Philadelphia University
Faculty of Science
Department of Biotechnology and Genetic Engineering
Second semester, 2009/2010

Course Syllabus

Course Title: Applied Molecular Biology/Practical	**Course code:** 240485
Course Level: 4th year	**Course prerequisite (s) and/or corequisite (s):** Applied Molecular Biology 240484
Lecture Time: Thursday 13.10-16.00	**Credit hours:** 1

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. Raida W. Khalil	**Assistant Professor**	**906**	**10-12 Tuesdaay**	**r_khalil@philadelphia.edu.jo** **halaweh@hotmail.com** **Biotechnology students** **stdbio@philadelphia.edu.jo**

Course module description:
This module is a major (Mandatory) Departmental course for the Fourth Year. It is taught by lectures, lab and Technology-based. The module focuses on selected basic methods in the purification of biological macromolecules: Protein and RNA. The course deals with horizontal and vertical electrophoresis using denaturing polyacryalmids and agarose gels, centrifugation, detection techniques such as immunoblting and other essential techniques in modern gene technology i.e cDNA synthesis and RT- PCR.

Course module objectives:

At the end of this module, student will be able to:

Demonstrate the Macromolecules extraction (protein and RNA) from mammalian cell lines and tissues

Demonstrate the separation of protein and RNA molecules by applying the vertical denaturing polyacrylamide (SDS PAGE) and horizontal agarose gels electrophoresis.

Integrate the Protein gel elctrophoresis (SDS PAGE) with Protein Fingerprinting analysis

Demonstrate the detection techniques such as Western Blot and other essential techniques in modern gene technology ie cDNA synthesis and RT- PCR.

Course/ module components

-The students will be provided with lab sheets for each practical session prepared By **Dr. Raida khalil**

Teaching methods:

The 48 hours in total will be mainly practical sessions.

Learning outcomes:

- Cognitive skills (thinking and analysis).
  Gain Self-management and professional development such as skills necessary for self-managed and lifelong learning (working independently, time management, organization).

- Communication skills (personal and academic).
  Gain interpersonal and Teamwork skills by getting opportunities to work productively with others in the laboratory.

- Practical and subject specific skills (Transferable Skills).
  Improve Practical skills such as ability to work with mammalian cell line and tissues and the ability to obtain record, collate and analyze information in the laboratory.

Assessment instruments

Allocation of Marks		
Assessment Instruments	**Mark**	**Date**
Mid term exam	**30**	**10/12/2009**
Final examination: 50 marks	**50**	
Reports, practical skills, Quizzes and Home works	**20**	
Total	**100**	

Course/module academic calendar

week	**Basic and support material to be practiced**
(1)	Laboratory safety techniques I. Protein analysis Preparation of the nuclear and cytoplasmic extracts(Protein Extraction)
(2)	I. Protein analysis Determination of protein concentration (Bradford Assay)
(3)	I. Protein analysis SDS- PAGE (a)
(4)	I. Protein analysis SDS- PAGE (b)
(5)	I. Protein analysis

	Western Blot Analysis(a)
(6)	I. Protein analysis Western Blot Analysis(b)
(7) **Midterm Exam**	
(8)	II. RNA analysis Total RNA isolation
(9)	**II. RNA Analysis** RNA Quantity and Quality detectionl
(10)	**II. RNA Analysis** RT- PCR and Detection of RT- PCR product
(11)	**Real Time PCR**
(12)	**Continue: Real Time PCR**
(13) **Final Examination**	**Final Examination**

Expected workload:

On average students need to spend 3 hours of study and preparation for each 50-minute lecture/tutorial.

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.

Module references

Books

1-Title: Cell and molecular biology: concepts and experiments,2001
Author(s)/Editor(s):Gerald ,etal
Publisher: New York: John Wiley and Sons, Inc.,
ISBN: 0-471-38913-7

2-Title:Human molecular biology laboratory manual, 2002
Author(s)/Editor(s): Rob reed, et al
Publisher: Oxford: Blackwell
ISBN: 0-632-04676-7

Websites

http://www.protocol-online.org/

http://rebase.neb.com/rebase/rebase.html
http://www.biozone.co.uk/biolinks/BIOTECHNOLOGY.html#Biotechnology_Techniques

http://userpages.umbc.edu/~jwolf/method1.html