EECS 730 Introduction to Bioinformatics

Instructor: Cuncong Zhong
Office: 2026 Eaton Hall
Hours: TR 11:00-12:15 LEA 2111
Email: cczhong@ku.edu
Webpage: TBD
Office hours: TBD

Summary

Bioinformatics in an interdisciplinary field that develops computational methods and computer software to analyze biological data and answer biological questions. It provides a slew of cutting edge computational problems, challenging the mathematicians and computer scientists. It is also a must-have skillset for modern biologists, as the size of biological data has grown beyond what anyone can handle manually.

The major objective of this course is to expose the students to a wide range of bioinformatics research area and nurture their own research interests in bioinformatics. The course will also prepare the students with mandatory theoretic background and technical skills to conduct further bioinformatics research.

Topics

- Biological sequence alignment and database search
- Hidden Markov Model for sequence annotation and gene discovery
- Non-coding RNA structure prediction and comparison
- Protein structure prediction and comparison
- Molecular evolution and the tree of life
- Principle of genetics and molecular diagnosis
- Microarray technology and gene expression pattern analysis
- Next-generation sequencing technology for whole genome and transcriptome analysis
- Mass-spectrometry technology for proteomics and transcriptomics

Prerequisite

EECS 660 (Fundamentals of Computer Algorithms) and BIOL 150 (Principles of Molecular and Cellular Biology), or consent of instructor.

Textbooks

All textbooks are **optional**. Mandatory materials will be posted on the course website.

The recommended textbooks are:

- *An Introduction to Bioinformatics Algorithms*, by Jones and Pevzner, MIT press, 2004, ISBN-13 978-0262101066
- *Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids*, by Durbin *et al.*, Cambridge University Press, 1998, ISBN-13 978-0521629713
- *Algorithms on Strings, Trees, and Sequences*, by Gusfield, 1997, Cambridge University Press, ISBN-13: 978-0521585194

Grading

Attendance 10%; Homework 40%; Mid-term 20%; Final 20%; Presentation 10%
A: >=90%; B: 80-89%; C: 70-79%; D: 60-69%; F: below 60%

Late assignments

Unless you have a previously approved excuse, the submission of late assignments is strongly discouraged. Late penalties: you lose 25% of your scores if the assignment was delayed by one day, 50% for two days, and 75% for three days. No late assignment will be accepted after three days.

Academic misconduct

The department, school and university have very strict guidelines regarding academic misconduct. Obviously, copying is not allowed on exams. Students are expected to submit their own work on individual programming projects. Lending or borrowing all or part of a program from another student is not allowed. Instances of cheating will result in a loss on one letter grade in the course and referral to the department chairman and the dean of engineering. If a second case of academic misconduct is reported in any class, a dismissal hearing may be initiated by the dean of engineering.