University of Connecticut - School of Business
OPIM 5512 (Sec. B13) – Data Science using Python, Fall 2025

Course website: https://lms.uconn.edu/
Instructor: Ramesh Shankar
Office Hours: By appointment
Contact: Email **(Preferred)** – Ramesh.Shankar@uconn.edu

I will typically respond to emails within 24 hours, excluding weekends.

Syllabus information may be subject to change. *Please monitor your UConn email and HuskyCT Announcements on a daily basis.*

On-line Office Hours/Availability: Please email to schedule. A confirmation appointment via Webex will be scheduled.

Class Details

Status	Open	**Academic Career**	Graduate
Class Number	8488	**Dates**	8/25/2025 - 12/5/2025
Session	Regular Academic	**Grading**	Graded
Units	3 units	**Location**	Hartford Campus
Instruction Mode	In Person	**Campus**	Hartford
Class Components	Lecture - Stand Alone Required		

Meeting Information

Days & Times	Room	Instructor	Meeting Dates
Th 6:00PM - 9:00PM	GBLC 505	Ramesh Shankar	08/25/2025 - 12/05/2025

Enrollment Information

Enrollment Requirements OPIM 5604; open only to MBA, MSBAPM, and MS FinTech students, others with consent. Not open to students who have passed OPIM 5894 when offered as Data Science with Python.

Class Availability

Class Capacity	65	**Wait List Capacity**	0
Enrollment Total	6	**Wait List Total**	0
Available Seats	59		

Description

Data science concepts using the Python programming language. Data wrangling and management using Pandas; visualization using MatPlotLib; fundamentals of matrix algebra and regression, with illustrations using Numpy; machine learning, focusing on fundamental concepts, classification, and information extraction.

Required text: NONE. Course materials consist of lecture notes and online resources.

Schedule: ALL MEETINGS ARE HELD IN-PERSON-CLASS. You are strongly urged to attend every class in person, to derive the full benefit from the course. Classes will not be recorded.

Pre-requisites: NONE. *Please note that this is a theory-intensive and programming-intensive course. You can expect to type in a lot of python programs. You may encounter frequent issues (bugs) in your programs, which you should be willing to debug with help from Google, StackOverflow, and some limited help from your instructor.*

Course description
This course teaches data science concepts using the Python programming language. It is divided into five modules.

- In Module 0, students are expected to learn the basics of the core Python language on their own. We will not spend time in class discussing Python programming language. Students are expected to complete an assignment prior to the first class, and submit this assignment at the start of the first class.
    - Assignment 0: Visit https://www.codecademy.com/learn/learn-python-3, complete at least 60% of the python module. You should sign up for the PRO (full features) – requires credit card, but will not charge if you cancel within 7 days. Submission (screenshot of your completion page on Codecademy, with your name visible – upload to HuskyCT) due by [TBD].

      Please see more here:
      https://help.codecademy.com/hc/en-us/articles/360007421393-Pro-Refund-Policy

      Pro Refund Policy

      Refunds are not available for Codecademy Pro purchases or post-trial charges.

      All new Codecademy accounts are eligible to receive a free trial of Codecademy Pro to use within the first 7 days of account ownership. A valid credit or debit card is required to receive a trial, and accounts are charged after day 7 of the trial.

      Pro trial is optional, and you can cancel at any time.

- Pandas: we will focus on Pandas, the data management library in the Python ecosystem, Pandas hands-on exercises
- Numpy: we will cover linear regression from first principles, focusing on the theory behind linear regression, and we will work on analysis examples in Python, using Numpy and statsmodels.
- Scikit-Learn: we will learn the fundamentals of Machine Learning, and work on an end-to-end machine learning analytics project with Python, using Scikit-Learn. We will continue with our exploration of Machine Learning using Python Scikit-Learn.
- Project: Student-presentations of group projects – should demonstrate usage of concepts learnt in classes 1 through 4.
- Final exam.

At the start of the course, students will download the Anaconda Python distribution. During the course, students should expect to become familiar with the Python environment. You may be required to install some software on your computers on your own, with very little support, if any, from the instructor or anyone else. You should be willing to trouble-shoot any issues during installation on your own, drawing help from Google searches.

HuskyCT: We will use HuskyCT extensively to deliver course materials and assignments.

Software
It is assumed that each student has a laptop computer that they can bring to class, as per the following specs:

64-bit Operating System (windows only), with at least 8GB RAM.

Students are responsible for having the latest recommended software installed on their computer. We will provide a link to software that you can download.

PLEASE NOTE: Python may not be pre-installed MS-BAPM Virtual Machine nor UConn Skybox VM. You should install Anaconda Python package in your own machine.

Grading policy
For each exam/assignment, you will receive a *numerical score* out of 100, which will be weighted according to the following table, to yield an overall numerical score for the course:

- 4 Assignments (Assignments 0, 1, 2, 3) – weightage 12.5% each, total 50%
- Team Project presentation 20%
- Final exam: 30%

Your *final* letter grade for your overall course performance will depend on your total *numerical* score over all exams, assignments and class participation, relative to the total numerical scores of the class. The final exam is in-class.

Group project

- This is a team project (5 students per team).
- Teams will be assigned by the instructor.
- Each team will work on a real-world dataset of its choosing. I will provide suggestions.
- Each team is encouraged to creatively find ways to use the concepts taught in classes 1 through 4, and analyze its chosen dataset. In the spirit of learning to learn, teams are encouraged to explore and use packages and libraries beyond those covered in class.
- Each team will present its overall findings on class #6.
- Total weightage for the group project is 20%. All team members get the same grade, unless there is an issue regarding participation. If any team member(s) report issues in contribution (e.g. some students are not contributing enough, etc.), then I will have all team members rate all other team members' participation, and use that to assign final grades.

Classroom Policies
1. **Absence Policy:** Your attendance is mandatory. Should an absence be unavoidable, please let me know in advance; we will work out a make-up option, to minimize your losses. Should you miss more than one class, it may affect your grade, so please do counsel with me about the matter beforehand.
2. **Exam absence policy:** If you are absent for any exam, it is very difficult to grant make-up exam dates. The University policy requires that you have a serious valid reason and back it up with documentation. If you do not have a serious valid reason with accompanying documentation, you will not be granted a make-up exam, and you will get a numerical score of zero for that exam. If you do have a valid reason, please note that the makeup exam will be granted at the discretion of the instructor, and the makeup exam is likely to be tougher than the regular exam. Please note that if religious observances prohibit you from participating in any required activities such as exams, please let me know at least one week in advance so alternative arrangements can be made.
3. **Assignment policy:** You should submit all assignments on or before the due date and time. Due date and time is specified in HuskyCT along with the Assignment-announcements. (Any assignment-dates and times specified in the syllabus below are tentative.) If you are late, you will lose 25% of the assignment credit for every day that you are late. Anywhere from 1 minute to 24 hours after the deadline counts as a day late. If you have a serious reason to be late with an assignment submission, to avoid loss of credit, you should do both of the following: (i) discuss your situation with me as early as possible *before* the due date, and (ii) provide valid documentation to justify your situation. No exceptions will be allowed. For students who are employed, work related emergencies are usually not allowed as an excuse for late submissions, as sufficient time is allowed to complete and submit the assignments, and you are expected to find the time to complete them.

Student Expectations During Exams and Class Assignments:

- Only resources approved by the faculty may be used
- No communication with others; Keep your eyes on your own work
- All materials not approved for the exam (i.e. books papers and other materials) must be removed from the table/desk and chairs and placed on the floor
- No caps/hats; no earphones. All cell phones must be turned off and put away unless expressly permitted by the instructor
- No electronic devices unless explicitly allowed by the instructor
- Let your professor know if you witness someone cheating

Academic integrity

The School of Business faculty strongly believe that academic integrity is a cornerstone in the educational process. So,

PLEASE DON'T CHEAT.

Your work should be your own – in the individual assignments and exams. If you cheat, you may get an F for the exam or assignment, overall course, or be expelled from the program.

All students should familiarize themselves with the rules and regulations found in the student code (http://www.dos.uconn.edu/student_code.html).

"A fundamental tenet of all educational institutions is academic honesty; academic work depends upon respect for and acknowledgement of the research and ideas of others. Misrepresenting someone else's work as one's own is a serious offense in any academic setting and it will not be condoned. Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g., papers, projects, and examinations); any attempt to influence improperly (e.g., bribery, threats) any member of the faculty, staff, or administration of the University in any matter pertaining to academics or research; presenting, as one's own, the ideas or words of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved. A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in The Student Code."

Behavior that appears to constitute academic misconduct will not be tolerated. All assignments and exams will be carefully monitored and multiple versions will be used. If any academic misconduct is discovered, the professor will seek the strongest sanctions available. Please become familiar with the University's Student Code so that you know and understand your rights and responsibilities.

For all assignments, you must properly cite sources of information as well as the ideas and words of others. Misrepresenting someone else's work as one's own is a serious offense in any academic setting and it will not be condoned. Cheating of any sort will not be tolerated and will result in a failure of the exam or assignment, deduction in the class participation grading component, and potential failure of the course.

(See next page for tentative class schedule)

Schedule for **Data Science with Python** *(Tentative and subject to change)*

*All assignment deadlines on this schedule page here are tentative. The actual deadlines are posted on HuskyCT along with the assignment link and announcement.

Date	***Week***	***Topics***
Class zero (You should complete this before the deadline specified)		***Python programming language basics:*** *Learn Python using https://www.codecademy.com/learn/python – complete at least 60% of the entire course. Register with credit card, complete quizzes and projects.* *Reference – "**Learn Python the Hard Way**" - http://learnpythonthehardway.org/book/* *Assignment 0 – complete as many quizzes and short projects as possible on Codecademy. Complete at least 60% overall. Due by [TBD] 10% weightage.*
Class 1-2:	*1-2*	***Data management using Pandas*** *Python Environment – installation; iPython - interactive Python environment: basics; Pandas – creating and modifying dataframes, descriptive statistics and histograms;*
Class 3-4:	*3-4*	***Data management using Pandas (Continued)*** *Selecting and filtering data from dataframes; joining and merging dataframes; etc.* *Hands-on exercise:* *Take a raw real-world dataset, and transform it into a suitable form using Pandas.* ***Matrix algebra using Numpy*** *Basics of matrices – adding, multiplying, inverse, transpose;* ***Assignment 1 released, 10% weightage.***
Class 5-6:	*5-6*	***Regression and Statistical simulation using Numpy and Statsmodels*** *Regression algebra with Numpy – OLS, panel data, logistic regression, instrumental variables* ***Assignment 1 due***
Class 7-8:	*7-8*	***Regression and Statistical simulation using Numpy and Statsmodels*** *Simulation of various distributions, PDFs and CDFs;* ***Assignment 2 released, 10% weightage***

Class 9-10:	*9-10*	***Assignment 2 due*** *(by Midnight, Sunday)* ***Machine learning with Python:*** *End-to-end machine learning project with a real-world dataset – creating test set – visualizing the data – experimenting with attribute combinations – data cleaning – handling text and categorical attributes – feature scaling – training and evaluation – cross-validation – fine-tuning the model – grid search – randomized search – evaluation on test set.*
Class 11-12:	*11-12*	***Machine learning with Python (Continued):*** *Classification – training a binary classifier – confusion matrix – precision and recall – ROC curve – multi-class classification – error analysis – multilabel classification* ***Assignment 3 released, 10% weightage.***
Class 13:		***Assignment 3 due*** *(by Midnight, Sunday)* ***Project presentations*** *(1/2 hour per group)* *20% weightage.* *Assignment 3 due.*
Class 14		***Final exam*** *30% weightage.*

*All assignment deadlines on this schedule page here are tentative. The actual deadlines are posted on HuskyCT along with the assignment link and announcement.

Thursday, August 28, 2025	Lecture 1
Thursday, September 4, 2025	Lecture 2
Thursday, September 11, 2025	Lecture 3
Thursday, September 18, 2025	Lecture 4
Thursday, September 25, 2025	Lecture 5
Thursday, October 2, 2025	Lecture 6
Thursday, October 9, 2025	Lecture 7
Thursday, October 16, 2025	Lecture 8
Thursday, October 23, 2025	Lecture 9
Thursday, October 30, 2025	Lecture 10
Thursday, November 6, 2025	Lecture 11
Thursday, November 13, 2025	Lecture 12
Thursday, November 20, 2025	Project presentations

Thursday, November 27, 2025	Thanksgiving break
Thursday, December 4, 2025	Final exam