Computational Economics (MGSC 532/CS 532)

Fall 2025

Class Meetings: Mondays & Wednesdays, 5:30 PM – 6:45 PM
Room: Wilkinson Hall 116

Instructor Information

Devyn Miller — Wilkinson Hall 017, devymiller@chapman.edu

Office Hours: After class or by appointment via Zoom.

Course Description/Learning Outcomes

This course will introduce you to basic computer programming (using Python) in the context of solving economic problems. By the end of this course, you will be able to:

- Write Python scripts and notebooks to simulate economic models
- Apply probability, optimization, and algorithmic logic to real-world economic scenarios
- Visualize and interpret simulation data with Pandas and Matplotlib
- Present and defend models with clear technical communication

Software Requirements

You may use either:

- Visual Studio Code (Recommended): https://code.visualstudio.com/download with Python (3.x): https://www.python.org/downloads/
- Google Colab: https://colab.research.google.com

You are required to bring a laptop to every class meeting for coding exercises and in-class work. If you do not have a laptop, please email me, and I'll help explore options for borrowing one during class.

Textbook

No textbook is required. All materials will be provided via Canvas, GitHub, or in class.

See the Collaboration and README sections for guidelines on using external resources and tools.

Credits and Course Format

This is a 3-unit course. Unless otherwise specified, all programs must be written in Python and should use the packages taught in class. Grading will be based on correctness, clarity, elegance of solution, and style (comments, naming conventions, etc.). Assignments must reflect your own work. Any outside resources, including tutors, websites, books, or AI tools, must be cited in your README with specific links, prompts, or references.

Prerequisites

MATH 110, CPSC 230 or 236

Grading Breakdown

Component	Weight
Participation	10%
Homework / Projects	30%
Quizzes	10%
Presentations	20%
Exams	30%

What to Expect Each Week

Most weeks include a short quiz, a coding assignment, and hands-on time in class. The class before each exam will be a review day, and I will provide a study guide and optional practice exams.

Participation (10%)

Attendance is mandatory. You are allowed two free absences. Please notify me ahead of time if possible. Each additional absence results in a 10% deduction from participation (i.e., a 1% deduction in your overall grade).

Homework and Projects (30%)

All assignments are **due by 11:59 PM on the date posted**, unless otherwise specified. Assignments must be submitted as `.py` or `.ipynb` files with an accompanying README (`.md` or `.txt`). Students may be asked to present their solutions in class. Two projects will be assigned and are meant to help you apply in-class learnings to more complex scenarios. Code clarity and documentation will be factored into grading. A detailed grading rubric will be posted on Canvas when each homework assignment or project is released.

Quizzes (10%)

Starting in Week 3, there will be weekly quizzes on lecture content and in-class material. You MUST be present in person to take them. Missed quizzes cannot be made up unless you are absent for a documented reason discussed in advance (e.g., family emergency). Your lowest quiz score will be dropped at the end of the semester, so use this dropped quiz to account for sick days or missed classes.

Presentations (20%)

You will frequently present your work in class. These presentations are a core part of your grade and a key tool for learning communication in computational economics. Additionally, in lieu of a final exam, you will give a final presentation during the course's allotted final exam time slot on

Wednesday, December 10, 2025, 4:15–6:45 PM. You may choose to present either a project from class or separate work. If you decide to present a non-class project, it must be approved by me ahead of time. **To pass the class, you must give a final presentation.**

Exams (30%)

There will be two in-class midterm exams, each worth 15% of your overall grade. **To pass the class, you must take both exams.** A study guide will be provided a minimum of one week in advance. Exams must be taken on the scheduled date. If you have a documented, unavoidable conflict or illness, you must notify the instructor beforehand to arrange accommodations. Exams must be taken in person, as they are pen-and-paper (written) format.

You are allowed to bring one single-sided 8.5" × 11" cheat sheet to each exam. You may include anything you'd like on it, but it must be in your own handwriting. Sharing cheat sheets is not allowed.

Optional practice exams will be provided before each exam. These are not required, but I will provide written feedback if you complete and submit them by the posted deadline. Doing them is highly recommended and will help you prepare effectively.

Each exam will include a small extra credit section to reward deeper insight or creative thinking.

Letter Grade Scale

% Score	92.5	89.5	86.5	82.3	70.5	76.5	72.5	69.5	66.5	63.5	59.5
Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	D–

You must score 69.5% or above to receive a P when taking the course P/NP. Again, **to pass the class, you must take both midterm exams and give a final presentation.**

Communication and Tools

Course announcements will be made through our Canvas page. All students must regularly check for updates. Course materials, starter code, and assignments will be available via our course GitHub repository. The best way to reach me is via email at `devymiller@chapman.edu`.

Late Days Policy

Life happens. You have **5 Late Days** to use on any homework or project, no questions asked (not valid for quizzes, exams, or Finals Week). Each late day extends your deadline by 24 hours. For example, if the due date is Monday at 11:59 PM, submit the form before that time to get an extra day. If you need another late day, submit a new form before your new deadline. Late days cannot be applied retroactively; forms submitted after the current deadline will not count. Fractional late days are not allowed. You must:

- Submit the Late Day Google Form **before the due date**.
- Fill it out once per late day used.
- Leave a comment on your Canvas submission indicating how many days you used.

Failure to follow these instructions may result in the late day not being applied.

Additional late work is penalized at **3% per day (or part thereof)**.

Collaboration and Use of AI

You are encouraged to collaborate with classmates to discuss course material, debug, and explore ideas. However, you may not submit code or written material copied from classmates, the internet, books, or other sources without proper citation.

Feel free to explore AI tools. They can be great learning partners for homework, projects, and exam prep. These tools can help you debug, clarify syntax, or suggest solutions. However, you are ultimately responsible for understanding the material and being able to explain your code and logic. Relying on AI without comprehension will limit your performance on quizzes and exams.

You must clearly document any AI assistance in your README file. This includes:

- The prompt(s) used
- Follow-up clarifications or refinements
- Specific parts of the assignment where AI output was used

You may be asked to present or explain your solution if concerns arise about authorship or understanding.

README Checklist

To help you submit professional and complete work, please include the following in every assignment README:

- Clear instructions on how to run your code
- Description of what each file contains
- Any challenges you faced or known bugs
- AI usage (if applicable; see Collaboration policy)
- External resources or references cited

Chapman University's Academic Integrity Policy:

Chapman University is a community of scholars that emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work and academic dishonesty of any kind will be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion. Please see the full description of Chapman University's policy on Academic Integrity at www.chapman.edu/academics/academicintegrity/index.aspx.

Chapman University's Students with Disabilities Policy: In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Office of Disability Services. If you

will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized.

Please contact Disability Services at (714) 516-4520 or https://www.chapman.edu/students/health-and-safety/disability-services/ if you have questions regarding this procedure, or for information and to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Chapman University's Equity and Diversity Policy: Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman's Harassment and Discrimination Policy: https://www.chapman.edu/faculty-staff/human-resources/_files/harassment-and-discrimination-policy.pdf. Any violations of this policy should be discussed with the professor.

Classroom Conduct and Technology Please maintain a classroom environment that supports learning. Use devices only for course-related purposes. Silence notifications, and stow phones unless used for class tasks. Unrelated use of laptops or phones, sleeping, or chatting off-topic is discouraged. Feedback about the course is always welcome and should be brought to the instructor directly.

Religious Accommodation Religious Accommodation at Chapman University Consistent with our commitment of creating an academic community that is respectful of and welcoming to persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to fulfill their obligations to the university without jeopardizing the fulfillment of their sincerely held religious obligations. Please review the syllabus early in the semester and consult with your faculty member promptly regarding any possible conflicts with major religious holidays, being as specific as possible regarding when those holidays are scheduled in advance and where those holidays constitute the fulfillment of your sincerely held religious beliefs. When dates of holidays are known in advance, you must notify me at least 7 days ahead of the necessary accommodation in order for us to plan together accordingly.

Tentative Course Schedule

Week	Dates	Topics	Deliverables	Notes
1	8/25, 8/27	Course intro, Python setup and basics		
2	9/3	Version control (Git), coding best practices, documentation	Homework 1 released	9/1: Labor Day (no class)
3	9/8, 9/10	Numpy, probability, combinatorics, Monte Carlo simulations	Homework 1 due; Homework 2 released	Quiz 1
4	9/15, 9/17	Data frame management and manipulation (Pandas) + Data visualization (Matplotlib, Seaborn)	Homework 2 due; Homework 3 released	Quiz 2
5	9/22, 9/24	Auctions, expected value, variance, and variance reduction	Homework 3 due; Project 1 released	Quiz 3
6	9/29, 10/1	Sampling methods		Quiz 4
7	10/6, 10/8	Exam 1 review and in-class exam	Project 1 due	
8	10/13, 10/15	Constrained optimization	Exam 1	Quiz 5
9	10/20, 10/22	Genetic Algorithms I: knapsack, mutation, crossover, and healthcare	Homework 4 released	Quiz 6
10	10/27, 10/29	Genetic Algorithms II: capital investment, gray coding, strategy representation, multi-population GA	Homework 4 due; Homework 5 released	Quiz 7
11	11/3, 11/5	Linear and integer programming GA	Homework 5 due; Homework 6 released	Quiz 8
12	11/10, 11/12	Reinforcement learning (bandits, exploration vs. exploitation)	Homework 6 due	Quiz 9
13	11/17, 11/19	Exam 2 review and in-class exam	Project 2 released; Exam 2	
14	11/24–11/29	No class		Thanksgiving (no class)
15	12/1, 12/3	Final presentations prep/check-in		
16	12/10	Final presentations (Final Exam Slot)	Final presentations	

Course Changes

This syllabus is subject to change. Updates will be posted on Canvas and announced in class.