

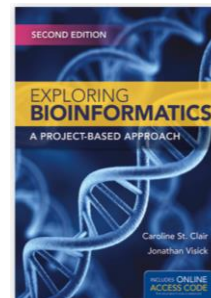
Bio 5280/7280: Bioinformatics

Instructor

Dr. Weilong Hao, BSB 5107.1, Phone: 577-6450, Email: haow@wayne.edu

Text book

Exploring Bioinformatics - A project-based approach
by Caroline St. Clair and Jonathan E. Visick
(see cover on the right)



Lecture time: 2:30-3:45pm Tue and Thr; 0174 Old Main

Purpose

This course is to introduce undergraduate and graduate biology students to the field of bioinformatics.

Course requirements

A familiarity with biology, basic biochemistry, genetics. It is assumed that students have basic training in computation and statistics. All students should be able to access computers and Internet. *Some homework assignments are in the form of classroom discussion/activities, therefore require physical presence.*

Prerequisite

Bio 3070 Genetics & Bio 3100 Cellular Biochemistry or equivalents.

Course objective

The course will familiarize students with computational methods of sequence analysis, which serves as the foundation of comparative genomics. By the end of the course, students will have understanding of the methods related to sequence and genomic analysis, and will be able to apply bioinformatic tools to carry out these analysis.

Grading (total: 1000)

BIO5280

Midterm 1: 250
Midterm 2: 250
Final exam: 250
Home work (due on Tuesdays): 100
Class presentation: 100
Attendance: 50

BIO7280

Midterm 1: 250
Midterm 2: 250
Final exam: 250
Home work (due on Tuesdays): 100
Project presentation: 100
Attendance: 50

The final letter grade will be determined as follows:

Percentage

90.00%- 100%
87.00%- <90%
85.00%- <87%
78.00%- <85%
75.00%- <78%
73.00%- <75%
65.00%- <73%
62.00%- <65%
60.00%- <62%
57.00%- <60%
55.00%- <57%
<55%

Final Grade

A
A-
B+
B
B-
C+
C
C-
D+
D
D-
F

Cheating

- A strict zero-tolerance policy for cheating will be enforced.
- Anyone caught cheating on an exam will receive a score of 0 (zero) for that portion of the grade.
- Students found to be cheating during an exam (using a “cheat sheet”, looking at another’s paper, or allowing another to look at yours), will receive a zero for that test with no opportunity to drop or replace that score.
- A second episode of cheating will result in a grade of F for the course and may also result in initiation of university disciplinary action.

Posting of Exam Grades

Exam grades will be posted on Black Board by Student ID Number as soon as possible after the exam has been administered. The distribution of scores will also be provided in class.

Special Considerations for Individuals with Disabilities

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs.

Religious Holiday Conflicts

- If you have a conflict with any of the scheduled class or exam times due to religious reasons, you must notify Dr. Hao in writing by class time on **Jan 25, 2020**.
- No make-up exams will be given unless s/he is notified in writing by this date.

Unexpected university closures

If the University is officially closed on an exam day, the exam will be held on the next regularly scheduled class day.

Others

- I am happy to write letters of recommendations for students who earn a grade of B+ and better.
- Please turn all cell phones off during class and during exams.
- Any specific issue not covered by this syllabus will be resolved using University policies.
- Disputes that cannot be resolved following the guidelines present in this syllabus will be resolved by following the guidelines of the University “Student Due Process”.

Add/Drop Policy

Add forms will not be signed after the second week of class.

- Drop forms must be signed before the end of “study day”, which is the day after the last day of classes.

Tentative Schedule

Week 1:

Chapter 1 Bioinformatics and Genomic Data: Investigating a Complex Genetic Disease (Jan 7)
Chapter 1 ..Continued (Jan 9)

Week 2:

Chapter 2 Computational Manipulation of DNA: Genetic Screening for Disease Alleles (Jan 14)
Chapter 2 ..Continued (Jan 16)

Week3:

Chapter 3 Sequence Alignment: Investigating an Influenza Outbreak (Jan 21)
Chapter 3 ..Continued (Jan 23)

Week4:

Chapter 4 Database Searching and Multiple Alignment: Investigating Antibiotic Resistance (Jan 28)
Chapter 4 ..Continued (Jan 30)

Week5:

Chapter 5 Substitution Matrices and Protein Alignments: Virulence Factors in *E. coli* (Feb 4)
Chapter 5 ..Continued (Feb 6)

Week6:

Chapter 6 Distance Measurement in Molecular Phylogenetics: Evolution of Mammals (Feb 11)

Midterm 1 (Feb 13)

Week 7:

Chapter 7 Tree Building in Molecular Phylogenetics: The Three Domains of Life (Feb 18)
Chapter 7 ..Continued (Feb 20)

Week 8:

Chapter 8 DNA Sequencing: Identification of Novel Viral Pathogens (Feb 25)
Chapter 8 ..Continued (Feb 27)

Week 9:

Chapter 9 Sequence-Based Gene Prediction: Annotation of a Resistance Plasmid (March 3)
Chapter 9 ..Continued (March 5)

Week (March 10, 12 **spring break**) - no class

Week 10:

Chapter 10 Advanced Gene Prediction: Identification of an Influenza Resistance Gene (March 17)
Chapter 10 ..Continued (March 19)

Week 11:

Chapter 11 Protein Structure Prediction and Analysis: Rational Drug Design (March 24)
Chapter 11 ..Continued (March 26)

Week 12:

Chapter 12 Nucleic Acid Structure Prediction: PCR and RNAi (March 31)

Midterm 2 (April 2)

Week 13:

Project presentation #1 (April 7)
Project presentation #2 (April 9)

Week 14:

Project presentation #2 (April 14)
Project presentation #3 (April 16)

Final Exam: 2:45-4:45pm on April 23