Computing Science Course Outlines

CMPT 711 - G100 Bioinformatics Algorithms

Instructor(s): Kay C Wiese

Calendar Objective/Description:
Bioinformatics Algorithms

Instructor's Objectives:
This is an introductory course on fundamental algorithmic techniques used to solve computational problems encountered in molecular biology. The course will investigate both traditional deterministic algorithms such as dynamic programming as well as machine learning and AI methods in Computational Biology. We will focus on practical algorithmic solutions as well as theoretical challenges.

Students need to have access to a computer, web-cam, and mic and a sufficiently stable internet connection as most content will be delivered online. Lectures will be given in live mode with an opportunity for students to interact. Lectures will also be recorded and posted.

Prerequisites:
see go.sfu.ca

Topics:
- Molecular biology basics
- Public Databases and Tools
- Sequence Analysis (local and global alignments)
- Multiple Sequence Alignments
- Dynamic Programming
- Markov Chains and Hidden Markov Models (HMMs)
- Sequence Similarity Search
- RNA secondary Structure Prediction
- Thermodynamic Models
- Machine Learning: Evolutionary Computation, Neural Networks

Grading:
There may be assignments, a midterm, a project and/or a final exam. Details will be discussed in class in the first week of classes.
Students must attain an overall passing grade on the weighted average of exams in the course in order to obtain a clear pass (C- or better).

Required Books:

Recommended Books:

Academic Honesty Statement::
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).