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

Course Syllabus

Course Title: Applied Molecular Biology	**Course code:** 240484
Course Level: 4th	**Course prerequisite (s) and/or corequisite (s):** Molecular Biology (240386)
Lecture Time:11.15-12.45 pm Monday and Wednesday	**Credit hours: 3**

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. Raida W. Khalil	Assistant Professor	906 Head of department office	9-11 Sunday	r_khalil@philadelphia.edu.jo Biotechnology students stdbio@philadelphia.edu.jo

Course module description:

This module is a major (Mandatory) Departmental course for the Fourth Year. The module starts with description the basic techniques essential to molecular biology and explained by putting them in the context of the impact which molecular Biology is having upon modern mainstream biology.

Course module objectives:

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

* Review critically the fundamental and key concepts of Molecular Biology and gene cloning
*Grasp a common and valuable techniques used by molecular Biologists
* Understand a broad range of experimental techniques used in molecular biology and how they are used to improve the concepts of replication, transcription and translation

Course/ module components

Title:" Molecular Biology" the second edition, 2002
Author(s)/Editor(s): Robert Weaver et al
Publisher: Mc Graw Hill
ISBN:0-07-234517-9

Title: Molecular Biology in Cellular pathology
Author: John Crocker et al
Publisher: Wiley
ISBN: 0-470-84475-2

Teaching methods:

The 45 hours in total will be mainly lectures w given as power point presentations, educational movies and white board. Student questions and student Discussion groups are encouraged.

Learning outcomes:

- **Cognitive skills (thinking and analysis).**

The lecturer will present the material in the text book in an interactive way that stimulates the thinking side of students. Conducting the learning objectives for each module components in clear manner to insure the material is digested by the students.

- **Communication skills (personal and academic).**

-Module language: English
-For every lecture the last five minutes will be open for discussion. For further discussion, the students are welcome at the lecturer's office hour as appeared in first page.
-the students have the option to submit their module activities either by email or by hand
-the students are welcome to share open discussions through the net

- **Practical and subject specific skills (Transferable Skills).**

-Practical related session will be taken in the Applied Molecular Biology Practical/240485 .

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects
- Quizzes.
- Home works
- Final examination: 50 marks

Allocation of Marks		
Assessment Instruments	**Mark**	**Date**
First examination	**15**	
Second examination	**15**	
Final examination: 50 marks	**50**	
Reports, Quizzes, Home works and presentations	**20**	
Total	**100**	

Course/module academic calendar

week	Basic and support material to be covered
(1)	Review: Flow of Genetic information--- Central dogma, Recognition of DNA as genetic material. Review: DNA replication
(2)	Molecular cloning, methods and tools for studying genes and gene activity *Introduction to gene manipulation: DNA cloning, restriction enzymes and maps
(3)	Molecular cloning, methods and tools for studying genes and gene activity *PCR, Real time PCR, DNA sequencing. Directed mutagenesis
(4)	Overview: Transcription &posttranscriptional modification in prokaryotic cells *Nothern Blot
(5)	Overview: Transcription &posttranscriptional modification in prokaryotic cells Mapping transcripts:-Primer extension -S1 mapping
(6) **First examination**	Overview: Transcription& posttranscriptional modification in eukaryotic cells *Quantifying transcripts *Nuclear run off **First Exam**
(7)	Overview: Transcription& posttranscriptional modification in eukaryotic cells *Measuring transcription in vivo *Nuclear run on
(8)	-Overview: Translation *Western blot
(9)	Overview: Translation *Two- dimensional gel electrophoresis- Proteomics *Expression vectors

(10)	Overview: Control of gene expression in prokaryotic cells *Assaying DNA-protein interaction **Second Exam**
(11) **Second examination**	Overview: Control of gene expression in prokaryotic cells *Foot -Printing
(12)	Control of gene expression in eukaryotic cells *5' deletion and 3' deletion study
(13)	Control of gene expression in eukaryotic cells *Linker scanning analysis *Reporter genes: luciferase,GUS,GFP CAT
(14)	Control of gene expression in eukaryotic cells *Reporter genes: luciferase,GUS,GFP CAT *DNA microaaray.
(15) **Specimen examination (Optional)**	Signal transduction: one and two hybrid systems
(16) **Final Examination**	Signal transduction: one and two hybrid systems

Expected workload:

On average students need to spend 2 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

Book

-Title:"Molecular Cell Biology" Fourth edition, 2000.
Author(s)/Editor(s): Harvey Lodish et al.
Publisher: W.H. Freeman and company
ISBN:0-7167-3136-3

2-Title:'"Molecular Biology-Understanding the Genetic revolution.",2005
Author(s)/Editor(s):David P. Clark

Publisher:Elsevier Academic Press
ISBN:0-12-175551-7.

3- Title: “Cell and Molecular Biology concepts and Experiments" the third edition, 2002

Author(s)/Editor(s): Gerald Karp,
Publisher:WILEY
ISBN: 0-471-38913-7

4-Title: “Instant notes Molecular Biology”, Second edition, 2001
Author(s)/Editor(s): Turner et al
Publisher: BIOS Scientific Publishers Limited
ISBN: 1-85996-152-5.

5-1-Title: '"Molecular Biology-Understanding the Genetic revolution.",2005
Author(s)/Editor(s):David P. Clark
Publisher:Elsevier Academic Press
ISBN:0-12-175551-7.

Website(s):

Journals

1. **Biotechnology**
   Publisher: the Asian Network for Scientific Information
   Start Year: 2002

   http://www.ansinet.org/c4p.php?j_id=biotech

2. **Genetics & Molecular Biology**
   Publisher: Brazilian Society for Genetics
   Start Year: 1998

   http://www.scielo.br/cgi-bin/fbpe/fbsite?got=site &pid=1415-4757&lng=en

3. **American Journal of Biochemistry & Biotechnology**
   Publisher: the Asian Network for Scientific Information
   Start Year: 2005

   http://ansinet.org/sciencepub/c4p.php?j_id=ajbb

4. **Bioscene - Journal of College Biology Teaching**
   Publisher: *the* **Association of College & University Biology Educators.**
   Start Year: 1990

   http://papa.indstate.edu/amcbt/bioscene.html

5. **International Journal of Biological Sciences**
   Publisher: Ivyspring International Publisher
   Start Year: 2005 http://www.biolsci.org/index.htm

Websites

- http://en.wikipedia.org/wiki/DNA_replication#DNA_structure
http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/Promoter.html#Transcription_start_site.
- http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/T/Translation.html