CMPE 59H
Bioinformatics
Spring 2015

This course will provide an introduction to Bioinformatics and the primary methods for data and text mining for computational biology.

Course Objectives:
- Understand the fundamentals of the field of bioinformatics.
- Learn the main bioinformatics problems.
- Learn the main tools and methods used in bioinformatics.
- Design and apply computational methods to biological data.
- Read/present/review papers on state-of-the-art research in bioinformatics.
- Prepare for original research in bioinformatics.

Prerequisites: Medium level programming skills in any high level programming language
(e.g. C/C++, Java, Perl, Python, Matlab, etc.)

Textbooks (Optional):
- N. C. Jones and P. A. Pevzner, An Introduction to Bioinformatics Algorithms, MIT press, 2004.
- M. Zvelebil and J. O. Baum, Understanding Bioinformatics, Garland Science, 2008.

Course Web Site:
We will use the Moodle Course Management System for lecture notes, announcements, grades, and project submissions: http://moodle.cmpe.boun.edu.tr/

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Tentative List of Topics:
- Review of relevant background material from molecular biology
- Dynamic Programming
- Pairwise Sequence Alignment
- Multiple Sequence Alignment
- Exact Pattern Matching and Suffix Trees
- Heuristic Sequence Similarity Search Algorithms (FASTA and BLAST)
- Microarray data analysis, Clustering and Classification Algorithms
- Phylogenetic Trees
- Introduction to Biological Networks
- Text mining for biology

Grading:
- Assignments: 20%
- Midterm Exam: 20%
- Paper summaries: 10%
- Paper presentation: 15%
- Term Project: 30%
- Class Participation: 5%