



THE MODULE HANDBOOK

Magister Biology Study Program

FACULTY OF BIOLOGY

BIODEGRADATION AND REMEDIATION

Course code	BIMB202108
Course level	Magister
Semester/ term	Odd and Even
Course coordinator(s)	Dr. rer. nat. Andhika Puspito Nugroho
Lecture(s)	<ol style="list-style-type: none">1. Dr. rer. nat. Andhika Puspito Nugroho2. Dr. Endah Retnaningrum, M.Eng.3. Dr. Diah Rachmawati, M.Si.4. Dr. Eko Agus Suyono, M.App.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: 3 credits of theory
Credits	3-0 credits
Requirements	-
Program Learning Outcome	<ol style="list-style-type: none">1. The graduates are demonstrating knowledge and comprehending biological systems 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.
Course Learning Outcome	<ol style="list-style-type: none">1. Students can understand the concept of biodegradation and bioremediation, and the types of pollutants in environments2. Students can understand the microbiological, biochemical, and molecular aspects of biodegradation and bioremediation processes3. Students can understand the application of biodegradation and bioremediation4. Students can identify and solve environmental pollution problems, including biodegradation and bioremediation processes
Course Description	This course studies bioremediation and biodegradation of pollutants/contaminants in soil and water, microbial



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	applications in biodegradation and bioremediation of household and industrial wastes, prospects for plants as remediation agents for polluted environments, plant mechanisms in pollutant remediation, factors affecting the effectiveness of phytoremediation, microalgae for bioremediation and absorption CO ₂ , and the role of microalgae in the biorefinery.
Assesments	Assignments/projects, midterm and final exams
Study Media	LCD
Literature	<ol style="list-style-type: none">1. Alexander, M. (1990). Biodegradation and bioremediation. Academic Press.2. Ansari, A.A., Lanza, G.R., Newman, L., Gill R., & Gill, S.S. (2019). Phytoremediation: Management of environmental contaminants Volume 6. Springer International Publishing.3. Chaudhry, G.R. (1995). Biological degradation and bioremediation of toxic chemicals. Dioscorides Press.4. Cookson, J. T. (1995). Bioremediation engineering - design and application. McGraw-Hill.5. Gadd, G.M. (2001). Fungi in bioremediation. Cambridge University Press.6. Kumar, A., Singh, P., Singh, V.P., & Mishra, V.K. (2020). Microbe-mediated remediation of environmental contaminants. Elsevier Science.7. Lehr, J., Hyman, M., Gass, T.E., & SeEVERS, W.J. (2002). Handbook of complex environmental remediation problems. McGraw-Hill.8. Margesin, R., & Schinner, F. (2005). Manual of soil analysis-monitoring and assessing soil bioremediation. Springer.9. Rosenberg, E. (1993). Microorganisms to combat pollution. Kluwer Academic Publishers.10. Sellers, K. (1998). Fundamentals of hazardous waste site remediation. Lewis. Boca Raton.11. Singh, A., & Ward, O.P. (2004). Applied bioremediation and phytoremediation. Springer.