



Course Syllabus

DSA 5061: Python for Data Science and Analytics

SUMMER

Instructor Contact Information

Instructor: Shima Mohebbi
 Online office hours: Tues 12:30 pm - 1:30 pm (Zoom link will be posted on Canvas)
 Email address: mohebbi@ou.edu

- I. Course Description: This course introduces core programming basics- including data types, control structures, and algorithm development with functions- via the Python programming language for students without prior programming experience. The course discusses the fundamental principles of Object-Oriented Programming and their application in data science and analytics. (RE) Prerequisite(s): Computer Science 1313/1323, and/or permission of instructor.
- II. Value Proposition: Out of all aspects of modern life, uncertainty is, *probably*, one of the most fundamental. Ability to program, model, and learn from *data* is absolutely crucial in making efficient business and engineering decisions. This course will address the topics that are essential for developing these skills focusing on data-driven techniques, machine learning, and linear mathematical programming.
- III. Student Learning Outcomes: By the end of the course, students will be able to summarize, visualize, and analyze data sets using Python as a programming language. Through this course, students will develop an understanding of what methods and Python modules are available for analyzing real-life decisions.

IV. Learning Environment:

Student's Responsibility	Instructor's Responsibility
Be responsible for keeping track of tasks	Create / facilitate meaningful online learning activities
Be proactive in communication with the instructor	Be available through email and scheduled live sessions
Abide by the OU Honor Code	Evaluate all fairly and equally

V. Required Textbook:

Fundamentals of Python: First Programs (2nd Edition), Kenneth Lambert (2018). Cengage Learning, ISBN-13: 978-1-337-56009-2.

Python for Data Analysis (2nd Edition), McKinney, W. (2017). O'Reilly Media Inc, ISBN: 9781491957653.

VI. Technological Resources: All homework assignments, lecture slides, and videos will be posted on the course Canvas Site.

Canvas Tutorial for Students: <http://www.ou.edu/cas/online/student-online-orientation/canvas-for-students.html>

VII. Course Requirements, Assessment and Evaluation Methods:

- (a) Students are responsible for announcements and material covered in recorded lectures.
- (b) Homework. Three homework problems (mini-projects) will be assigned throughout the semester. Late homework assignments will not generally be accepted. However, each student will be permitted one late homework assignments turned in not more than one week after the original due date.
- (c) Requests for regrading of homework assignments will be considered only within a one-week period from the time graded work is returned in class.
- (d) You are responsible for checking the announcements and reading material from the class web page on the course Canvas Site.

(e) Final Project. Students will be given a project to be delivered at the end of the semester. The project will require students to analyze a data set and apply techniques discussed in this course. A project report briefing the result and data interpretation will be expected at a date to be determined.

VIII. How to Be Successful in This Online Class: To maximize your success in this class:

- Get in the mindset of owning your learning
- Look through the syllabus and module layout, and establish a routine
- Make sure you have the right software tools
- Use the textbook!
- Attend office hours for extra help

IX. The instructor reserves the right to revise, alter and/or amend this syllabus, as necessary. Students will be notified in writing and/or by email of any such revisions, alterations and/or amendments.

X. Course Outline/Exams: The following is a tentative outline for the course - we will probably change things as we proceed depending upon the progress we are able to make.

Lecture Topics	Schedule
Administrative Preliminaries; Installing Python and Gurobi	Week 1
Introductory Python: Data types and Expressions, Loops and Selection Statements, List and Dictionaries)	Week 1
Advanced Python: Formatting, Methods, Files, Design with Functions	Week 2
Structured Query Language (SQL): SQL basics, Relational Database, Sqlite3, SQLAlchemy	Week 3
Pandas: DataFrames, Data manipulation, Frame manipulation	Week 4
NumPy: Demonstrations of Python slowness, Arrays, Matrices, Statistical Functions, Linear Algebra package	Week 5
Matplotlib: Scatter plots, Time series plots, Histograms, 3-Dimensional plotting	Week 6
SciKit Learn: Linear Regression, Logistic Regression, Support Vector Machine basics, Neural Network basics, Clustering basics	Week 7
Gurobipy: Linear Optimization Models, Network Flow, Mixed-Integer Programming	Week 8

XI. Academic Honesty: Cheating, plagiarism, or any act of dishonesty will NOT be tolerated. This policy applies to all parties involved in the incident. Never take credit for anyone else’s intellectual property, be it on an exam or a homework assignment. This includes, but is not limited to, copying from another student’s paper, copying from a paper from a previous semester, using forbidden information on exams, and copying from published writings. Students are responsible for knowing the requirements of the Academic Misconduct Code.

XII. Reasonable Accommodation Policy: Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

XIII. Religious Holidays: It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and required class work that may fall on religious holidays. Notification must be provided sufficiently in advance, and every effort should be made to submit required work in advance.

XIV. Title IX Resources and Reporting Requirement: For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources. Also, please be advised that a professor/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. For more info, please see <http://www.ou.edu/eoo>.

- XV. Adjustments for Pregnancy/Childbirth Related Issues: Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me or the Disability Resource Center at 405/325-3852 as soon as possible. Also, see <http://www.ou.edu/eoo/faqs/pregnancy-faqs.html> for answers to commonly asked questions.
- XVI. Final Exam Preparation Period: Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU's Final Exam Preparation Period policy (<https://apps.hr.ou.edu/FacultyHandbook#4.10>).
- XVII. Emergency Protocol: During an emergency, there are official university procedures that will maximize your safety.
 Severe Weather: If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather
 1. LOOK for severe weather refuge location maps located inside most OU buildings near the entrances 2. SEEK refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building. 3. GO to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows. 4. GET IN, GET DOWN, COVER UP. 5. WAIT for official notice to resume normal activities. Also, see <http://www.ou.edu/content/dam/emergencypreparedness/docs/BuildingSevereWeatherRefugeAreas.xlsx> for severe weather refuge areas and <https://vimeo.com/237922159> for sever weather preparedness-video.
- XVIII. Armed Subject/Campus Intruder: If you receive an OU Alert to shelter-in-place due to an active shooter or armed intruder situation or you hear what you perceive to be gunshots: 1. GET OUT: If you believe you can get out of the area WITHOUT encountering the armed individual, move quickly towards the nearest building exit, move away from the building, and call 911. 2. HIDE OUT: If you cannot flee, move to an area that can be locked or barricaded, turn off lights, silence devices, spread out, and formulate a plan of attack if the shooter enters the room. 3. TAKE OUT: As a last resort fight to defend yourself. For more information, visit <http://www.ou.edu/emergencypreparedness.html>
- XIX. Fire Alarm/General Emergency: Fire Alarm/General Emergency: If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates: 1. LEAVE the building. Do not use the elevators. 2. KNOW at least two building exits 3. ASSIST those that may need help 4. PROCEED to the emergency assembly area 5 ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues. 6. .WAIT for official notice before attempting to re-enter the building. also, see <https://vimeo.com/125093634>
- XX. Mental Health Support Services: If you are experiencing any mental health issues that are impacting your academic performance, counseling is available at the University Counseling Center (UCC). The Center is located on the second floor of the Goddard Health Center, at 620 Elm Rm. 201, Norman, OK 73019. To schedule an appointment call (405) 325-2911. For more information please visit <http://www.ou.edu/ucc>.