

CS 5263 Bioinformatics, Fall 2008

Syllabus

Description

This course is a survey of algorithms and methods in bioinformatics and computational biology, approached from a computational viewpoint. Topics covered include: sequence comparison (dynamic programming), motif finding (combinatorial algorithms, stochastic heuristic search algorithms, suffix trees), gene prediction (Hidden Markov Models), RNA structure prediction (stochastic context free grammar), microarray analysis (statistics, data mining), and gene network/pathway analysis (graph algorithms).

Time: MW 7:00-8:15PM

Place: HSS 3.03.20

Instructor: Jianhua Ruan

4.01.48 SB

Tel: 210-458-6819

Fax: 210-458-4437

Email: jruan@cs.utsa.edu

www: http://cs.utsa.edu/~jruan/teaching/cs5263_2008

Office hours: MW 2:00-3:00 PM

Recommended text books:

- An Introduction to Bioinformatics Algorithms by Jones and Pevzner
- Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids by Durbin, Eddy, Krogh, and Mitchison
- Additional readings including chapters from other textbooks, journal papers, and review articles will be handed out in class or posted on course homepages

Prerequisites

There are no formal prerequisites for the course. However, fundamental understanding of data structure and algorithms, programming experience in at least one programming language (C/C++/Java/Perl/Matlab), as well as some knowledge of probability and statistics are expected. Some prior exposure to molecular biology is preferred, but not required.

Grading policy

- 10% Attendance
- 50% homeworks

- 40% Final project

At most 2 classes missed without affecting grade.

Late assignments will not be accepted and a score of zero will be given.

Tentative lecture topics

Topics	Number of weeks
Introduction to molecular biology	1
Pairwise sequence alignment	2
Multiple sequence alignment	1
Hidden markov models and gene predictions	1.5
String matching algorithms and applications	1.5
Motif finding	2
RNA structure	1
Phylogeny	1
Microarray data analysis	2
Biological networks	1