



Universitas Gadjah Mada
 Faculty of Agriculture
 Agricultural Microbiology Study Program

Course Syllabus

Course Code	Course Name	Credits	Semester	Course Status	Requirement
PNM20193121	Microbial Bioremediation in Agriculture	2	1	Optional	-
Learning Outcome	1	Understanding the diversity of agricultural waste			
	2	Understanding the bioremediation methodologies for agricultural waste			
	3	Understanding the biological methodologies for monitoring bioremediation			
Course Description	<p>Agricultural soil receives a wide variety of environmental contaminants through multiple input pathways. Pollutants such as polycyclic aromatic hydrocarbons, polychlorinated and polybrominated biphenyls, pesticides and fertilizers, metals, and more recently, pharmaceuticals and personal care products, reach the soil through irrigation with reclaimed wastewater, application of sewage sludges and agrochemicals to combat respectively nutrient deficit of soil and pests, or even by atmospheric deposition. Bioremediation provides an attractive approach for removal of chemical stressors and, in turn, improving biological and chemical parameters of soil quality. This course will present the example of bioremediation methodologies to clean soil using microorganisms and familiarize students with various bioremediation technique.</p>				
Course Content	<ol style="list-style-type: none"> 1. Agricultural Waste: Sources, Implications, and Sustainable Management 2. Agricultural Wastes and Its Applications in Plant-Soil Systems 3. Impact of Agriculture on Soil Health 4. Global Scenario of Remediation Techniques to Combat Pesticide Pollution 5. Woodchip Bioreactors for Nitrate Removal in Agricultural Land Drainage 6. Consolidation of Green Chemistry into Biorefineries: A Pavement for Green and Sustainable Products 7. Microbial Interventions and Biochemistry Pathways for Degradation of Agricultural Waste 8. Mushroom Cultivation Technology for Conversion of Agro-Industrial Wastes into Useful Products 9. Bioremediation Technologies for the Management of Agricultural Waste 10. Biological Methodologies for Monitoring Bioremediation 				

Reference	<ol style="list-style-type: none">1. <i>Bioremediation of Agricultural Soils</i>, J.C. Sanchez-Hernandez (2019), CRC Press, New York.2. <i>Agricultural Waste Threats and Technologies for Sustainable Management</i>, R.A. Bhat, K.R. Hakeem, H. Qadri, M.A Dervash (2019), CRC Press, New York
Lecturer	Prof. Ir. Irfan Dwidya Prijambada, M.Eng., Ph.D. Nur Akbar Arofathullah, M. Biotech., Ph.D Ahmad Suparmin, S.P., M. AgrSc., Ph.D