

# Data Science I with Python (STAT 303-1)

Fall 2023



## Course Description

First course in Data Science, with focus on data management, manipulation, and visualization skills and techniques for exploratory data analysis. The course also introduces the Python programming language in the context of Data Science.

**When:** Monday & Wednesday 12:30 - 13:50 (Sec 20), 17:30 - 18:50 (Sec 21), & Tuesday & Thursday 17:00 - 18:20 (Sec 22)

**Location:** Harris Hall L07 (Sec 20 & 22); Harris Hall 107 (Sec 21)

**Prerequisite:** Introduction to programming (STAT201), Introduction to Statistics (STAT 202) or equivalent

**Please note** that this course will not be covering advanced algorithms, classification methods, data mining techniques, or statistical/machine learning techniques. This course is meant to provide students with the skill set needed to explore such methods in Data Science II & III (STAT 303-2 & -3).

## Instructors

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FOR INDIVIDUAL APPOINTMENT/MEETINGS please make request through Campuswire (discussed below) by selecting *Post to instructors and TAs*.

## Course Goals

- TRANSLATE a problem described in layman terms to a data science project..
- ACQUIRE, INTEGRATE, AND STORE data from various sources.
- MANIPULATE, CLEAN, AND TRANSFORM data to make it suitable for answering the question at hand.
- VISUALIZE, EXPLORE, AND ANALYZE data to identify patterns and gather insights.
- DEMONSTRATE proficiency with coding in the Python programming language, in the context of data science.

- COLLABORATE in a team to develop a complete data science solution that answers a question of interest.

## Course Structure

Classes will be a combination of "lectures" + "quizzes". Concepts will be introduced in the "lectures" portion of the classes, and students will be tested on those in the beginning of the following class. In-class quizzes will help students be prepared to tackle the weekly assignment. Students are allowed to discuss and seek help during the in-class quizzes. Everyone must bring their own laptop in each class, as coding in Python will be required. Python installation on laptop is necessary.

## Textbooks

Sections will be assigned for reading from the free [e-book](#).

Reference book: McKinney, W. (2017). Python for data analysis: Data wrangling with Pandas, NumPy, and IPython. 2nd Edition. O'Reilly Media, Inc. ISBN-13: 978-1491957660

## Software

The whole course is based on the Python programming language. We recommend everyone to install the [Anaconda](#) distribution. Once Anaconda is installed, you will find Jupyter notebooks in it, which is the interface that we will use for coding.

## Asking Questions

We will use [Campuswire](#) as our preferred platform for questions about labs/homework, and general course questions. The system is highly catered to getting you help quickly and efficiently from classmates and the instructional team. Rather than emailing questions to the instructional team, you should post your questions on Campuswire.

The instructional team will check Campuswire periodically and answer questions<sup>1</sup>, but we strongly encourage students to answer each other's questions. To this end, student will be able to earn bonus points.

Enrollment Code: 2473

Questions concerning individual grades or appointments should be addressed through email.

<sup>1</sup> Please do not expect answers during weekends and evenings.

## Evaluation

STUDENTS WILL BE EVALUATED through (1) In-class quizzes, (2) Assignments , (3) Mid-term exam, (4) Final exam, (5) Project<sup>2</sup>.

<sup>2</sup> You will find a dataset of your choice and complete an Exploratory Data Analysis (EDA). More details will be provided.

## Course website

Please check the [course website](#) for live course schedule, deadlines, exam dates, office hours, grading, and other course related stuff.

## Late submission policy

Assignments submitted less than 48 hours after the due date will be subject to a deduction of 20%. Submissions will not be accepted 48 hours after the due date, as solutions will be released by that time.

## Tips for Success

- DEDICATE YOURSELF to being an active and engaged learner.
- PREPARE FOR CLASS by *reading and working* through code *before* class.
- WORK IN GROUPS TO learn and complete labs<sup>3</sup>.
- ASK QUESTIONS! Ask them during class, office hours, or on Campuswire<sup>4</sup>.
- SEARCH THE INTERNET for help, especially for software issues.
- CONTRIBUTE TO a welcoming and inclusive learning environment.
- DON'T BE AFRAID to make mistakes, you learn from mistakes.

<sup>3</sup> Don't just copy, help each other.

<sup>4</sup> Be active on Campuswire!

## Academic Integrity

Students in this course are required to comply with the policies found in the booklet, "Academic Integrity at Northwestern University: A Basic Guide". All papers submitted for credit in this course must be submitted electronically unless otherwise instructed by the professor. Your written work may be tested for plagiarized content. For details regarding academic integrity at Northwestern or to download the guide, visit: <https://www.northwestern.edu/provost/policies-procedures/academic-integrity/index.html>

## Accessibility statement

Northwestern University is committed to providing the most accessible learning environment as possible for students with disabilities. Should you anticipate or experience disability-related barriers in the academic setting, please contact AccessibleNU to move forward with the university's established accommodation process (e: [accessiblenu@northwestern.edu](mailto:accessiblenu@northwestern.edu); p: 847-467-5530). If you already have established accommodations with AccessibleNU, please let me know as soon as possible, preferably within the first two weeks of the term, so we can work together to implement your disability accommodations. Disability information, including academic accommodations, is confidential under the Family Educational Rights and Privacy Act.

## **Covid-19 classroom expectations**

Students, faculty and staff must comply with University expectations regarding appropriate classroom behavior, including those outlined below and in the [COVID-19 Expectations for Students](#). With respect to classroom procedures, this includes:

- Policies regarding masking, social distancing and other public health measures evolve as the situation changes. Students are responsible for understanding and complying with current University, state and city requirements.
- In some classes, masking and/or social distancing may be required as a result of an Americans with Disabilities Act (ADA) accommodation for the instructor or a student in the class even when not generally required on campus. In such cases, the instructor will notify the class.

If a student fails to comply with the [COVID-19 Expectations for Students](#) or other University expectations related to COVID-19, the instructor may ask the student to leave the class. The instructor is asked to report the incident to the Office of Community Standards for additional follow-up.

## **Covid-19 testing compliance**

To protect the health of our community, Northwestern University requires unvaccinated students who are in on-campus programs to be tested for COVID-19 twice per week.

Students who fail to comply with current or future COVID-19 testing protocols will be referred to the Office of Community standards to face disciplinary action, including escalation up to restriction from campus and suspension.

## **Exceptions to class modality**

Class sessions for this course will occur in person. Individual students will not be granted permission to attend remotely except as the result of an Americans with Disabilities Act (ADA) accommodation as determined by AccessibleNU.

Maintaining the health of the community remains our priority. If you are experiencing any symptoms of COVID do not attend class. Follow the steps outlined on this site for testing, isolation and reporting a positive case. Next, contact your instructor as soon as possible to arrange to complete coursework.

Students who experience other personal emergencies should contact the instructor as soon as possible to arrange to complete coursework.

Should public health recommendations prevent in-person class from being held on a given day, the instructor or the university will notify students.

## Prohibition of Recording of Class Sessions by Students

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact [AccessibleNU](#). Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. Under the University's [Copyright Policy](#), faculty own the copyright to instructional materials – including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display, or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording, or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.

## Support for Wellness and Mental Health

Northwestern University is committed to supporting the wellness of our students. Student Affairs has multiple resources to support student wellness and mental health. If you are feeling distressed or overwhelmed, please reach out for help. Students can access confidential resources through the Counseling and Psychological Services (CAPS), Religious and Spiritual Life (RSL) and the Center for Awareness, Response and Education (CARE). Additional information on all of the resources mentioned above can be found here:

<https://www.northwestern.edu/counseling/>

<https://www.northwestern.edu/religious-life/>

<https://www.northwestern.edu/care/>