THE MODULE HANDBOOK

Magister Biology Study Program
FACULTY OF BIOLOGY

TOXICOLOGY AND ENVIRONMENTAL POLLUTION

Course code	BIMB202243
Course level	Magister
Semester/ term	Odd and Even
Course coordinator(s)	Dr. rer. nat. Andhika Puspito Nugroho
Lecture(s)	1. Siti Nurleily Marliana, S.Si., M.Sc., Ph.D. 2. Dr. Diah Rachmawati, M.Si.
Language	Indonesian
Classification within the Curriculum	Elected
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	1. The graduates are demonstrating knowledge and comprehending the biological system and bio-engineering methods to solve tropical biodiversity problems. 2. The graduates can manage research data and solve biological problems based on analytical or experimental studies and critical information analysis. 3. The graduates can solve problems related to biological resources through inter-and/or multidisciplinary approaches beneficial to society and the scientific community. 4. The graduates can manage research data to ensure validity, strictly hold academic integrity, and prevent plagiarism.
Course Learning Outcome	1. Students can identify the types of pollutants/contaminants in soil, air, and water and understand the pollutants' emission, distribution, and transformation in ecosystems. 2. Students can understand toxicokinetic, toxicodynamic, and detoxification processes and evaluate the effects on molecular up to ecosystem levels. 3. Students can identify and solve environmental pollution problems. 4. Students can perform toxicity testing.
Course Description	This course studies the scope of toxicology and environmental pollution, pollutant emissions and transport, routes and kinetics of pollutant uptake, toxicity testing, factors affecting toxicity, persistence, bioaccumulative, and toxicity, air pollution, acid deposition, global climate change I and II, depletion of stratospheric ozone, the mechanism of entry of pollutants into plants, pollutant effects on physiological processes and plant resistance, plant

	response to pollutants, and prospects and phytoremediation mechanisms.
Assessments	Assignments, laboratory work, midterm and final exams
Study Media	LCD
Literature	1. Anonymous. 2001. Bioindicator. http://www.eds.ornl.gov/programs/bioindicators 2. Berg, MVD, DVD Meent, WJGM Peijnenburg, DTHM Sijm, J. Struijs, and JW Tas. 1995. Transport, accumulation, and transformation processes. p. 52 - 59. In CJ van Leuween and JLM Hermens [eds.]. Risk assessment of chemical: an introduction. Kluwer Academic Publisher. Netherlands. 3. Hattum, BV 1995. Toxicokinetic and bioconcentration of polycyclic aromatic hydrocarbons in freshwater isopods. p. 75 - 99. In BV Hattum [ed.]. Bioaccumulation of sediment - bond contaminant by freshwater isopod *Asellus aquaticus* (L.). The Institute for Environmental Studies of Vrije Universitiet. 4. Jeffree, RA, SJ Markich, and PL Brown. 1995. Australian freshwater bivalves: their applications in metal pollution studies. Australasian Journal of Ecotoxicology. Vol. 1, pp. 33 - 41. 5. Karr, JR, and EW Chu. 1999. Restoring life in running waters: better biological monitoring. Island Press. Washington. 6. Leeuwen, CJV and JLM Hermens (eds). 1995. Risk assessment of chemicals: an introduction. Kluwer Academic Publishers. Netherlands. 7. Manahan, SE 1994. Environmental Chemistry. Sixth edition. CRC Press, Inc. USA. 8. Stine, KE, and TM Brown. 1996. Principles of Toxicology. CRC Press, Inc. USA. 9. Walker, CH, SP Hopkin, RM Sibly, and DB Peakall. 2001. Principles of ecotoxicology. 2nd edition. Taylor & Francis, Inc. New York. 10. Widianarko, B. and NV Straalen. 1996. Toxicokinetic-based survival analysis in bioassay using nonpersistent chemical. Environ. Toxicol. Chem. 15: 402 - 406.