Philadelphia University
Faculty of Science
Department of Biotechnology & Genetic Engineering
Second semester, 2008/2009

Course Syllabus

Course Title: Environmental Biotech.	**Course code:** 0240352, 0240365
Course Level: 3	**Course prerequisite (s):** 0240216
Lecture Time: 08:15-09:15 Mon. & Wed. 14:00-16:00 Wed. (lab)	**Credit hours:** 3

Academic Staff Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Tawfiq Froukh	Assis.Prof.	918	12-13 Sun, Wed, Thu & 14-16 Sun	tfroukh@philadelphia.edu.jo

Course module description:

This module describes the diverse problems of the environment and the approaches toward their solution or mitigation in connection to the modern or classical methods of biotechnology. It describes the significance in conservation of environmental resources and biodiversity, provision for alternate sources of energy, biological control of pests and pathogens, purification of environment, mitigation of problems of chemical fertilizers , and most important of all, improvement in the quality of life.

Course module objectives:

This module aims to give the students a comprehensive idea of the different facets of environment in which the emerging biotechnology has started playing a significant role and the future possibilities it holds. It attempts to exploit some of the basic biological processes in cost-effective manners towards the amelioration of the degrading eco-health and eco-resources.

Course/ module components

- **Books (title , author (s), publisher, year of publication)**

-Text book: Environmental Biotechnology: Theory& Application, Gareth M. Evans & Judith C. Furlong, John Wily & Sons, 2003.

-Environmental Microbiology A laboratory Manual, I.L. Pepper & C.P. Gebra, Elsevier Academic Press, 2005.

-Environmental Biotechnology Concepts and Applications, Hans-Joachim Jordening and Josef Winter *edt.*, Wiley VCH verlag, 2005.

Teaching methods:

Lectures, tutorials.
Laboratory work.
Scientific visits to: (1) Al-Baga'a waste water treatment planet; (2) Zai water planet.
Exams and Quizzes

Learning outcomes:

- Knowledge and understanding

The students should be able to understand the fundamentals of environmental biotechnology.

- Practical and subject specific skills (Transferable Skills).

The students should be able to draw the attention towards the possibilities of utilization of bio-methodologies in restoring ecohealth.

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects
- Quizzes.
- Exams

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	15%
Second examination	15%
Lab. midterm	10%
presentation	10%
Final theory & Lab	50%
Total	100%

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.

Course/module academic calendar

Week	Theory	Laboratory
(1) 15 Feb	Introduction -Role of Environmental Biotechnology -The scope of use 1-5	Introduction
(2) 22 Feb	Contaminated land & Bioremediation -Remediation methods -The suitability of bioremediation -Factors Affecting the use of Bioremediation -Biotechnology selection -Essential Features of Biological Treatment Systems	Oxidation of Sulfur in Soil
(3) 1 Mar		Dehydrogenase Activity of Soils
(4) 8 Mar	Phytotechnology and Photosynthesis -Metal phytoremediation -Organic phytoremediation -Hydraulic contaminant -Macrophyte treatment system -Algal Treatment system	Nitrification and Denitrification
(5) 15 Mar		Enrichment and Isolation of Bacteria that Degrade 2,4-Dichlorophenoxyacetic Acid
(6) 22 Mar	Aerobes and Effluents -Sewage treatment -The oxidation ditch -Nitrogenous wastes -Rotating biological contractor -Trickling filters -Membrane bioreactor -Activated sludge system -Cellulose Ion Exchange media -Pure Oxygen systems -Sludge disposal	Adaptation of Soil Bacteria to Metals
(7) 29 Mar (1st)		Biodegradation of Phenol Compounds
(8) 5 Apr	Biotechnology and Wastes -Biowastes -Composting -Anaerobic digestion -Annelidic conversion -Biowastes to ethanol -Eutrophic fermentation	Bacteriological Examination of Water: The Coliform MPN Test & Membrane Filter Technique
(9) 12 Apr		Midterm
(10) 19 Apr		Scientific visit
(11) 26 Apr (2nd)	Genetic Manipulation -Manipulating of bacteria without genetic engineering -Manipulating of bacteria with genetic engineering -Transgenic plants	Defined Substrate Technology for Detection of Coliforms and Fecal Coliforms
(12) 3 May		Film Medium for the Detection of Coliforms in Water, Food, and on Surfaces
(13) 10 May	Integrated Environmental Biotechnology -Bioenergy -methane biogas -ethanol fermentation -biodiesel -Integrated agricultural applications -plant disease suppression -microbial pesticides -plant/microbe interaction -plant pathogens	Detection of Bacteriophages
(14) 17 May		Scientific visit
(15) 24 May		Final
(16) 31 May (Final)	THE WAY A HEAD & REVISION	

Expected workload:

On average students need to spend per week 2 hours of study per week 50-minute each lecture/tutorial and 2.5 hours in the lab.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.