Syllabus

2026 Spring STAT 3041-001

Data Science and Statistics

Tuesdays/Thursdays, 11 am – 12:20 pm 60WCHARL 140

Instructor: *Dr. Xuan Cao* *http://homepages.uc.edu/~caox4* ➫ *(http://homepages.uc.edu/~caox4)*

Email: *xuan.cao@uc.edu*

Office Hours: *12:30–2:30 pm Tuesdays in my office or by appointments*

Office Location: Room 5306, French Hall West

Course Webpage: All course related information are posted on UC Canvas (uc.instructure.com), including course syllabus, reading assignments, lecture notes, lab assignments/practices/exams and answer keys, announcements (choose "Notify me right away" for "Announcement" notification preference on Canvas), etc. **Visit Canvas frequently.**

Class Delivery: This is an in-person class*. No course recordings or broadcasting will be provided.*

Prerequisites: Minimum Grade of C- in STAT2037 or permission by instructor.

Course Description: This course will provide the foundation for data science. It will cover the basics of the following integral parts of data science: data management, visualization, analysis, and reporting. The course will also prepare students for more advanced courses in applied statistics and data science that depend on the use of statistical software and tools covered in this course.

The course will use R and Python as the main programming language because they are standard programming tools in data science. Starting from the basic syntax and various commands and functions, R and Python will be used to do data input and output; data manipulation; data summary and display.

Textbook: *R for Data Science (2e) by Hadley Wickham Python for Data Analysis (3e) by Wes McKinney*

Examination:

Midterm: Friday, Mar 5, in class

Final Exam: Tuesday, Apr 28, 10:15 am–12:15 pm

- The examination dates are as specified in the syllabus or as announced if there is any change (updates will be posted on UC Canvas accordingly).

- **Exams will cover materials from the textbook, lectures and lab assignments**. The Final Exam is cumulative. Chapters to be covered in Midterm will be announced one week before the examination date.
- You will be asked to perform coding tasks during the in-person exams.
- Both exams are open-book but you are allowed to open only the course website and R-studio or Jupyter Notebook.
- Review materials such as a practice exam will be given before the test.
- Cell phones are not allowed for any usage during the exams.
- Academic misconduct including act of cheating will lead to 0 score.
- <u>**There will be no scheduled make-up examinations**</u> (including the Midterm and the Final Exam). When there are unavoidable circumstances, the student must contact the instructor *before* the examination date.

Tentative Course Schedule *(Subject to change.)*

Week	Topic
1	Introduction. Visualization I-III; Coding basic; tibbles
2	Visualization IV; Data Transformation I
3	Data Transformation II-III; Case Study
4	Tidy Data I-III
5	R Project
6	Data Import I-II; Quarto I
7	Quarto II; Exercise for Midterm
8	**Midterm Exam**; Intro to Python I
9	Intro to Python I; Data Structure, Functions and Files I-II
10	Data Structure, Functions and Files III; Numpy Basics I-II

11	Pandas Basics I-III

12	More on Pandas I-II

13	Matplotlib I-II; More on Data Manipulation I

14	More on Data Manipulation II-III

15	Exercise for Final Exam

16	**Final Exam**

Lab Assignments: *(in-class. All by the end of the Thursday of the week in which they are assigned).* Throughout the semester various in- class lab assignments will be given. You will be asked to reproduce some examples in the lecture slides or to answer some simple questions regarding them at the end of (almost) each lecture. Some in-class time will be allocated to working on the lab assignments. Any unfinished tasks can be finished and submitted by the due date.

- These in-class assignments will be assigned along with lectures through the semester and they are due on the same day as they are assigned. The exact due dates will be announced in the class and on CANVAS.
- Please follow the instructions carefully (e.g., if you are asked to provide R or Python code or output, please do so!). No credits will be assigned for submitted work that does not follow the instruction.
- Prepare your answers with problems in order. Please note that your solutions need to be presented in a **clear, readable format** with sufficient The lab work needs to be submitted electronically through Canvas (typed or scanned). If you scan the file, please make sure the scanned file is well organized and easy to read. **No credit** will be given to solutions lack of details or hard to read.
- Five lab assignments with the lowest scores will be dropped.
- **No late assignments will be accepted! Use your drops wisely!**
- AI usage is generally prohibited in this course. However, you will be allowed to use it on specific assignments that are built around However, you can only use AI on assignments where it is explicitly permitted in the assignment description.
- Your lab work will be graded on Canvas with feedback from the grader/instructor usually before the next class period. The answer key, when needed, will be posted on Canvas or discussed in detail in class.

Students should thoroughly check their returned work against the answer key on Canvas or in class discussion. Please do not hesitate to contact the instructor if you have any questions.

Policy about Make-Up Exam: There will be no scheduled make-up examinations. Only students with legitimate excuses will be allowed to make up missed exam. The student must contact the instructor **before the examination date** after one of the following excusable events occurs:

1. **Illness**. Need official certification from you doctor, typed on medical stationary (with their license # to practice medicine on it).
2. **Attending the funeral of an immediate relative**. Need proof of attending the funeral with the date of the ceremony.
3. **Mandatory courtroom appearance**. Need a copy of your official court summons with the date.
4. **Athletic event participation**. Need a signed letter from your coach no later than **one week prior to** the day of the exam.

Final Grade Calculation: The upper limits for contributions to the final grade are **attendance (5%), in-class lab assignments (35%), Midterm 1 (30%), and Final Exam (30%)**. The final grade will be converted to the traditional letter grade based on the following chart:

A: 92 -100 pts, A-: 89 -91pts, B+: 86 – 88 pts, B: 83 -85 pts, B-: 80 – 82 pts, C+: 76 – 79 pts,

C: 72 – 75 pts, C-: 69 - 71pts, D+: 66 – 68 pts, D: 63-65 pts, D-: 60 – 62 pts, F: 59 or less pts

Students should keep all returned assignments and exams until they have received their final grade. It is the student's responsibility to get the assignments and the exams from the instructor.

Regrading Policy: If a student believes that a grading error has occurred, he/she should request for regarding within the next **5 days** after the work is graded and returned.

Minimum passing grades: This course is designated as a prerequisite of Bayesian Data Science (STAT4041). A student must earn at least a **C-** grade on this course (or STAT3038) in order to register for the course STAT 4041.

About withdrawal: Last day to withdraw: **April 10 @ 11:59 pm.** For class withdrawal and refund info, please go to Spring 2026 Dates & Deadlines Calendar at **https://www.uc.edu/about/registrar/calendars/spring-2026/dates-deadlines.html** ⬏ **(https://www.uc.edu/about/registrar/calendars/spring-2026/dates-deadlines.html)** .

Learning and Communication

- Course announcements and materials are posted on Canvas through the semester.
- For this course, students are required to set the notification preferences for "Announcement" as "Notify me right away". If you are not sure, please click "Account" on the up-left corner after signing in Canvas, you will see "Notification Preferences". The check sign, which is the first in the row corresponding to "Announcement", should be green,
- Make good use of the instructor's office **It is extremely importance for you to ask the instructor's help as soon as possible if you have difficulty in the course materials covered.**

- Beyond office hours, the best way to contact the instructor is by email **(xuan.cao@uc.edu).** **(mailto:(xia.wang@uc.edu)** The instructor will reply to e-mails within **48 hours on school days**. Please note the course email correspondence must be done via UC email accounts. The instructor cannot send email to any other account (i.e. gmail, hotmail, icloud, etc.).
- If the instructor needs to contact a student outside of class, the instructor will use the student's UC email address, and expect that the student will read and respond to this communication in a timely manner.

Academic Integrity Policy: The University Rules, including the Student Code of Conduct, and other documented policies of the department, college, and university related to academic integrity will be enforced. Any violation of these regulations, including acts of plagiarism or cheating, will be dealt with on an individual basis according to the severity of the misconduct.
(http://www.uc.edu/conduct/Academic_Integrity.html) ⤷
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Accessibility Policy: The University of Cincinnati is committed to providing all students with equal access to learning opportunities. The Accessibility Resources is the official campus office that works to arrange for reasonable accommodations for students with an identified physical, psychological or cognitive disability (learning, ADD/ADHD, psychological, visual, hearing, physical, cognitive, medical condition, etc.) Students are encouraged to contact Accessibility Resources to arrange for a confidential meeting to discuss services and accommodations.

Contact should be initiated as soon as possible to allow adequate time for accommodations to be arranged.

Counseling Services: Students have access to counseling and mental health care through the University Health Services (UHS), which can provide both psychotherapy and psychiatric services. In addition, students can receive three free professional counseling sessions upon request through the Counseling and Psychological Services (CAPS). These sessions are not associated with student's insurance coverage. Students are encouraged to seek assistance for anxiety, depression, trauma/assault, adjustment to college life, interpersonal/relational difficulty, sexuality, family conflict, grief and loss, disordered eating and body image, alcohol and substance abuse, anger management, identity development and issues related to diversity, concerns associated with sexual orientation and spirituality concerns, as well as any other issue of concerns. After hours, students may call UHS at 513-556-2564 or CAPS Cares at 513-556- 0648. For urgent physician consultation after-hours students may call 513-244-9984.

Student Religious Accommodations Ohio law and the University's Student Religious Accommodations for Courses Policy 1.3.7 permits a student, upon request, to be absent for reasons of faith or religious or spiritual belief system or participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization and/or to receive alternative accommodations with regard to examinations and other course requirements due to an absence permitted for the above-described reasons. Not later than fourteen days after the first

day of instruction in the course, a student should provide the instructor with written notice of the specific dates for which the student requests alternative accommodations. For additional information about this policy, please contact the Executive Director of the Office of Equal Opportunity and Access at (513) 556-5503 or **oeohelp@UCMAIL.UC.EDU. (mailto:oeohelp@UCMAIL.UC.EDU)**

Disclaimer

This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it, and we reserve the right to change due dates or the methods of grading and/or assessment if necessary. Any changes will be communicated to you through official course announcements on Canvas.