CMPT 441 - D100 Computational Biology

Instructor(s): Kay C Wiese

Calendar Objective/Description:
Computational Biology

Instructor's Objectives:
This is an upper division 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.

Please note that due to the evolving Covid 19 situation there may be required changes to the course delivery.

As of May 26, 2021, the university has announced its plan for approximately 70-80% of teaching in person in Fall 2021. It has also stated that: "not all courses will be delivered in person. The fall will be a transitional term. Deans, supported by the work of chairs and directors, will make final decisions about whether courses will be taught remotely or in person."
Please continue to check our course outline for further information.

Should this course be taught remotely, students must have access to a computer with internet access, allowing the use of a conferencing system such as Zoom or BB Collaborate Ultra. Some components of the course will require synchronous (real-time) participation during the scheduled lecture and/or exam times. Visual proctoring may be required, subject to university approval.

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 will be assignments, a midterm, and 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).