



Essential Bioinformatics

BIOL 580: Spring 2007

Computer Applications for the Life Sciences (3 credits)

001 14483 Monday 4:30 – 7:10 PM Innovation Hall Rm. 326

Jin Xiong

Instructor: *Alexei Samsonovich*

Text: Jin Xiong (2006) Essential Bioinformatics (Paperback), 339p. New York: Cambridge University Press. \$55 / \$37.

As a field, bioinformatics is expanding and developing at an extremely rapid rate. This up-to-date course will cover the basics of bioinformatics, including methods and software tools. The objectives are:

- to understand the basis of molecular biological data,
- to become familiar and comfortable with data analysis tools,
- to be able to identify the appropriate tools to solve bioinformatics questions.

Students will learn what computer applications and databases are available and how to use them. Students do not need to know how to write applications. Accordingly, the text is easy to read for undergraduate students who are new to bioinformatics and have no computational background. Specifically, the following topics will be covered:

- Introduction: what is bioinformatics?
- The central dogma of molecular biology, genomes and genomics
- Biological databases, database similarity
- Sequence search and analysis (alignment, comparison)
- Molecular phylogenetics

The course will proceed as a seminar, in which a substantial fraction of the material will be presented by students. As a part of their coursework, students will be asked to complete their own research projects. **One-page project proposals must be approved by the instructor before the Spring Break.**

Methods of instruction and evaluation: lectures, hands-on exercises, assignments (50%), project (50%). Collaboration among students in their work on the projects is acceptable; however, any particular arrangement of a collaborative work on a project needs to be approved by the instructor. In contrast, students are supposed to work on their in-class or homework assignments individually (copying is not allowed) and should only use the approved sources of information in this case.