Course Title: Introduction to Bioinformatics
Lecturer: Noha A. Yousri
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Level: Graduate

Course Objectives:
Introducing molecular biology basics, sequence alignment algorithms, phylogeny, searching in sequence databases, gene finding, micro-arrays and gene expression analysis,and introducing gene networks and protein folding problems.

References:

- David Mount, Bioinformatics: Sequence and Genome Analysis. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 2001.

- Richard C. Deonier, Simon Tavaré, Michael S. Waterman , Computational genome analysis: an introduction.

- Richard Durbin, Sean R. Eddy, Anders Krogh, Graeme Mitchison, Biological Sequence Analysis: Probabilistic models of proteins and nucleic acids, Cambridge University Press, 1998 (ISBN: 0521629713)

Course Contents:

1-Introduction to molecular biology
(cells, DNA, RNA, genes, proteins, transcription translation, amino acids, etc)

2-Sequence Alignment
Finding similarities between DNA or protein sequences.
A-Pair-Wise Alignment
Dot matrix, dynamic programming, scoring methods, etc
B-Multiple Alignment
-Progressive methods, iterative methods
-Motif, profile finding

3-Phylogeny
Finding families of proteins/genes

4-Searching sequence Databases
BLAST, FASTA, etc..

5-Gene Finding
Finding coding regions (genes) in DNA

6-DNA Microarray Data Analysis
Gene expression analysis: pre-processing, clustering, etc.

7-Introduction to Protein Folding

8-Introduction to Gene networks

Grading Scheme:

Assignments: 50%
Project: 50%