CMPE 549
Bioinformatics
Fall 2019

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 and algorithms proposed to solve them.
- 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, etc.), background on data structures and algorithms.

Textbook (Optional):
- P. Compeau, P. Pevzner. Bioinformatics Algorithms: An Active Learning Approach, 3rd Edition. 2018. (Volume 1 and 2 of the Second Edition is also fine.)
Supplementary website: http://bioinformaticsalgorithms.com

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

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Tentative List of Topics:
- Review of relevant background material from molecular biology
- Dynamic Programming and Sequence Alignment
- Motif finding and Randomized Algorithms
- Combinatorial Pattern Matching and Suffix Trees
- Heuristic Sequence Similarity Search Algorithms (FASTA and BLAST)
- Graph algorithms and genome assembly
- Gene expression analysis, Clustering and Classification Algorithms
- Phylogenetic Trees
- Text mining for biology

Grading:
- Assignments: 30%
- Midterm Exam: 25%
- Tool/Resource presentation: 15%
- Term Project: 30%