



Title:	Environmental Biotechnology APPROVED
Long Title:	Environmental Biotechnology
Module Code:	BIOT6008
Duration:	1 Semester
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Biotechnology
Valid From:	Semester 1 - 2017/18 (September 2017)
Module Delivered in	3 programme(s)
Module Coordinator:	Brigid Lucey
Module Author:	Rosemary Rea
Module Description:	This module is designed to familiarise students with aspects of environmental biotechnology such as biological waste treatment systems, bioremediation, environmental legislation and pollution control.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Provide an overview of industrial waste streams and the role of the Environmental Protection Agency.
LO2	Describe the role of microorganisms in waste treatment.
LO3	Describe the use of biotechnological processes to protect the environment.
LO4	Describe the role of industrial hygiene.
LO5	Perform and report on experimental tasks related to the roles of microorganisms in waste treatment.
Pre-requisite learning	
Module Recommendations	
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named MTU module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
Incompatible Modules	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Industrial Waste Management

Hazardous and non-hazardous waste streams. Wastewater. Role of the environmental protection agency. Integrated Pollution Prevention Control License. Environmental Legislation. Environmental Impact Assessments.

The role of microorganisms in waste treatment.

Overview of treatment of sewage/waste water and industrial effluents. Biological nutrient removal. Differences between treatment strategies for potable water and waste water. Landfill technologies and composting.

Biotechnological processes to protect the environment.

Bioremediation, detection and monitoring of pollutants using biosensors. Biofuels.

Industrial Hygiene

Hazards in the workplace. Responsibility of the employer and employee. Control of hazards.

Laboratory Programme

Conduct relevant laboratory procedures and practical skills.

Assessment Breakdown	%
Course Work	100.00%

Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Theory based assessment	1,2	35.0	Week 6
Short Answer Questions	Theory based assessment	2,3,4	35.0	Week 12
Practical/Skills Evaluation	Laboratory practicals and report writing	2,5	30.0	Every Second Week

No End of Module Formal Examination

Reassessment Requirement

Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Classroom Instruction	2.0	Every Week	2.00
Lab	Laboratory Practicals	2.0	Every Second Week	1.00
Independent & Directed Learning (Non-contact)	Self-Directed learning	4.0	Every Week	4.00
Total Hours				8.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

This module has no Part Time workload.

Module Resources

Recommended Book Resources

- Gareth G. Evans, Judy Furlong, 2011, *Environmental Biotechnology*, J. Wiley [ISBN: 9780470684177]

Supplementary Book Resources

- Bruce E. Rittmann, Perry L. McCarty 2001, *Environmental biotechnology*, McGraw-Hill [ISBN: 9780071181846]
- Gabriel Bitton 2011, *Wastewater microbiology*, J. Wiley [ISBN: 9780470630334]
- Barbara A. Plog and Patricia J. Quinlan 2012, *Fundamentals of Industrial Hygiene*, National Safety Council [ISBN: 9780879123123]

This module does not have any article/paper resources

Other Resources

- Website: *Environmental Protection Agency*
<http://www.epa.ie>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SAGBI_8	<u>Bachelor of Science (Honours) in Agri-Biosciences</u>	3	Mandatory
CR_SPHBI_8	<u>Bachelor of Science (Honours) in Pharmaceutical Biotechnology</u>	3	Elective
CR_SAGBI_7	<u>Bachelor of Science in Agri-Biosciences</u>	3	Mandatory