CSC 314: Intro to Bioinformatics (3 credits)
TR, 2:00 - 3:15 PM, Science Room 139
Spring 2026

Instructor Information

Name:	Garrett Dancik (he/him/his)
Contact Info:	E-mail: dancikg@easternct.edu
	Phone: 860-465-4587
Office Location:	Science Building, Rm 257

Office Hours: TR, 1 – 2:00 PM
 W, 3 – 5:00 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. Click to sign up for office hours.

Course Description

Bioinformatics is an interdisciplinary science that involves the development and use of computational and statistical tools to store and analyze large biological datasets such as DNA and protein sequences. This course will provide an introduction to fundamental concepts in bioinformatics, including genetics, genomic and protein databases, sequence alignment algorithms, databse searching, and structure and function prediction.

Learning Resources

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)

Learning Outcomes

Upon completing this course, students will be able to:

- *Learning Outcome 1 (LO1):* Understand **foundational concepts in bioinformatics**, including inheritance, gene expression, sequence databases, and sequence alignment.
- *Learning Outcome 2 (LO2):* **Identify and utilize** appropriate **bioinformatics tools and databases** to answer biological questions.
- *Learning Outcome 3 (LO3):* **Design and write code** that uses fundamental programming constructs to carry out basic tasks and bioinformatics analyses.

Assessments

Assessment	Percentage of final grade
Labs / Exercises	25%
Exam I	25%
Exam II	25%
Final Project	25%

Students will be assigned the following final letter grades, based on the calculations coming from the above section.

Grade	Percentage Interval
A	94-100%
A-	90-93%
B+	86-89%
B	82-85%
B-	79-81%
C+	75-78%
C	71-74%
C-	67-70%
D+	62-66%
D	55-61%
F	> 55%

Grading Policies

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.

Academic Integrity and Use of AI

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 and 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.

Additional Class Policies

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: treat others with respect and in the way you want to be treated.

University Policies and Resources

Academic Integrity

Students are expected to take personal responsibility for their intellectual work and to respect and acknowledge the ideas of others. Academic honesty means doing one's own work and giving proper credit to others whose work and thoughts are drawn upon. It is the responsibility of each student to become familiar with what constitutes academic dishonesty and plagiarism and to avoid all forms of cheating and plagiarism. Students may not engage in any form of academic misconduct and are responsible for learning how to present the ideas of others in their own work and avoid all other forms

of academic misconduct. Students should read and understand Eastern's Academic Misconduct Policy, which can be found in the Eastern Student Handbook at . Students should also review the definition of academic misconduct in the BOR/CSU Student Code of Conduct, which can be found on the BOR website: . (Rev. 9/25 per SB 24/25-07)https://www.ct.edu/policies/interim-student-academic-misconduct-policy

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. Please visit the Office of Accessibility Website at www.easternct.edu/accessability/index.html for more information on how to register with our office. (Rev. 7/24)

Counseling and Psychological Services (CAPS)

Mental Health and Wellness: Eastern Connecticut State University faculty and staff recognize that mental health concerns can impact academic performance and interfere with daily life activities. Please notify your faculty member or academic advisor for academic assistance, as needed. Counseling and Psychological Services (CAPS) can also provide support if you're feeling stressed, overwhelmed, anxious, depressed, lost or are struggling with other personal issues.

Please call or visit the Counseling and Psychological Services (CAPS) website at www.easternct.edu/counseling-services/index.html for more information. These professional services are free, confidential, and support non- traditional, graduate, and undergraduate students. Call 860-465-0181 to schedule an appointment. Same day urgent hours are M-F, 1-3.

Outside of CAPS office hours (M-F, 8:30-4:30), students may access after-hours phone support by calling 860-465-0181 to speak with an on-call crisis counselor.

Students in crisis and/or experiencing suicidal thoughts: for free 24/7 crisis support in the US, call:

Suicide & Crisis Lifeline at 9-8-8

Suicide Prevention Lifeline at 1-800-273-8255

Text HOME to the Crisis Text Line at 741 741

Trevor Project 1-866-488-7386 for LGBTQ youth

211 (mental health emergency)

(Current as of 7/25)

Tentative Course Schedule

Week	Week of	Topic
1	01/19/26	Intro to Bioinformatics
2	01/26/26	Mendelian and Chromosomal Basis of Inheritance; OMIM database
3	02/02/26	Cells and DNA Basic Python Programming (Input/Output, Variables, Strings, Branching, *for* loops)
4	02/09/26	Proteins Python Dictionaries
5	02/16/26	From Genes to Proteins
6	02/23/26	**Review / Exam I**
7	03/02/26	Biological Databases (GenBank, UCSC Genome Browser) Python: List Comprehension and Regular Expressions
8	03/09/26	Biopython
9	03/16/26	***Spring Break - No Class***
10	03/23/26	Producing and Analyzing Sequence Alignments
11	03/30/26	Dynamic Programming Methods for Pairwise Sequence Alignment
12	04/06/26	Sequence Queries with BLAST / Review
13	04/13/26	**Exam II /** Gene Prediction
14	04/20/26	Hidden Markov Models
15	04/27/26	Using Galaxy for NGS analysis
16	05/04/26	Work on Final Projects
	05/14	**Final Project (Due: Tuesday, May 14, 4:00 PM)**