

STAT 1129.10 - Introduction to Computing (Spring 2023)

Course Information

- **Course Name:** Introduction to Computing, STAT 1129
- **Meeting Time:** Monday, Wednesday, 11:10 AM – 12:25 PM
- **Location:** 1957 E, Room B12

Instructor

- **Name:** Fang Jin
- **Email:** fangjin@gwu.edu
- **Office:** Rome Hall, room 769
- **Instructor office hours:** Wednesday 1 PM – 2 PM, either in person, or remote <https://gwu.webex.com/meet/fangjin>

Teaching Assistant:

- **TA Name:** Muzhe Guo, muzheguo@gwu.edu
- **TA office:** Rome Hall 768
- **TA Office Hours:** Monday 1 PM – 3PM

Course Prerequisites: None

Course Description

This course will introduce basic programming skills and practice how to program in both Python and R. The goal is to use Python and R for effective data analysis. Students will learn how to install and configure software necessary for a statistical programming environment and master the concept of generic programming language. The course covers practical issues in statistical computing which includes reading data in different formats, writing statistical functions, such as correlation and covariance, debugging, organizing code, accessing Python and R packages, data aggregation and group operations, and visualization. This course will teach in a mixture style including lecture, lab coding, and project. Topics in statistical data analysis will provide working examples.

Learning Outcomes

As a result of completing this course, students will be able to:

1. Explain and use basic concepts in programming
2. Construct and execute basic programs in Python and R
3. Design and implement basic algorithms in Python and R
4. Use external libraries with Python and R-packages
5. Use Python and R for statistical calculations
6. Graphically visualize data and results of statistical calculations

Reference Book

- Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition, by Wes McKinney. ISBN-13: 978-1491957660; ISBN-10: 1491957662. Electronic version is freely available <https://www.programmer-books.com/wp-content/uploads/2019/04/Python-for-Data-Analysis-2nd-Edition.pdf>
- R in Action: Data Analysis and Graphics with R, 2nd edition by Robert Kabacoff, Rob Kabacoff. ISBN: 1617291382; ISBN-13: 9781617291388. Electronic version is freely available: http://www.cs.uni.edu/~jacobson/4772/week11/R_in_Action.pdf

Course Grading:

Homework	35%	Homework assignments, individual work Will release around 5 homework
Pop up Quiz	25%	<ul style="list-style-type: none"> • 6 quizzes will be released & collected in the class. You can drop the lowest one. • Each quiz account for 5%. • There are no make-up opportunities if missed any quiz, unless asked for leave ahead of time. • If the total number of quizzes changed, the proportion will be adjusted accordingly.
Midterm Project	15%	Individual work, will release in the class
Final project	20%	Teamwork, form 2-member team, will release in the class.
Attendance	5%	<ul style="list-style-type: none"> • Attendance will be checked each class. • Students are allowed to miss up to 4 classes without penalty. • If miss more than 4 classes without asking for leave, 1 point will be deduced each time, until all the 5 points run out.

✧ Average minimum amount of out-of-class expected per week: 6 hours.

Course Websites and Instructions

- We will be mainly using Blackboard to release assignments, announcements, and material passed to the class during the week. blackboard.gwu.edu
- **The class will be teaching in person.** Students are required to attend class on time.

Course Topic Schedule (Tentative):

This course consists of two parts. During the first half semester of the course focus is on Python programming and during the remaining weeks focus is on R programming. The Python part of the course will give a general introduction to programming, and students will learn and practice introductory programming concepts using the Python programming language. In the R part of the course the tools needed for data analysis, in particular practical issues in statistical computing will be covered.

Python Part:

- Introduction concepts to programming
- Simple input
- Main program
- If-statement
- Logical operators
- Loops
- Functions
- Parameters, return values
- Lists, Strings, Dictionary
- NumPy Basics, array, operations, index
- Mathematical and statistical methods
- Sorting
- Data loading, storage, and file formats
- Basics of program design
- Exceptions
- Classes and objects

R Part:

- The RStudio editor, Install and configuration of R programming environment
- Basic language elements and data structures
- Working with Data, Data input/output, reading data into R, Data storage formats
- Introduction to plotting
- Data manipulation,
- Control structures
- Data manipulation: examples
- Statistical simulation
- R as statistical platform

Grading Distribution

- ✧ The usual grading scale will be used. This scale may be curved to raise student grades at the instructor's discretion.

[94, 100] A

[90, 94) A-

(87, 90) B+

[83, 87] B

[80, 83) B-

(77, 80) C+

[73, 77] C

[70, 73) C-

(67, 70) D+

[63, 67] D

[60, 63) D-

<60 F

University policies

Academic Integrity Code

Academic integrity is an essential part of the educational process, and all members of the GW community take these matters very seriously. As the instructor of record for this course, my role is to provide clear expectations and uphold them in all assessments. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and otherwise violate the [Code of Academic Integrity](#). If you have any questions about whether or not particular academic practices or resources are permitted, you should ask me for clarification. If you are reported for an academic integrity violation, you should contact the Office of Student Rights and Responsibilities (SRR) to learn more about your rights and options in the process. Consequences can range from failure of assignment to expulsion from the university and may include a transcript notation. For more information, please refer to the SRR website (<https://studentconduct.gwu.edu/academic-integrity>), email rights@gwu.edu, or call 202-994-6757.

University policy on observance of religious holidays

Students must notify faculty during the first week of the semester in which they are enrolled in the course, or as early as possible, but no later than three weeks prior to the absence, of their intention to be absent from class on their day(s) of religious observance. If the holiday falls within the first three weeks of class, the student must inform faculty in the first week of the semester. For details and policy, see "Religious Holidays" at provost.gwu.edu/policies-procedures-and-guidelines.

Use of Electronic Course Materials and Class Recordings

Students are encouraged to use electronic course materials, including recorded class sessions, for private

personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Please contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Please contact Disability Support Services at disabilitysupport.gwu.edu if you have questions or need assistance in accessing electronic course materials.

Academic support

Writing Center

GW's Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online at gwu.mywconline.

Academic Commons

Academic Commons provides tutoring and other academic support resources to students in many courses. Students can schedule virtual one-on-one appointments or attend virtual drop-in sessions. Students may schedule an appointment, review the tutoring schedule, access other academic support resources, or obtain assistance at academiccommons.gwu.edu.

Support for students outside the classroom

Disability Support Services (DSS) 202-994-8250

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services at disabilitysupport.gwu.edu to establish eligibility and to coordinate reasonable accommodations..

Counseling and Psychological Services 202-994-5300

GW's Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success. healthcenter.gwu.edu/counseling-and-psychological-services.

Safety and Security

- In an emergency: call GYPD 202-994-6111 or 911
- For situation-specific actions: review the Emergency Response Handbook at: safety.gwu.edu/emergency-response-handbook
- In an active violence situation: Get Out, Hide Out, or Take Out. See go.gwu.edu/shooterpret

Stay informed: safety.gwu.edu/stay-informed