

Syllabus

Fall 2025

BIOL 3178 Introduction to Programming for Biologists Lab

TIME: 2-4:50pm Thu

LOCATION: BEP 139

INSTRUCTOR:

Dr. Wei-Chin Ho (who@uttyler.edu)

Phone: 903-565-5824

Office hours: 10-noon Mon, 10-11am Tue at HPR 113, or by appointments.

COURSE FORMAT: This course is in a **face-to-face** format. Attendance is expected in this course. Please check Canvas frequently for changes and updates.

COMMUNICATION:

E-mail Policy: When sending an email, please add “**BIOL 3178**” at the beginning of the title and clearly indicate your **name** in the first few sentences of the main text. Please note that the instructor may not be able to respond to emails in two working days.

Canvas Announcements: Announcements are found on Canvas, and depending on your Canvas settings for this class, you will get notified if there is a new one. Please make a point of reading the announcements. This is how I will communicate with the class as a whole when there is important information you need.

COURSE OVERVIEW: This is an introductory course for programming using Python as a focal language. No prior programming experience is required. This course is particularly designed for biology majors or any STEM majors who are interested in biology, as it has an emphasis on how to use programming to solve problems in biology. The lab is further designed for students to use the programming knowledge learned from the course in a research project involving computational biology.

LEARNING OUTCOMES:

Upon completion the lab, students should be able to:

- 1) Identify research questions in computational biology
- 2) Planning programming strategy for solving research questions in biology
- 3) Write codes to manipulate sequence data for biological research
- 4) Write codes to manipulate tabular datasets for biological research
- 5) Write codes to generate figures for publication
- 6) Communicate the research results in computational biology

COURSE MATERIALS: All required materials can be found on Canvas and/or will be provided by the instructors. If students are interested with more reading, below are list of books for references:

- Eric Matthes (2023) *Python Crash Course: A Hands-On, Project-Based Introduction to Programming (3e)*, No Starch Press.
- Martin Jones (2013) *Python for Biologists: A complete programming course for beginners*, CreateSpace Independent Publishing Platform.
- Mark Lutz (2013) *Learning Python: Powerful Object-Oriented Programming (5e)*, A O'Reilly Media.

GRADING:

The grade of the lab will be determined by three parts:

1. **Lab Notebooks (40%):** Students will perform programming tasks for each lab and submit the code and the analysis results in the lab notebooks.
2. **Presentation (30%):** Students will present the results of their research projects several times throughout the semester.
3. **Final Report (30%):** Students will finish the lab course with a final written report summarizing all the research work.

Letter grades will be assigned at the end of semester according to the following scale:
A = above 90.00%; B = 80.00-89.99%; C = 70.00-79.99%; D = 60.00-69.99%; F = below 59.99%.

Late Work Policy

No late work is acceptable.

Corrupted File Policy

Any student that turns in a corrupted file will be given 24 hours to turn in a file that can be opened successfully by the instructor. Failure to do so will earn a grade of “0” (Zero) for the paper.

Use of Artificial Intelligence (AI)

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools’ ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler’s Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler’s Academic Integrity Policy.

For this course, AI tools are encouraged during the course, and appropriate acknowledgment is expected. You are allowed to use AI tools for assignments and exams as long as a note of acknowledgement to the AI tools is included. Below is an example of note: “ChatGPT and Copilot were used for this assignment.”

WHAT IS PLAGIARISM AND HOW CAN IT BE AVOIDED?

Plagiarism may be defined as (1) presenting work, ideas, or phrasing of another, in whole or part, as one's own without giving credit and proper documentation of sources; (2) copying material directly from sources (including electronic media) except when the material is enclosed in quotation marks and the source is clearly identified; (3) paraphrasing too closely to the original, even when the source is identified; and (4) claiming credit for work in any media (electronic, digital, artistic, etc.) where the student is not the original creator of said work. Work that is plagiarized will receive an automatic grade of "F". If you are unsure about this subject, please take the time to talk to your instructor and/or read this:

<https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism>

SCHEDULE (subject to change*):

Lab 01: Project Introduction; Search for Literature and Datasets

Lab 02: Search for Literature and Datasets (2)

Lab 03: Search for Literature and Datasets (3); Presentation #1

Lab 04: Analyzing Genome-Wide Data

Lab 05: Analyzing Genome-Wide Data (2)

Lab 06: Analyzing Transcriptomic Data

Lab 07: Analyzing Transcriptomic Data (2)

Lab 08: Analyzing Tabular Data

Lab 09: Analyzing Tabular Data (2)

Lab 10: Analyzing Tabular Data (3); Presentation #2

Lab 11: Statistical Analysis

Lab 12: Statistical Analysis (2)

Lab 13: Data Visualization

Lab 14: Data Visualization (2); Final Presentation

Lab Final Report Due: midnight on Dec 12 Fri

*The program and schedule are subject to change. Please check the announcements at the beginning of the week for any changes.