# CSC 314-01, Introduction to Bioinformatics
# Fall 2020
***Eastern Connecticut State University***

**Instructor:** Dr. Garrett Dancik
dancikg@easternct.edu
(860) 465-4587
Science Building, Rm 257 (see Blackboard for virtual location)

**Office Hours:** MWF: 10-11:00
MF: 2-3:00, or by appointment

**Course information:**

| | |
|---|---|
| Title: | Introduction to Bioinformatics |
| Day/Time: | MWF 9:00 – 9:50 PM (online – see Blackboard for login info) |
| Section: | 01 |
| Credit: | 3 hours |

**Course Materials:**

**Textbook:** Understanding Bioinformatics by Marketa Zvelebil and Jeremy O. Baum, Garland Science, Taylor & Francis Group, 2008 (ISBN: 9780815340249)

**Technology:**

1. Course notes and class website: https://gdancik.github.io
2. Python (http://www.python.org), Jupyter Notebooks (https://jupyter.org/) and Biopython (https://biopython.org/) will be used for programming assignments. Installation instructions are available on the Info section of the course web page.
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)

**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% |

**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 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 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. A student found cheating will 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 in the student handbook. *www.easternct.edu/academicmisconduct*
All violations will be handled under the procedures established in this policy.

**Classroom civility**

Unless the instructor indicates otherwise, online etiquette stipulates that you should keep your microphone muted and your video off unless you are speaking. This preserves bandwidth and limits distractions to others. You may unmute yourself to ask questions when invited to do so by the instructor; you can also "raise your hand" to get the

instructor's attention if you have a question. In general, follow the Golden Rule and treat others with respect and the way you want to be treated.

**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 | 8/24/20 | Intro to Bioinformatics | |
| 2 | 8/31/20 | Mendelian and Chromosomal Basis of Inheritance | Cells and DNA |
| 3 | 9/7/20 | ***Labor Day – No Class Monday*** | Python Programming |
| 4 | 9/14/20 | Python Programming | Protein Structure |
| 5 | 9/21/20 | From Genes to Proteins | |
| 6 | 9/28/20 | **Review / Exam I** | |
| 7 | 10/5/20 | Gene and Protein Databases | |
| 8 | 10/12/20 | BioPython | |
| 9 | 10/19/20 | Regular Expressions and UCSC Genome Browser | |
| 10 | 10/26/20 | Producing and Analyzing Sequence Alignments | |
| 11 | 11/2/20 | Dynamic Programming Methods for Pairwise Sequence Alignment | |
| 12 | 11/9/20 | Multiple Alignments and BLAST | |
| 13 | 11/16/20 | **Review / Exam II** | |
| 14 | 11/23/20 | Methods for Gene Prediction and Genome Annotation | ***Thanksgiving – No Class Wednesday or Friday*** |
| 15 | 11/30/20 | Methods for Gene Prediction and Genome Annotation | |
| 16 | 12/7/20 | Final Projects | ***Last Day of Class (Monday)*** |
| | 12/11/20 | **Final Project Due (10:00 AM**) | |