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

# Course Syllabus

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|---|---|
| **Course Title: Molecular Biology Practical** | **Course code:** 240387 |
| **Course Level: 3rd** | Course prerequisite (s) and/or corequisite (s): Molecular Biology 240386 or Con |
| **Lecture Time: Tuesday 13.10-16.00** | **Credit hours: 1** |

## Academic Staff Specifics

| Name | Rank | Office Number and Location | Office Hours | E-mail Address |
|---|---|---|---|---|
| **Mrs Maha Qadan** | **Msc** | **1005** | **9:00-12 Sunday** | **Mahaqadan@Yahoo.com Biotechnology students stdbio@philadelphia.edu.j** |

**Course module description:**

This module is a major (Mandatory) Departmental course for the Third Year. It is taught by lectures, and Technology-based labs. The course deals with procedures that have been developed to exploit our knowledge of the replication and expression of genetic information. Recombinant DNA technology enables us to identify, isolate, amplify, analyze and express virtually any genetic material, whether it is DNA or RNA. Increasingly, identify and characterize genetic polymorphisms in a gene by using the polymerase chain reaction (PCR).

**Course module objectives:**

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

*Demonstrate practical experience of selected Molecular Biological Techniques.
*Demonstrate the basic techniques involved in recombinant DNA manipulations including DNA restriction, ligation, transformation and selection of recombinant plasmid.
* Demonstrate the principle of PCR and its applications (e.g Analysis of DNA repeats to estimate its frequency in the population).

**Course/ module components**

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

  Molecular Biology Manual prepared By **Dr. Raida khalil, Philadelphia University (2007)**

**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**

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

| **Allocation of Marks** | | |
|---|---|---|
| **Assessment Instruments** | **Mark** | **Date** |
| Mid term exam | **30** | **08/12/2009** |
| Final examination: 50 marks | **50** | |
| Reports, practical skills, Quizzes and Home works | **20** | |
| Total | **100** | |
| Mid term exam | **30** | |

| week | Basic and support material to be covered |
|---|---|
| **(1)** | Understanding and application of Material Safety Data Sheet<br><br>Basic tools in Genetic Engineering<br>Restriction analysis of chromosome and Plasmids DNA and determination of the sizes of the resulting restriction fragments |
| **(2)** | Basic tools in Genetic Engineering<br>Restriction analysis of chromosome and Plasmids DNA and determination of the sizes of the resulting restriction fragments |
| **(3)** | Basic tools in Genetic Engineering<br>DNA ligation |
| **(4)** | Elution of DNA fragments from agarose gel |
| **(5)** | Principle of Recombinant DNA technology<br>DNA sub cloning and *E.coli* Competent cells (JM109) Transformation |
| **(6)** | Principle of Recombinant DNA technology<br>Plasmid DNA Minipreparation |
| **(7)** | Principle of Recombinant DNA technology<br>Analysis of plasmid DNA samples |
| **(8)** | **Midterm** |
| **(9)** | Polymerase Chain reaction (PCR) and Biotechnology<br>Melting point Determination of the Oligonucleotides (primers) |
| **(10)** | Polymerase Chain reaction (PCR) and Biotechnology<br>Analysis of a single Alu repeat of the PV2 locus on chromosome16<br>DNA Template preparation<br>PCR amplification |
| **(11)** | Polymerase Chain reaction (PCR) and Biotechnology<br>Electrophoresis of amplified PCR<br>Analysis and interpretation of results |
| **(12)** | Polymerase Chain reaction (PCR) and Biotechnology<br>Continue: Data AnalysisThe Hardy-Weinberg equation<br>**Analysis of Classroom Data using Bioinformatics** |
| **(13)** | **Final Examination** |

**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**

**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