Course Syllabus
BIOL 358 Computer Skills for Biotechnology
Spring 2006

Class Hours: Monday 17:00-20:15 (Sec 01; CRN 21487)
Classroom: SCI2 308
Instructor: Patrick Sebrechts, Computer Science Department
Office and Office Hours: SCI2 237
E-mail: patrick@csusm.edu
Home Page: http://www.csusm.edu/patrick
Phone: 760.943.9121

Materials:
The course website is http://www.bioinformaticscourses.com/BIOL358. All lecture notes and other course materials, including a list of recommended books will be made available at this location.

Course Objectives:
This course is designed to introduce and explain the application of computational and analytical methods to address problems in biotechnology. Many popular software tools employed in biotechnology and bioinformatics research will be covered. The theoretical basis governing the use and importance of these tools will be explored.

Disabled Student Services:
Students with disabilities who require academic accommodations must be approved for services by the Office of Disabled Student Services (DSS) located in Craven Hall 5205. DSS can be contacted by phone at 760.750.4905 or TTD 760.750.4909. Students authorized by DSS to receive accommodations should meet with me in a private setting to ensure your confidentiality.

Grades:
Grades will be assigned based on three projects, each of which is due at the end of each section, as per the syllabus below. There will be no mid-term and no final; however students are required to present their final projects during the last session of class.

Important Dates:
First day of class: Monday, 23 January 2006.
Last day of class: Monday, 1 May 2006.
Course Outline

Section I – Essential Basics
- Computers & the Internet
- HTML, CGI & Web Services
- Operating Systems & UNIX
- Relational Databases
- Perl & Other Programming Languages

Section II – Introduction to Bioinformatics
- NCBI Entrez
- The BLAST Algorithm
- Using BLAST online
- ORF Finder
- GENSCAN
- Principles and use of PSI-BLAST
- Multiple Sequence Alignments with ClustalW
- Protein analysis (Prosite, Pfam, PRINTS, Blocks)

Section III – Introduction to Structural Bioinformatics
- The Protein Data Bank
- Visualization with Rasmol & Chime
- Secondary Structure Calculation (Kabsch/Sander)
- Structure Classification (SCOP & CATH)
- Structure Determination
- Basic Geometry
- Structure/Function Assignment
- Structure Alignment
- Structure Prediction
- Protein Folding
- Protein/Ligand Docking
- Molecular Dynamics