

Semester	7		
Course Code:	ENCM 41852		
Course Name:	Environmental Biotechnology		
Credit Value:	2		
Status:	for BSc Honours in ENCM degree		
Pre-requisites:	MIBI 22554, MIBI 22562, ENCM 22773, ENCM 22782		
Co-requisite:	None		
Hourly Breakdown:	Theory	Practical	Independent Learning
	26	12	62
Intended Learning Outcomes:			
At the completion of this course unit, student will be able to;			
<ol style="list-style-type: none"> 1. describe the concepts of environmental biotechnology, 2. explain the scope of biotechnology in environmental management, 3. demonstrate basic skills used in molecular biotechnology, and 4. evaluate and propose appropriate biotechnology approaches to address contemporary environmental issues. 			
Course Content:			
<p>Introduction to environmental biotechnology and recombinant DNA technology, Relevance and scope of biotechnology in contemporary environment, Bioremediation for environment protection and pollution control, Environment protection and pollution control: biosensors, bio-filters, nutrient film techniques, biological off-gas treatment. Agricultural biotechnology: plant growth-promoting bacteria, bio-pesticides, bio-fertilizer, post-harvest biotechnology. Biotechnology tools for forest resource management: reforestation, soil conservation, land rehabilitation. Resource recovery: phyto-remediation and biomining. Biotechnology for sustainable development: biofuels, bioplastics, biopolymers, microbial fuel cells, biotechnology for industries. Environmental genomics, Genetics for biodiversity conservation: gene banks, germplasm, molecular markers, DNA and protein profiling and DNA bar coding. Genetically modified organisms, Ethical and regulatory aspects of environmental biotechnology, Challenges and Prospects of Environmental Biotechnology</p> <p>Practical sessions on DNA extraction, cDNA synthesis and Polymerase chain reactions for visualization foreign/GM/invasive microorganisms or environmental DNA.</p>			
Teaching /Learning Methods:			
A combination of lectures, laboratory practical sessions, case studies and online resources.			
Assessment Strategy:			
Continuous assessment and end of semester examination. Percentage given for each sub component indicates the percent contribution to the final marks.			
Continuous Assessment 40%		Final Assessment 60%	
Details:		Theory	Practical
Assignments	10	60	-
Case study presentation	20		-
Laboratory reports	10		

Recommended Readings:

1. Wang, L.K., J. H. Tay, S.T.L. Tay & Y.T. Hung (2010) Environmental Biotechnology, Humana Press. Springer, Boston, MA.
2. Rittmann, B.E. & P.L. McCarty (2001) Environmental biotechnology: principles and applications, McGraw-Hill, Boston.
3. Jördening, H.J. & J. Winter (2005) Environmental Biotechnology: Concepts and Applications John Willey & Sons, New York
4. Vallero, D.A. (2015) Environmental Biotechnology: A biosystems approach Academic Press, Elsevier
5. Dick, G. (2018) Genomic Approaches in Earth and Environmental Sciences, Springer, Boston, MA