

Module designation	Ecotoxicology
Module level, if applicable	Undergraduate
Code, if applicable	NBIOUM6362
Subtitle, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Even semester
Person responsible for the module	Dr. Sueb M.Kes.
Lecturer	1. Dr. Sueb M.Kes. 2. Bagus Priambodo, S.Si., M.Si., M.Sc. 3. Ajeng Daniarsih, S.Si, M.Si.
Language	Bahasa Indonesia and English
Relation to curriculum	Undergraduate degree program, Elective, 6th semester.
Type of teaching, contact hours	Undergraduate degree program: cooperative learning, presentation, laboratory work, 2 x 50 = 100 minutes and 1 x 170 minutes
Workload	1. 2 x 50 minutes lecture = 100 minutes (1,67 hours) per week 2. 2 x 60 minutes tugas terstruktur = 120 minutes (2 hours) per week 3. 2 x 60 minutes tugas mandiri = 120 minutes (2 hours) per week 4. 1 x 170 minutes praktikum = 170 minutes (2.83 hours) per week
Credit points	3 Credit points (~5 ETCS-eq)
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to be eligible for the final examination.
Recommended prerequisites	-
Module objectives/intended learning outcomes	After completing this module, a student is expected to: LO3: Mastering basic biological theoretical concepts in an integrated manner by using logical, critical, systematic and innovative thinking to analyze various problems in the field of biology so that they admire and try to protect His creations
Course learning outcomes	1. Explaining the history and definition of ecotoxicology 2. Explaining the types and classification of pollutants

	3. Explaining pesticide ingredients and their working power 4. Explaining heavy metals and their impact on the environment and organisms 5. Explaining the characteristics and toxicology of B3 waste 6. Understanding chemical analysis 7. Explaining the characteristics of the biological test method 8. Applying the concept of bioremediation 9. Presenting the results of ecotoxicological investigations.	
Content	This course covers the following main topics: • history and definition of ecotoxicology • types and classifications of pollutants • pesticides and their working power • heavy metals and their impact on the environment and organisms • the characteristics and toxicology of B3 waste • chemical analysis • the characteristics of the biological test method • application of the concept of bioremediation • presentation of the results of ecotoxicological investigations	
Learning activity	Week 1	Theory : Introduction and group division.
	Week 2	Theory : The history of ecotoxicology, definition and scope of ecotoxicology studies.
	Week 3	Theory : Types and classification of toxic pollutants.
	Week 4	Theory: Pesticide distribution. Fungicides, insecticides, herbicides and their effectiveness. The dynamic relationship of pesticides in the environment and in the body of organisms.
	Week 5	Theory: Kinds of heavy metals. Source of heavy metal pollution. Effects of heavy metal pollution.
	Week 6	Theory : Analyzing the characteristics of B3 chemicals. Source of B3 chemicals. The impact of B3 waste on human health. Law and handling of B3 waste.
	Week 7	MIDTERM EXAMINATION
	Week 8	Theory : Chemical instrument for the test of toxic substances. Connecting factors related to the working principle of the experimental apparatus.
	Week 9	Theory: Measuring parameter values from the results of experimental animal tests.

		Experimental animal toxicity test.
	Week 10	Theory: Plant-based, microbial, animal-based bioremediation. In situ and ex situ bioremediation. Bioremediation with the help of surfactants.
	Week 11	Theory: Presentation of group research reports.
	Week 12	Theory: Presentation of group research reports.
	Week 13	Theory: Presentation of group research reports.
	Week 14	Theory: Presentation of independent research reports.
	Week 15	Theory: Presentation of independent research reports.
	Week 16	FINAL EXAMINATION
Study and examination requirements and forms of examination	Mid term examination and Final examination, review articles and a self project.	
Media employed	LCD, blackboard, and Sipejar.	
Reading list	1. Frank C. Lu, Sam Kacew. 2009. Lu's basic toxicology : fundamentals, target organs, and risk assessment. – 5th ed. Informa Healthcare USA, Inc 2. Sembel, D.T. 2015. Toksikologi Lingkungan Dampak Pencemaran dari Berbagai Bahan Kimia dalam Kehidupan Sehari-hari. Yogyakarta: Andi Offset. 3. Nugroho, A. 2006. BIOREMEDIASI : Hidrokarbon Minyak Bumi. Penerbit Graha Ilmu. Yogyakarta. 4. Surtikanti, H..2004. Pengujian bahan toksisitas logam berat terhadap daphnia dan planaria. Proceeding Seminar Nasional Penelitian, pendidikan & penerapan MIPA di Yogyakarta. 5. Walker, C. 2014. Ecotoxicology Effects of Pollutants on the Natural Environment. CRC Press. 6. Newman, M.C. 2014. Fundamentals of Ecotoxicology – The Science of Pollution. CRC Press. 7. Hopkin, S.P., Peakall, D.B, Sibly, R.M., Walker, C.H. Principles of Ecotoxicology, Fourth Press. CRC Press. 8. Sparling, D.W. 2017. Basics of Ecotoxicology. CRC_Taylor & Francis. 9. Various Scopus indexed international journal articles (AJIS) and Sinta indexed national journal articles (AJUNS) according to the topics discussed.	
Date of last amendment made	January, 2022	