COURSE SYLLABUS

**Overview**

* Course Meets: MW 2 pm– 3:50 pm Instructors: Dr. M. A. Smith
* Office Phone: 285-2160
* Office Hours MW 4-5 pm TR 1-3
* Email Address: smithma@ncat.edu

Textbooks

* Supplemental *Textbook: Pevsner, Bioinformatics and Functional Genomics*
* *Hartwell et al. Genetics From Genes to Genomes*

Course Description: This course provides an introduction to select topics in genomics and bioinformatics, and focuses on the use of an array of biological databases and bioinformatics tools used for the retrieving and analyzing sequence data of DNA, RNA, proteins and genomes.

**Learning Objectives**

* The goal of this course is to enhance the potential of students to use bioinformatics tools in research and to make new discoveries in the area of genomics.
* Undergraduate Learning Objectives and Outcomes:
1. Use computers to access and retrieve biological information from a variety of databases and literature sources.
2. Apply quantitative methods for comparative sequence analysis (algorithms and scoring matrices, phylogeny, homology modeling) to show evolutionary relationship.
3. Use computers and bioinformatics tools to study a gene annotation research problem.
Graduate Student Learning Objectives and Outcomes:
1. Use computers to access and retrieve biological information from a variety of databases and literature sources.
2. Apply quantitative methods for comparative sequence analysis (algorithms and scoring matrices, phylogeny, homology modeling) to show evolutionary relationship.
3. Use computers and bioinformatics tools to study a gene annotation research problem.
4. Apply bioinformatics skills and literacy to produce an oral and written report on a protein family sequence analysis research project.

Evaluation

Evaluation: Student evaluation will be based on laboratory exercises, exams, class participation and project. The grading scale for undergraduate students is as follows:
Participation (progress on exercises) 25%
Short Reports 25%
Test/Quizzes 25%
Final Report 25%
100%
The graduate student grading scale varies slightly to include credit for a special project requirement. The grading scale above will be adjusted to allow graduate students to earn a maximum of 80% of their grade on those items and 40% for their final project. All students will maintain a lab manual to record results of all readings and computer laboratory assignments. This manual will be used to evaluate participation in class and in the computer lab. At the end of the semester, all students will give an oral presentation of their projects which involve using bioinformatics learned during the course of the semester.

**SCHEDULE**

DAY / DATE LECTURE AND/OR COMPUTER LABORATORY TOPICS
M Jan 14 Introduction to the course/ Bioinformatics
W Jan 16 Lecture: Sequencing
Computer Laboratory Exercise- Comparative study of sequencing technologies
M Jan 21 No class: Holiday
W Jan 23 Lecture: Access to Sequence Data and Literature
M Jan 28 Computer Laboratory Exercise NCBI Pubmed
W Jan 30 Computer Laboratory Exercise NCBI Navigation
M Feb 04 Lecture –Pairwise Alignment
W Feb 06 Computer Lab - Scoring Matrices (Needleman-Wunch,)
M Feb 11 Lecture –Pairwise Alignment (cont’d)
W Feb 13 Computer Lab - Scoring Matrices (Smith Waterman)
M Feb 18 Lecture- Basic Local Alignment Search Tool (BLAST)
W Feb 20 Computer Lab – Detecting and Interpreting Genetic Homology
M Feb 25 Exam
W Feb 27 Lecture - Introduction to Gene Annotation Project
M Mar 04 University Holiday (Spring Break)
W Mar 06 University Holiday (Spring Break)
M Mar 11 Lecture – Annotation (tools and databases)
W Mar 13 Guest Lecturer- Driving Heterogeneity in Biofilms
M Mar 18 Lecture and Computr Lab – Gene Finding Exercise
W Mar 20 Computer Lab- Annotation ( Apply Genescan and analyse)
M Mar 25 Lecture- Annotation (Strategies)
W Mar 27 Computer Lab Simple Annotation Problem
M Apr 01 Computer Lab – Annotation Project (Annotation Using Gene Finder)
W Apr 03 Computer Lab: Computer Lab (Annotation, BLAST & Finding Coordinates)
M Apr 08 Computer Lab –Computer Lab (Annotation, BLAST & Finding Coordinates)
W Apr 10 Computer Lab –Using Model Checker
M Apr 15 Computer Lab – (trouble shooting annotation projects)
W Apr 17 Computer Lab –Guest Lecturer - Bioinformatics and Genomic Medicine
M Apr 22 Computer Lab: (trouble shooting annotation projects)
W Apr 24 Lecture/lab –Preparing Labratory Reports
M Apr 29 Computer Lab – Preparing Labratory Reports
W May 01 Computer Lab – Post-Survey & Post Exam
Final Exam
Note: The schedule is subject to change.

Syllabus

North Carolina A&T State University: BIOL 640 - Spring 2013

Category:Faculty