BIOCOMPUTING
CSCE 4810.001 / CSCE 5810.001
BIOL 4810.001 / BIOL 5005.008
MATH 4980.001/MATH 5700. 001

Course Information & Syllabus (Fall 2014)

Instructors: Armin R. Mikler & Rajeev Azad
Lectures: Tue 5:30pm – 8:20pm, NTDP B157
Office Hours (Mikler): M & Tu 9:30 – 11:00am or by appointment
Phone: 565-4279 **E-mail:** mikler@cs.unt.edu

Office Hours (Azad): F 9:00 −10:00 & 3:30 – 5:15pm at GAB 434 or by appointment
Phone: 369-5078 **E-mail:** Rajeev.Azad@unt.edu

TA: Joseph Helsing **Office:** F254 **Hours:** TBA

Class Web Page:

Textbook: An Introduction to Bioinformatics Algorithms, Neil C. Jones and Pavel A. Pevzner. MIT Press, 2004. URL: http://www.bioalgorithms.info

Recommended Text: Beginning Perl for Bioinformatics, James Tisdall, O'Reilly

Course Objective: We will study the principles and algorithms used to create computational analytical models for problems in the Life Sciences in general and Biology in particular. Genome sequencing projects, including the completed human genome project, continually generate large datasets of gene and protein sequences. Efficient and optimal analysis of this ever-growing dataset yield important knowledge and information that have direct consequences on the biological aspects. A broad range of topics will be studied to establish a basic understanding and appreciation of the issues and problems of computational biology. The course includes an applied component, which will you an introduction to programming for biological data and use of a range of web-based biocomputing utilities.

Biocomputing is inherently ***interdisciplinary*** and so are the assignments and projects given in this course. **YES,** the instructors are fully aware of the fact that students in this class may have little of no background in Biology or Computer Science. This is what makes this course challenging and fun. While students are expected to work on homework assignments independently, all projects shall be approached by interdisciplinary teams consisting of at least one Biology student and one Computer Science student.

Grading:

Assignments	20%
Projects	25%
Midterm (1)	15%
Final (1)	15%
Poster Presentation (1)	25%

The following is a list of topics we will attempt to cover during this course:

Week #	Description	Assignments
1	Computational Science – Introductory Discussion	
2-4	Molecular Biology – A gentle introduction	HW#1 Basic Molecular Biology
4-5	Introduction to the world of algorithms	
5-6	A (very) quick overview of PERL	HW#2 Perl Programming
7	DNA Restriction Maps	
8	Finding Regulatory Motifs	HW#3 Restriction Maps
9	Bioethics	Exam #1
10	Genome Rearrangements	Group Project
11-12	Dynamic Programming – Calculating Edit Distance	
13-14	Sequence Alignment	HW#4 Sequence Alignment
15	PROJECT PRESENTATIONS	
16	EXAM #2 (FINAL)	

Submission: All submissions, including assignments, projects and exams, shall be turned in electronically using the project command. Late submissions will not be accepted.

Graduate vs. Undergraduate Work: Since this is a combined course, *graduate* students will be assigned some additional assignments and projects as appropriate.

Attendance: Attendance will not be taken in class, but is expected. However, all students are responsible for everything done or said in class.

Plagiarism: Plagiarism of any kind will automatically result in a grade of F for the course.

Americans with Disabilities Act: We cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you require accommodation please discuss your needs with the instructor or submit a written Accommodation Request on or before the fourth class day.