Course Syllabus
EECS 600: Systems Biology & Bioinformatics
Fall 2008

Objectives

This course provides an overview of bioinformatics approaches in making sense of diverse biological data sources (sequences, gene expression, protein expression, interactions and pathways, metabolomics). It targets students from mathematical/computational sciences and engineering, as well as life sciences. It is expected that, upon completion of this course, the students will be familiar with current models and abstractions used in describing biological systems and state-of-the-art methods in analyzing biological data. The course work is designed to encourage critical thinking and research initiatives by students.

Course Format

The course includes lectures by the instructor, student presentations, in-class discussions, small assignments, a term project, and guest lectures.

Course Webpage

All of the reading material and other important information about the course is posted at `http://vorlon.case.edu/~mkx331/teaching/eecs600/`.

Instructor

Mehmet Koyutürk
Office: Olin 512
Phone: (216) 368-2963
Email: koyuturk@eecs.case.edu
Office hours: TTh 1:30 – 2:30 PM; walk-ins and appointments are also welcome.

Class Meeting

TTh 2:45 – 4:00 PM, WICK 306

Prerequisites

No prerequisites are required. Since the target audience is interdisciplinary, the course is designed with assumption of minimal knowledge in computer science and biology.

Course Material

No textbooks are required for this course. The course material is composed of recent research and survey papers selected by the instructor, as well as the students themselves. The survey papers are intended to provide an overview about each topic and they will be incorporated into the lectures by the instructor. The research papers will be used to facilitate in-depth discussions about cutting-edge methods and they will be presented by the students. A preliminary selection of survey and discussion papers are available in the course website. The students are strongly encouraged to contribute to the selection of reading material.

Course Work & Grading

Paper Presentation/In-class Discussion: Each student will present and facilitate the discussion of one or two research articles throughout the semester. All students are expected to participate in these discussions (20%).

Assignments: There are four assignments that will allow the students to get hands on experience on small samples from real datasets related to systems biology. (30%).

Project: The students will prepare small proposals that describe their approach to a particular problem of their choice. The proposals are expected to provide comprehensive review of the current state-of-the-art on the selected topic, in-depth discussion to motivate/illustrate the proposed approach, and preliminary results to demonstrate that the idea has potential. The proposals will be double-blindly reviewed by other students, as well as the instructor, and discussed in the class. The students are strongly encouraged to prepare their proposals in groups, preferably with interdisciplinary backgrounds (50%).

Calendar

Week	Topics	Event
1	Introduction to Molecular & Systems Biology	Assignment 1 Out
2	DNA Microarrays, Gene Expression Data Analysis	
3	Molecular Networks: Metabolic Pathways, Gene Regulation	Assignment 1 Due
4	Molecular Networks: Cellular Signaling, Protein-Protein Interactions	Assignment 2 Out
5	Topology of Molecular Networks	Suggested Proposal Topics Out
6	Computational Analysis of Molecular Networks	Assignment 2 Due
7	Dynamics of Molecular Networks	Assignment 3 Out
8	Dynamics of Molecular Networks – Discussion Papers	Assignment 4 Out
9	Molecular Networks, Phenotype, & Disease	Assignment 3 Due
10	Molecular Networks, Phenotype, & Disease – Discussion Papers	Proposal Drafts Due
11	Molecular Networks, Phenotype, & Disease – Discussion Papers	Instructor Reviews Out
12	Proteomics and Systems Biology	Final Proposals Due
13	Proteomics and Systems Biology – Discussion Papers	Proposal Reviews Due
14	Discussion/Defense of Proposals	Assignment 4 Due