Computer Applications for BME

BME 3053C, Section CA01
Class Periods: Mondays, Wednesdays, and Fridays 12:50 PM-1:40 PM (Period 6)
Location: NEB 0202
Academic Term: Fall 2025

Instructor:
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(786)-473-5083
Office Hours: TBA

Supervised Teaching Student:
Please contact through the Canvas website

- Yang Xing, yxing2@ufl.edu, Office hours: TBA

Learning Assistant:
Please contact through the Canvas website

- Alexander Patangan, patangan.a@ufl.edu, Office hours: TBA

Course Description
(2 credit hours) – Computer application and programming knowledge and lab to utilize Python to analyze biomedical measurements.

Course Pre-Requisites / Co-Requisites
COP 2271 and COP 2271L or equivalent and MAC 2312, with minimum grades of C.

Course Objectives

- Appreciate the importance and value of computer applications for BME
- Develop an understanding of biomedical engineering problems that require quantitative analysis and visualization.
- Develop proficiency in computer programming (specifically, Python).
- Solve real-life BME problems using AI assistants through collaborative teamwork.
- Use cutting-edge deep learning models and AI assistants to analyze and interpret biomedical datasets.

Materials and Supply Fees
N/A

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	Low
4. An ability to recognize ethical and professional responsibilities in engineering situations and make	

informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives	Medium
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- No required textbook
- Lecture slides will be provided
- Software: Python
- A laptop is requiredand

Recommended Materials

- https://www.learnpython.org/
- https://www.learnpython.org/
- 3Blue1Brown's Essence of linear algebra video series:
  - https://www.3blue1brown.com/topics/linear-algebra

Required Computer

Recommended Computer Specifications: https://it.ufl.edu/get-help/student-computer-recommendations/
HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/

Course Schedule

Week 1: Welcome & Course Logistics/ Siegel/ HW 1
Week 2: Python Basics – Part 1/ Siegel/ Quiz 1
Week 3: Python Basics – Part 2/ Siegel/ HW 2
Week 4: Python Libraries/ Siegel/ Quiz 2
Week 5: Data Structures – Part 1/ Siegel/ HW 3
Week 6: Data Structures – Part 2/ Siegel/ Quiz 3
Week 7: Matrix Computations/ Siegel/ HW 4
Week 8: Review - Midterm/ Siegel/ Midterm Exam
Week 9: Signal Processing/ Siegel/ HW 5
Week 10: Cloud Development/ Siegel/ Quiz 5
Week 11: AI Tools/ Siegel/ HW 6
Week 12: Supervised Machine Learning/ Siegel/ HW 7
Week 13: Unsupervised Machine Learning/ Siegel/
Week 14: Reinforcement Learning/ Siegel/ HW 8
Week 15: Review – Final/ Siegel/ Final Exam

Important Dates

<Date TBD> Midterm Exam (Time TBD, Location TBD)
<Date TBD> Project 1 Due (Time TBD)

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance:

- Required
- Attend office hours if having questions
- Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Expectations:

- Complete the course activities (quiz, homework and projects) on time.
- Every week's module will be available on every **Wednesday before class** via Canvas.
- Turn in homework on time (**Quiz/Survey due every Wednesday 11:59 PM, Assignments due every Monday 11:59 PM**)
- Write your own code. Do not copy code from others (Code plagiarism will be checked)
- Better late than never
- Ask for help if you need it (instructor and TA hold office hours every week)

Late Policy:

- To address the potential late submission of assignments (homework, quiz, project), we will give a free late submission for the first time. From the second time and on, (number of late minutes * 0.1 points) will be deducted from the 20 points of your homework or 10 points of your quiz, e.g., 30 min late = 30*0.1=3 points from 20 = 17 points if you did not make any

Extra Credit:

- The lectures will incorporate in-class exercises that students can complete for a bonus of 5% of their grade. To take advantage of these bonus points, students must complete at least 90% of the exercises and push their changes to GitHub at the end of class.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (8)	75 each	60%
Quizzes (5)	20 each	10%
Midterm Exam	100	10%
Final Project	200	20%
		100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu