Quantitative Biology and Bioinformatics
Course Information and Policies

Course:	01:447:302
Credits:	3
Semester:	Spring 2024
Classroom:	Nelson B125, in-person only
Meeting Times:	Tuesdays and Friday, 10:20-12:50, in person
Course Management:	**CANVAS**
Course Director:	Dr. Tara Matise matise@rutgers.edu Student Support Hours: by appt. - Nelson B410
Teaching Assistant:	Luna Wang Email: xw347@rutgers.edu Student Support Hours: TBD
Student Assistant:	Atharwa Musale
Instructors:	Dr. Tara Matise, Dr. Tim Stanek, Dr. Vikas Nanda, Dr. Wilma Olsen

Course Description: Quantitative Biology and Bioinformatics is a computer-based laboratory course that introduces students to the use of computers in biological research. Instruction is given in introductory computer programming while developing applications and analyses for problems in genetics and molecular biology. Classes consist of a mixture of lecture and computer-based exercises, as well as time for students to work on assignments. The course provides the introductory skills needed to conduct basic computational research in the life sciences, including many aspects of computer programming and data analysis. This course is designed for students with no prior programming experience. **Students with some programming experience, including in other coding languages, are also welcome, but should be aware that the pace is designed for beginners.**

This course is particularly aimed at students who plan to pursue research careers, attend graduate or medical school, or enter the biomedical/research workforce. The course fulfills the laboratory requirement for the Genetics major.

NOTE: Credit cannot be received for both 01:447:203 and 01:447:302

Course Goals: The Goals of Quantitative Biology and Bioinformatics reflect the learning Goals of the Department of Genetics, and include 1) knowledge specific goals: know the terms, concepts and theories in genetics; 2) integrate the material from multiple courses and research.

Department Learning Goals

https://genetics.rutgers.edu/academics/undergraduate/learning-goals

Last edited: 2016-11-16

Course Technology Requirements: All work will be done on the free Google CoLab web-based platform. During class you may either use PC computers located in the classroom or use your own laptop. You need access to a computer or laptop to use outside of the class periods. You will not need to install software, you will be able to access the course material and your saved material from any computer with an internet connection

Course Materials: No textbook is required as needed material is made available during class. One useful resource is:
Think Python eBook (free): http://greenteapress.com/wp/think-python/

Contacting the Instructors: The best way to contact the instructors is by email. **NOTE**: we get scores of email each day. To ensure your email is noticed, **be sure to** put "**447:302**" in your email subject header. We try to respond within 24 hours M-F.

Attendance: Attendance is expected at all classes; in-class demos and exercises and unannounced short are an integral part of this class. All classes build upon the material from a previous class, so it may be challenging to make-up work when class is missed. We also have unannounced quizzes.

If you must miss a class, please use the University absence reporting website https://sims.rutgers.edu/ssra/ to indicate the date and reason for your absence. An email is automatically sent to me. If you know dates you must miss in advance, such as for a graduate school interview, please discuss with me in advance.

On-time completion of all assignments is expected, including assignments given on, or due on, days you are absent. Homework is submitted in Canvas so you may submit even if you are unable to attend class.

Assignments, Due Dates, and Course Announcements: You are responsible for being aware of all assignment due dates, which are indicated for each assignment. **There are no late submissions**. All assignments are handed in via Canvas, so even if a class must be missed when an assignment is due, assignments can be uploaded online early. Arrangements can be made if serious illness keeps you from completing homework, however, in this case, you must contact me BEFORE THE HOMEWORK DUE DATE. **There is no extra credit or make-up work available for this class.**

Performance Expectations and Evaluation: The course is graded on the basis of homework assignments (65% of total grade), in-class quizzes and attendance (5%), a mid-term exam (10%) and the final exam (20%). The mid-term will cover the Python instruction segment and will consist of an open-notes programming problem for which you will have 24

hours to complete. The final exam is an open-notes cumulative exam that accounts for 20% of the final grade, and for which you will also have 24 hours to complete.

Grades will be calculated based on overall course performance. The following grading scale will be used: 90% A 87% B+ 80% B 77% C+ 70% C

D and F grades will be determined based on the final score distribution at the end of the course.

If warranted, Warning Grades will be given by the warning grade deadline as follows:

W1 = Warning for poor performance
W2 = Warning for poor attendance
W3 = Warning for poor performance and poor attendance

Academic Integrity: ***We expect the honesty and integrity of every student in this course.*** Students are encouraged to interact with other students while doing assignments in class. However, assignments that are turned in for grading must represent each student's individual work – they may not be copied from another person's work, and they may not be the same as another person's work.

Scientists and doctors and all professionals must be intellectually honest. The most unforgivable thing that any scientist can do is to fake his/her data. Scientists who fabricate data lose their grants and jobs. Doctors who fake lab results or are dishonest in other ways not only lose their jobs and licenses but might also go to jail.

Students are expected to maintain the highest level of academic integrity. You should be familiar with the university policy on academic integrity. Violations will be reported and enforced according to this policy.

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication
- Using another person's ideas or words without attribution–re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work.

If you are ever in doubt, please consult the instructor .

Please review the Academic Integrity Policy (http://academicintegrity.rutgers.edu/) or the Academic Integrity Resources for Students (https://nbprovost.rutgers.edu/academic-integrity-students)

Use of external websites to obtain solutions to homework assignments, quizzes, assessments, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions. Posting homework assignments, or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.

The Rutgers honor pledge will be included on all (major) assessments for you to sign: *On my honor, I have neither received nor given any unauthorized assistance on this examination (assignment).*

Disability Accommodations: Students in need of disability accommodations to register for accommodations and consult the policies and procedures of the Office of Disability Services website: https://ods.rutgers.edu If you have a letter of accommodation, please provide that to me at the start of class.

Student Support and Mental Wellness

- Student Success Essentials: https://success.rutgers.edu
- Student Support Services: https://www.rutgers.edu/academics/student-support
- The Learning Centers: https://rlc.rutgers.edu/
- Rutgers Libraries: https://www.libraries.rutgers.edu/
- Bias Incident Reporting: https://studentaffairs.rutgers.edu/bias-incident-reporting
- Dean of Students – Student Support Office: https://success.rutgers.edu/resource/dean-students-student-support-office
- Office of Veteran and Military Programs and Services: https://veterans.rutgers.edu
- Student Health Services: http://health.rutgers.edu/
- Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS): http://health.rutgers.edu/medical-counseling-services/counseling/
- UWill: free immediate access to teletherapy; you can choose a therapist based on your preferences including issue, gender, language, ethnicity. http://health.rutgers.edu/uwill/
- Office for Violence Prevention and Victim Assistance: www.vpva.rutgers.edu/
- Office of Disability Services: https://ods.rutgers.edu/
- Basic Needs Assistance (food, housing, and other essentials): https://ruoffcampus.rutgers.edu/basic-needs
- Rutgers Student Food Pantry: https://ruoffcampus.rutgers.edu/food-pantry

Course Content

11 classes: basic Python

Midterm

5 classes: Genetic Association Analysis

4 classes: Bioinformatics - Genetic Sequence Analysis

6 classes: Structural Biology/Protein Structure

End-of-term assessment