CSC 314-01, Introduction to Bioinformatics
Spring 2025
Eastern Connecticut State University

Instructor: Dr. Garrett Dancik (he/him/his)
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(860) 465-4587
Science Building, Rm 257

Office Hours:
M: 3:00 – 5:00 PM
TR: 1:00 – 2:00 PM
R: 3:30 – 4:30 PM, or by appointment

Office hours can be virtual (appointment required) or in person. It is not necessary to sign up for in-person office hours, but those who do will be given priority. Sign up at https://outlook.office.com/bookwithme/user/0acaa1ae25934137a8606a78e6582ea5@easternct.edu?anonymous&ep=pcard.

Course information:

Title:	Introduction to Bioinformatics
Day/Time:	TR 2:00 – 3:15 PM (Science Rm 138)
Section:	01
Credit:	3 hours

Course Materials:

Technology:

1. Course notes and class website: https://gdancik.github.io
2. We will use Google Colab (https://colab.research.google.com/) to run Python and Biopython code. A Google account is required (https://accounts.google.com/).
3. Piazza (https://piazza.com) will be used for online discussion and several assignments. Note: a mobile app is available from the App store (iPhone/iPad) or Google Play (Android devices). You can access Piazza through Blackboard.

References (not required):

1. Campbell Biology, 9th Edition by Jane B Reece, *et al*., Boston: Pearson, 2010 (ISBN: 978-0321739759)
2. Understanding Bioinformatics by Marketa Zvelebil and Jeremy O. Baum, Garland Science, Taylor & Francis Group, 2008 (ISBN: 9780815340249)

Course Description
Bioinformatics is an interdisciplinary science where computational and statistical tools are used to store and analyze large biological datasets. This course will provide an introduction to fundamental concepts in bioinformatics, including genetics, genomic and proteomic databases, sequence alignment algorithms and database searching, and protein structure and function prediction.

Grading

Labs / Exercises	25%
Exam I	25%
Exam II	25%
Final Project	25%

Assignment Policy: We will devote some class time to completion of assignments. All assignments are due at the beginning of the class on the due date unless specified otherwise. However, a 48-hour grace period is allowed for one eligible assignment of your choice. In this case, you may turn in an assignment up to 48 hours late with no penalty. No assignment will be accepted after the grace period without prior approval. Late assignments will also not be accepted if you have already used your grace period. However, the lowest assignment grade (among eligible assignments) will be dropped. If you know ahead of time that you will be missing class or that you will not be able to complete an assignment on time, please talk to me and if appropriate, additional arrangements will be made. The grace period can be applied to any assignment, unless the assignment specifically states otherwise. The grace period cannot be used for exams or the final project. Only one grace period can be used for each student.

Online discussion: We will use Piazza (https://piazza.com) as an online discussion and question and answer forum in this course. Shortly after the beginning of the semester, you will receive an e-mail with registration instructions sent to your Eastern e-mail address. Piazza allows for students to post and answer questions, anonymously if desired. The class benefits by seeing questions asked by other students (who often have the same questions as you) and by contributing answers. As the instructor, I will answer questions and can endorse correct student answers as well. For these reasons, all non-personal (e.g., not grade-related) questions should be posted to Piazza rather than e-mailed to me. Questions regarding course content, logistics or due dates, or homework assignments should be posted to Piazza. Questions regarding homework must be specific and may contain no more than *several* lines of code. Note that posts not meeting these criteria will be deleted and the poster penalized if warranted. Note also that piazza will be required for several assignments.

Exam Policy: Make-up exams will only be given if you have an official excuse for missing class. If you know ahead of time that you will miss an exam, please talk to me before the exam to make arrangements for taking it. Missing **two** or **more** exams without official excuses will result in your dismissal from the course with a grade of **F**.

Grading Scale

93-100: **A**	90-92: **A-**	
87-89: **B+**	83-86: **B**	80-82: **B-**
77-79: **C+**	73-76: **C**	70-72: **C-**
65-69: **D+**	60-64: **D**	59 and below: **F**

Academic Honesty

You are encouraged to discuss projects and exercises with one another unless specified otherwise. However, copying answers from another student (unless otherwise specified) is *cheating* and this will not be tolerated. You may use AI code generation tools provided that your prompt is included as a comment in your code, and clearly labeled as such. Code that uses concepts not covered in class, that does not have an AI prompt, will not be accepted. You are strongly encouraged to use AI to explain coding examples. Note that while AI may be used on assignments, ultimately your understanding of the material (without the use of AI) will be evaluated on exams. A student found cheating may automatically receive a grade of "F" on the assignment and will be reported to the department head with further potential consequences. In addition, students are responsible for familiarizing themselves with the University's numerous policies and procedures contained in the University Catalog and Student Handbook. The Code of Conduct policies and the Policy on Academic Misconduct are of special significance, since cheating, plagiarism, and personal misconduct are strictly prohibited and carry severe penalties. Students should read and understand Eastern's Academic Misconduct Policy, which can be found at https://easternct.makekb.com/entry/307/. All violations will be handled under the procedures established in this policy.

Classroom civility

Cell phones are not appropriate in class and must be turned off or set to vibrate and stored off of the class desk. In general, follow the Golden Rule and treat others with respect and the way you want to be treated. In addition, students are expected to adhere to current health and safety protocols as regularly updated on Easternct.edu. Any student who fails to follow safety protocols during class will be referred to the Office of Student Conduct for disciplinary review. In response to state or university restrictions, the professor may deem it necessary to revise assignments and due dates articulated here.

Accommodations for Students with Disabilities

Eastern Connecticut State University is committed to following the requirements of the Americans with Disabilities Act (ADA) of 1990, the ADA Amendment Act of 2008, and Section 504 of the Rehabilitation Act of 1973, as amended in 1998. If you are a student with a disability (or think you might have a disability) and require accommodations or assistance evacuating a building in the case of an emergency, please contact the Office of AccessAbility Services (OAS) at 860-465-0189 to discuss your request further. Please note that accommodations are not retroactive and must be communicated through a Letter of Accommodation, which is drafted by the OAS.

***Tentative course schedule**

Week	Week of	Topic
1	01/20/25	Intro to Bioinformatics
2	01/27/25	Mendelian and Chromosomal Basis of Inheritance; OMIM database
3	02/03/25	Cells and DNA Basic Python Programming (Input/Output, Variables, Strings, Branching, *for* loops)
4	02/10/25	Proteins Python Dictionaries
5	02/17/25	From Genes to Proteins
6	02/24/25	**Review / Exam I**
7	03/03/25	Biological Databases (GenBank, UCSC Genome Browser) Python: List Comprehension and Regular Expressions
8	03/10/25	Biopython
9	03/17/25	***Spring Break - No Class***
10	03/24/25	Producing and Analyzing Sequence Alignments
11	03/31/25	Dynamic Programming Methods for Pairwise Sequence Alignment
12	04/07/25	Sequence Queries with BLAST / Review
13	04/14/25	**Exam II /** Gene Prediction
14	04/21/25	Hidden Markov Models
15	04/28/25	Using Galaxy for NGS analysis
16	05/05/25	Work on Final Projects
	05/13/25	**Final Project (Due: Tuesday, May 9, 4:00 PM)**