

CS 368 Introduction to Bioinformatics (Fall 2011)

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Office Hours: 1:00PM to 4:00PM on Monday and Thursday; 2:00PM to 4:00PM on Tuesday and Wednesday; and by appointment

Textbook: Fundamental Concepts of Bioinformatics, by Krane and Raymer

Recommended Reference: Beginning Perl for bioinformatics, by Tisdall

Course Web Site: <http://cs.winona.edu/lin>

Course Description

This course introduces students to the fundamental concepts of bioinformatics. Topics include introduction to DNA machinery and informatics, pairwise sequence alignments, bioinformatics programming, bioinformatics tools and database searches, genomics and proteomics, and introduction to DNA microarray analysis. *Prerequisites:* CS 250 (RCTC's COMP 2247) Algorithms/Problem Solving II, AND BIOL 241 (RCTC's BIOL 1220) Basics of Life

Synopsis

This course studies the principles of solving problems pertinent to genetics/genomics using computer science and technologies. Topics include fundamental molecular biology and genomics; dynamic programming and sequence alignment algorithms; basic local alignment search tool (BLAST); comparative genomics and phylogenetic trees; gene recognition; genome access tools and databases; bioinformatics programming in PERL; proteomics; and microarray technology. Advanced topics will also be introduced if time allows.

Grading

Grades are based on the total of the following coursework categories: homework assignments, programming assignments and labs (35%), two exams (40%), projects (20%), and in-class participation (5%). Distributions are as follows:

- A: 90% or above, with at least a B or better on each coursework category
- B: 80% or above, with at least a C or better on each coursework category
- C: 70% or above, with at least a D or better on each coursework category
- D: 60% or above
- F: less than 60%

Course Objectives and Expectations

Upon entering CS 368, students should have

- Knowledge of fundamental algorithms and data structures
- Basic understanding of molecular biology

Upon completing CS 368, students should be able to

- Understand how computer science is applied to solving biological problems
- Gain knowledge of various areas in bioinformatics
- Read scientific articles in the field of bioinformatics
- Communicate with people in the field of life science
- Appreciate the contributions of computer science to the advent of life science
- Understand the fundamentals of data processing and analysis
- Write programs to solve simple bioinformatics problems

Lectures Notes

The lectures will utilize notes posted to the course website and written on the board in the class, and in-class discussions. Note that the set of notes posted to the website does not replace the lectures nor the textbook – its main purpose is to serve as the study guide. In particular, not everything discussed in the lectures is included in the notes. Similarly, not everything included in the notes will be discussed in the lectures.

User Group

The class user group serves as a major communication channel for the class. The instructor uses it to post announcements, course material updates, and other useful information. It is the student's responsibility to check the user group regularly so that no important messages will be missed. Students are also encouraged to use the user group to share information and exchange ideas.

Homework Policy

1. Each homework assignment is due by the time and date specified on the assignment handout.
2. **Late Work:** Two late assignments will be accepted without penalty, and a late assignment should be handed in within a week. After the

two late assignments, no additional late work will be given credit. The late policy is in place so that students will not be burdened to discuss each personal issue with the instructor. Thus, late assignments should be reserved for these types of situations. If a student has an issue that requires more than two late assignments, it is unlikely they will be successful in the course and they are encouraged to withdraw from the course.

3. **Plagiarizing is absolutely prohibited and will result in a grade of F for the course** according to the Computer Science Department's [Collaboration Policy Form](#) and [Illegal Collaboration Policy](#).

Attendance Policy

You are expected to be present for all class meetings. You are expected to treat each other and your instructor politely and with respect. This includes turning off all cell phones (or muting them), participating in class, and arriving in a timely manner. Please note that personal conversations and using your computer performing tasks unrelated to class during lecture and lab time are distracting to your fellow students.

Student Responsibilities

You are responsible for what goes in the class, including obtaining lecture material, assignments and handouts, turning in assignments, and taking exams. If you are unable to attend a class meeting, it is your responsibility to obtain class notes, assignments, and extra copies from your study partners, other students, or me; you may turn in assignments early or your study partners may turn them in for you on time. If, due to extremely unusual circumstances, you are unable to take an exam at the scheduled time, the exam may be rescheduled, but it is your responsibility to arrange this with the instructor in advance as early as possible. **An official documentation is required to justify taking an exam later than the scheduled time.**

Commitment to Inclusive Excellence

WSU recognizes that our individual differences can deepen our understanding of one another and the world around us, rather than divide us. In this class, people of all ethnicities, genders and gender identities, religions, ages, sexual orientations, disabilities, socioeconomic backgrounds, regions, and nationalities are strongly encouraged to share their rich array of perspectives and experiences. If you feel your differences may in some way isolate you from WSU's community or if you have a need of any specific accommodations, please speak with the instructor early in the semester about your concerns and what we can do together to help you become an active and engaged member of our class and community. The complete statement with resources is at [Inclusive Excellence Statement](#).