

# MOLECULAR BIOLOGY AND BIOCHEMISTRY

## MBB 441-3

### Bioinformatics

### DAY Fall 2012

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**Instructor:** Dr. F.S.L. Brinkman, Office: SSB 7110

**Description/topics:** An introduction to bioinformatics, which is loosely defined as the intersection between the fields of molecular biology and computer science. This course, which is geared for biologists (and complements computational biology courses in computing science), consists of 10 lectures describing major topics in bioinformatics. Each lecture is followed by a hands-on computer lab session, which provides an opportunity to use and experiment on bioinformatics software and databases in current genomic and bioinformatic-based research. There are additional lecture sessions, in which graduate students (MBB741 students) present recent progress in bioinformatics for selected topics.

#### **Course Structure:**

Approximately one week will be devoted to each of the following topics:

1. What is bioinformatics? An overview of history and future
2. Biological data models and bioinformatics databases
3. Sequence alignment and searching
4. Sequence alignment and searching – BLAST
5. Gene identification
6. Multiple-sequence alignment and molecular evolution
7. Phylogenetic analysis
8. Protein analysis
9. Genome analysis
10. Systems Biology
11. Current topics in bioinformatics – student presentations I
12. Current topics in bioinformatics – student presentations II

**Grading:** Lab assignments worth a total of 40% of the final mark will be given and there will be a written final exam (40% of final mark). One larger lab assignment/project worth 20% of your final mark will be evaluated at the end of term that involves web-based presentation of a series of computational analyses developed that deal with answering a biological question.

**Text** None. Relevant articles as supplementary reading material will be provided.

**Prerequisite/corequisite:** Completion of MBB 331 (or BISC 331 or other demonstration of adequate knowledge of genetics), and one introductory computer programming course (e.g. CMPT 101, CMPT 102, CMPT 104, CMPT 110, or equivalent).

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