MARYLAND APPLIED
GRADUATE ENGINEERING

ENAI607 PYTHON PROGRAMMING FOR ENGINEERING AI

COURSE SYLLABUS

Term: *Fall 2025*
Instructor: Zoltan Safar
Office Phone: 301-405-5779
Credits: 3
Course Dates: From Sept 2nd 2025 – December 12th 2025
Course Times: Tuesday 4:00 PM – 6:40 PM
Classroom: TBD

Email: zsafar@umd.edu
Office Hours: TBD

Canvas/ELMS: https://umd.instructure.com/courses/1393007

Course Description
This course covers topics including:

- Basic Python program structure, variables and assignments, built-in data types, strings, lists, tuples and dictionaries, control flow, functions and modules; basic I/O and file operations.
- Classes, object-oriented programming and exceptions.
- Introduction to algorithms and data structures: recursion, searching, graph algorithms.
- Priority queues, search trees and hash tables.
- Algorithms for AI and machine learning: regression, classification, and clustering.
- Introduction to the Numpy, Scipy and Matplotlib libraries.

Prerequisites

Some background in programming and discrete mathematics is useful, but not required.

Learning Outcomes
After successfully completing this course you will be able to:

- understand and utilize basic Python syntax,
- work with simple and complex data types like integers, strings, lists, and dictionaries,
- implement control flow structures such as loops and conditionals, and define functions and modules,
- understand object-oriented programming concepts, including class structure, objects, encapsulation, inheritance and polymorphism,
- implement and apply various algorithms and data structures to solve problems efficiently
- utilize frequently used Python libraries to build solutions to complex problems

Course Materials

Required Resources
- No textbook is required. Recommended book: N. Ceder, The Quick Python Book, Manning Publications, 4th edition, 2025.

- It is expected that every student has access to a computer (e.g a laptop) with Internet access and is able to install and run programs and applications on it.

Supplemental Resources
- Additional books:
    - M. Summerfield, Programming in Python 3: A Complete Introduction to the Python Language, Addison-Wesley Professional, 2nd edition, 2009
    - D. Beazley, Python Essential Reference, Addison-Wesley Professional, 4th edition, 2009
    - T. Cormen et al., Introduction to Algorithms, MIT Press, 3rd edition, 2009
    - J. Erickson, Algorithms, Independently published, 2019
- Hardware/Software: None

Course Structure

This course includes both on-campus and online sections. To attend synchronously online, log into ELMS-Canvas at the time of the Section 0101 class Tuesdays 4:00 PM – 6:40 PM and select "Video Conference" from the left side menu. This will open a Zoom link to the live classroom.

For asynchronous online students, all lectures will be recorded and made available on ELMS-Canvas under "Panopto Recordings/Video Lectures" within 24 hours of the class time. Be sure to review the recorded lecture in a timely manner.

Please note that F1 students enrolled in the on campus section are required to attend in person. If you have a conflict on a particular day, please reach out to me in advance to discuss.

Communication Guidelines

Communicating with the Instructor

My goal is to be readily available to you throughout the semester. I can be reached by email at zsafar@umd.edu. Please DO NOT email me with questions that are easily found in the syllabus or on ELMS-Canvas (e.g., When is this assignment due? How much is it worth? etc.), but please DO reach out about personal, academic, and intellectual concerns/questions.

Finally, if you need to discuss issues not appropriate for the classroom and/or an email, we can arrange to talk over Zoom, or in person. Send me an email asking for a meeting and we can set something up.

Announcements

I will send important messages, announcements, and updates via email. To ensure you receive this information in a timely fashion, make sure that you check your UMD email regularly. I will not send any communications via Canvas, and I will not check Canvas for received messages. If you would like to get in touch with me, please send an email.

Names/Pronouns and Self-Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to in this class, both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). Keep in mind that the pronouns someone uses are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, it is your choice whether to disclose how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Communicating with your Peers

With a diversity of perspectives and experience, we may find ourselves in disagreement and/or debate with one another. As such, it is important that we agree to conduct ourselves in a professional manner and that we work together to foster and preserve a virtual classroom environment in which we can respectfully discuss and deliberate controversial questions. I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that you will be expected to craft and defend arguments that support your position. Keep in mind, that free speech has its limit and this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued.

Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please alert me immediately if you feel threatened, dismissed, or silenced at any point during our semester together and/or if your engagement in discussion has been in some way hindered by the learning environment.

Netiquette Policy

Netiquette is the social code of online classes. Students share a responsibility for the course's learning environment. Creating a cohesive online learning community requires learners to support and assist each other. To craft an open and interactive online learning environment, communication has to be conducted in a professional and courteous manner at all times, guided by common sense, collegiality and basic rules of etiquette.

Grading

Grade Breakdown

Assignment	Percentage %
Homework	10%
Quizzes	10%
Midterm Exam	20%
Project	30%
Final Exam	30%
Total	100%

Course Assignments

Homework Assignments
- The homework assignments will check and reinforce your understanding of the material covered during the lectures. You will be expected to solve problems individually and submit your solutions.

Quizzes
- I expect to have about 4 quizzes during the semester. It will be a closed-book, closed-notes test of your understanding of the taught material. Each quiz will be about 15-20 minutes long, and they will be conducted in the beginning of some of the lectures. I will give at least a week's notice for any upcoming quiz (there will be no surprise quizzes).

Participation & Engagement
- You will receive no quantitative credit or score for participation. However, I encourage you to pay attention and ask questions.

Project
- The goal of the project is to improve your ability to design, implement and test a Python program that solves a non-trivial problem. It will be an individual project, and it will take about 4-6 weeks to complete the work. As a part of the project work, you will also be expected to write a project report that describes and explains your solution.

Final Exam
- The final exam will test the degree to which you have mastered the course material. The final exam will be comprehensive; that is, any material taught during the semester may show up on the final exam.

Grading of Assignments

All assignments will be graded according to a predetermined set of criteria (i.e., rubric) which will be communicated to students before the assignment is submitted.

To progress satisfactorily in this class, students need to receive timely feedback. To that end, it is my intention to grade all assignments within two weeks of their due date. If an assignment is taking longer than expected to grade, students will be informed of when they can expect to see their grade.

Grade Computation

All assessment scores will be posted on ELMS/Canvas page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet and discuss.

It is expected that you will submit work by the deadline listed on ELMS-Canvas. Late work will be penalized according to the late work policy described in the **Course Policies and Procedures** section below.

Grade Disputes: I am happy to discuss any of your grades with you, and if I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

There will be no absolute grading scale. I will curve the grades; that is, your grade will depend on your performance as well as the performance of your peers in the same class.

Course Schedule

Please note that this is a tentative schedule and may be subject to change.

Week #	Topic	Deliverable
1	Python program structure, variables and assignments, simple data types: integers, booleans, floating-point numbers, logical operators, basic console I/O, Python identifiers and coding style	
2	Collection/sequence data types: lists, tuples, and strings.	
3	More collection types: dictionaries, iterating and copying collections. Control flow: conditional branching and looping; functions and arguments, lambda functions.	HW #1 out
4	Exception handling; modules, imports; file I/O operations.	HW #1 due, Quiz #1
5	Classes, object-oriented programming, attributes and methods, encapsulation and inheritance.	
6	Introduction to the Numpy, Scipy and Matplotlib libraries: numpy arrays, vectorized operations, solving linear systems, matrix decompositions, statistical functions and data visualization.	
7	Midterm exam	
8	Algorithm complexity, big-O notation, recursion, divide and conquer method, iteration, merge sort, linear and binary search.	
9	Linked lists, queues, and stacks.	
10	Heaps, and priority queues.	
11	Graphs, graph representation, breadth-first search, depth-first search, topological sort.	
12	Hash tables, binary search trees, kd-trees.	
13	Algorithms for regression: linear regression, nearest neighbors; algorithms for clustering: k-means, mixture models, the EM algorithm	
14	Algorithms for classification: linear/quadratic discriminant analysis, logistic regression, nearest neighbors.	

Note: This is a tentative schedule, and subject to change as necessary – monitor ELMS-Canvas for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

Course Policies and Procedures

The University of Maryland's conduct policy indicates that course syllabi should refer to a webpage of course-related policies and procedures. For a complete list of graduate course related policies, visit the Graduate School website. Below are course-specific policies and procedures which explain how these Graduate School policies will be implemented in this class.

Satisfactory Performance
The Graduate School expects students to take full responsibility for their academic work and academic progress. The student, to progress satisfactorily, must meet all the academic requirements of this course. Additionally, each student is expected to complete all readings and any preparatory work before each class session, come to class prepared to make substantive contributions to the learning experience, and to proactively communicate with the instructor when challenges or issues arise.

Questions about Assignments
Please ask all questions you may have about an assignment at least one day before the assignment is due. Any questions asked after that may not be answered on time for you to submit your assignment.

Late Work Policy
Assignments should be completed by the due date and time listed with the assignment, on the syllabus, and/or in the course calendar. Late assignments will receive 0 points. If you cannot submit your work due to a medical emergency, you will need to submit a doctor's note in order to be allowed to submit your assignment late.

Religious Observance
It is the student's responsibility to inform the instructor of any intended absences for religious observances in advance. Notice should be provided as soon as possible but no later than the end of the schedule adjustment period.

Academic Integrity
For this course, some of your assignments will be collected via Turnitin on ELMS/Canvas. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Students

The University's Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the University of Maryland does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the University of Maryland.**

It is important to note that course assistance websites, such as CourseHero, or AI generated content are not permitted sources, unless the instructor explicitly gives permission. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might be inaccurate or biased and most importantly, relying on restricted sources will hamper your learning process, particularly the critical thinking steps necessary for college-level assignments.

Additionally, students may naturally choose to use online forums for course-wide discussions (e.g., Group lists or chats) to discuss concepts in the course. However**, collaboration on graded assignments is strictly prohibited unless otherwise stated**. Examples of prohibited collaboration include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc. Please visit the **Office of Graduate Studies' full list of campus-wide policies** and reach out if you have questions.

Finally, on each exam or assignment you must write out and sign the following pledge: ***"I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."***

If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, ***if you are ever unclear*** about acceptable levels of collaboration, ***please ask***!

To help you avoid unintentional violations, ***the following table*** lists levels of collaboration that are acceptable for each graded exercise. Each assignment will contain more specific information regarding acceptable levels of collaboration.

	OPEN NOTES	USE BOOK	LEARN ONLINE	GATHER CONTENT With AI	ASK FRIENDS	WORK IN GROUPS
Homework Assignments	✔	✔	✔	---	✔	✔
Quizzes	---	---	---	---	---	---
Project	✔	✔	✔	---	---	---
Final Exam	---	---	---	---	---	---

Course Evaluation

Please submit a course evaluation through Student Feedback on Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to Course Experiences is confidential. Campus will notify you when Student Feedback on Course Experiences is open for you to complete your evaluations at the end of the semester. Please go directly to the **Student Feedback on Course Experiences** to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through Testudo the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.

Copyright Notice

Tips for Succeeding in this Course

1. **Participate.** I invite you to engage deeply, ask questions, and talk about the course content with your classmates. You can learn a great deal from discussing ideas and perspectives with your peers and professor. Participation can also help you articulate your thoughts and develop critical thinking skills.
2. **Manage your time.** Students are often very busy, and I understand that you have obligations outside of this class. However, students do best when they plan adequate time that is devoted to course work. Block your schedule and set aside plenty of time to complete assignments including extra time to handle any technology related problems.
3. **Login regularly.** I recommend that you log in to ELMS-Canvas several times a week to view announcements, discussion posts and replies to your posts. You may need to log in multiple times a day when group submissions are due.
4. **Do not fall behind.** This class moves at a quick pace and each week builds on the previous content. If you feel you are starting to fall behind, check in with the instructor as soon as possible so we can troubleshoot together. It will be hard to keep up with the course content if you fall behind in the pre-work or post-work.
5. **Use ELMS-Canvas notification settings.** Pro tip! Canvas ELMS-Canvas can ensure you receive timely notifications in your email or via text. Be sure to enable announcements to be sent instantly or daily.
6. **Ask for help if needed.** If you need help with ELMS-Canvas or other technology, IT Support. If you are struggling with a course concept, reach out to me and your classmates for support.

Student Resources and Services

Taking personal responsibility for your learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit the [Counseling Center's Academic Resources](#) to learn more about the wide range of resources available to you. Below are some additional resources and services commonly used by graduate students. For a more comprehensive list, please visit the Graduate School's [Campus Resources Page](#).

Accessibility and Disability Services
The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The [Accessibility & Disability Service (ADS)](#) provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at adsfrontdesk@umd.edu. Information about sharing your accommodations with instructors, note taking assistance and more is available from the Counseling Center.

Writing Center
Everyone can use some help sharpening their communication skills (and improving their grade) by visiting The Graduate School's Writing Center and schedule an appointment with them. Additionally, international graduate students may want to take advantage of the Graduate School's free English Editing for International Graduate Students (EEIGS) program.

Health Services
The University offers a variety of physical and mental health services to students. If you are feeling ill or need non-emergency medical attention, please visit the University Health Center.

If you feel it would be helpful to have someone to talk to, visit UMD's Counseling Center or one of the many other mental health resources on campus.

Notice of Mandatory Reporting
Notice of mandatory reporting of sexual assault, sexual harassment, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible University Employee," and I must report all disclosures of sexual assault, sexual harassment, interpersonal violence, and stalking to UMD's Title IX Coordinator per University Policy on Sexual Harassment and Other Sexual Misconduct.

If you wish to speak with someone confidentially, please contact one of UMD's confidential resources, such as CARE to Stop Violence (located on the Ground Floor of the Health Center) at 301-741-3442 or the Counseling Center (located at the Shoemaker Building) at 301-314-7651.

You may also seek assistance or supportive measures from UMD's Title IX Coordinator, Angela Nastase, by calling 301-405-1142, or emailing titleIXcoordinator@umd.edu.
To view further information on the above, please visit the Office of Civil Rights and Sexual Misconduct's website at ocrsm.umd.edu.

Basic Needs Security
If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit UMD's Division of Student Affairs website for information about resources the campus offers you and let me know if I can help in any way.

Veteran Resources
UMD provides some additional supports to our student veterans. You can access those resources at the office of Veteran Student life and the Counseling Center. Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to the instructor.