

EECS 730 Introduction to Bioinformatics

Instructor:

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Hours: 11:00-12:15 MW @ LEA 3154
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Catalog Listing:

This course provides an introduction to bioinformatics. It covers computational tools and databases widely used in bioinformatics. The underlying algorithms of existing tools will be discussed. Topics include: molecular biology databases, sequence alignment, gene expression data analysis, protein structure and function, protein analysis, and proteomics.

Prerequisites: EECS 560 and introduction to biology equivalent to BIOL 150, or consent of instructor.

Class Objectives:

1. Learn algorithms and databases in bioinformatics
2. Gain knowledge and hand-on experience of bioinformatics tools
3. Understand the interaction between computer science and modern biology within the context of data-driven knowledge discovery

Text Book:

There is no official text book for the class. Reading materials will be posted online at the class's homepage. Major references are:

Biological Sequence Analysis by R. Durbin, S. Eddy, A. Krogh, G. Mitchison, Cambridge, 1st edition, 1999, ISBN-10: 0521629713

Bioinformatics, Sequence and Genome Analysis, by David Mount, Cold Spring Harbor Laboratory Press, 1st edition, 2001, ISBN-10: 0879696087

Grading:

Take home background survey	1pt
Homework: 4 homework assignments	20pts

Midterm Exam: two midterms	30pts
Final Project: one team project	19pts
Final Exam: one final	25pts
Class participation	5pts
Total:	100pts

We will use the following scale to assign final grades (tentative and curving will be used):

A:	over	90%
B:	80%	89%
C:	70%	79%
D:	60%	69%
F:	below 60%	

Attendance:

I expect you to come to lectures on a regular basis. While you are in classroom, please show courtesy to your classmate. You are responsible for all announcements made in class. Generally I will be unwilling to answer questions about material covered in a class you missed (unless you were sick or had another legitimate excuse). Class participation is strongly encouraged.

Extra Credit:

Extra credits will be given to creativity and/or additional efforts shown in the team project and exams. Details will be given in the related assignments.

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. Students ARE allowed to borrow and modify any code on this class web site in their labs or programming projects. 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.

Class Contents (subject to change):

1. Introduction to bioinformatics and molecular biology
2. Statistical methods in biology
3. Pair-wise sequence alignment
4. Multi-sequence alignment
5. Sequence databases and database search
6. Protein structure: an introduction
7. Protein structure alignment
8. Protein structure prediction
9. Chemical biology and drug discovery
10. Introduction to molecular cell biology
11. Gene expression
12. Gene expression data analysis
13. Gene ontology
14. Introduction to computational systems biology