Computing Science Course Outlines 2019 Fall

CMPT 711 - G100 Bioinformatics Algorithms

Instructor(s): Kay C Wiese

Calendar Objective/Description:
Fundamental algorithmic techniques used to solve computational problems encountered in molecular biology. This area is usually referred to as Bioinformatics or Computational Biology. Students who have taken CMPT 881 (Bioinformatics) in 2007 or earlier may not take CMPT 711 for further credit.

Instructor’s Objectives:
This is a 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. The course will have a project based on student’s choice.

The course satisfies the “Area I - Theory” requirement.

Prerequisites:
None

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:
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). Details will be discussed in the first week of classes. There will be assignments and a project and also a midterm 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).