, as well as the structural characteristics of these compounds within plant systems. The course also examines the specific plant tissues or cells where secondary metabolites are accumulated and introduces a range of methods used for the separation and analysis of secondary metabolites. Through this course, students will gain a comprehensive understanding of the biochemical diversity and analytical approaches relevant to natural product metabolism.

Assessments	The assessment for Selected Topic for Dissertations (Natural Product Metabolism) is based on four components, with the respective criteria and weights: 1. Stuctured Assigment/Task (20%) 2. Presentation (20%) 3. Mid-Term Exam (30%) 4. Final-Term Exam (30%)
Study Media and Literature	**Main** 1. Dewick, P.M. 2009. Midicinal natural product: A biosyntesis approach. John Wiley and Sons Ltd. Chichester. 2. Nugroho, L. H. 2017. Strukur dan produk jaringan sekretori tumbuhan. Universitas Gadjah Mada Press. Indoenesia 3. Harborne, J.B. 1982. Introduction to ecological biochemistry. Academic Press, Inc. London. 4. Samuelsson, G. 1999. Drug of Natural Origin. Swedish Pharmaceutical Society. Swedish Pharmaceutical Press. Sweden. **Additional** 1. Nugroho, L. H. dan Hartini, YS. 2020. Farmakognosi Tumbuhan Obat: Kajian Spesifik Genus Piper. Universitas Gadjah Mada Press. Indonesia 2. Nugroho, L. H. dan Hartini, YS. 2024. Tumbuhan Obat Antidiabetik: Etnomedisin, Ramuan, dan Mekanisme Aksi. Universitas Gadjah Mada Press. Indonesia.