



Philadelphia University
Faculty of Science
Department of Biotechnology & Genetic Engineering

Course Syllabus

Course Title: Bioinformatics	Course code: 0240462
Course Level: 4 th Year	Course prerequisite (s): 0240231 & 0240335
Lecture Time:	Credit hours: 2

Academic Staff
Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Tawfiq Froukh	Assis.Prof.			tfroukh@philadelphia.edu.jo

Course module description:

This module introduces the fundamental principles of bioinformatics and uses this knowledge to tackle research problems. It covers major databases and software programs for genomic data analysis, with an emphasis on the theoretical basis and practical applications of these computational tools. The course is organized into four main sections: biological databases, sequence alignment, molecular phylogeny, and human genome.

Course module objectives:

This module aims to make the students familiar with the molecular databases and the associated software of analyses.

TEXT Books Bioinformatics and functional Genomics. Jonathan Pevsner. 2nd ed. 2009. Wiley-Blackwell.

Reference: From Genes to Genomes. Jeremy W. Dale, 3rd ed. 2012. Wiley-Blackwell

Teaching methods:

Lectures and practical applications on PCs in the computer lab

Learning outcomes:

- Knowledge and understanding

The students will become familiar with various computational possibilities for modern molecular biological research.

- Practical and subject specific skills (Transferable Skills).

The students will be able to use variable software to analyze genetic data such as DNA and protein sequences.

Assessment instruments

Quizzes & Homework

Final examination: 40 marks

Allocation of Marks	
Assessment Instruments	Mark
First examination	20%
Second examination	20%
Final examination: 50 marks	40%
Quizzes & Home works	20%
Total	100%

Course/module academic calendar

Week	Topics to be covered	PP.
(1)	-Introduction and Review (DNA structure, protein structure, Sanger method of sequencing, Next Generation Sequencing) -Editing DNA sequence files	
(2, 3)	Chapter 2: Access to Sequence Data and Literature Information -GenBank -NCBI and EBI -Access to information: Accession numbers; Entrez; Protein databases; Genome browsers; Biomedical literature	13-42
(4,5)	Chapter 3: Pairwise Sequence Alignment: -Introduction -Algorithms	47-57
		75-86
1st exam		
(6,7)	Chapter 4: Basic Local Alignment Tool (BLAST) -BLAST search Steps -BLAST search strategies	101-114 123-134
(8)	<i>Chapter 5 :Advanced Database Searching (in brief)</i> -Specialized BLAST sites -PSI Blast -Profile Search -BLAST like Alignment Tools to Search Genomic DNA rapidly -Using Blast for gene discovery	141-174 (in brief)
(9)	Chapter 6: Multiple Sequence Alignment -Introduction -Approaches to multiple sequence alignment (in brief) - Databases of multiple sequence alignment (in brief)	179-184 184-197 203-207
(10,11,12)	Chapter 7: Molecular Phylogeny and Evolution	215-271
2nd exam		
(13,14,15)	Chapter 19 : Human Genome Chapter 20: Human Disease	791-883
(16)	Final Exam	