

# SYRACUSE UNIVERSITY, SPRING 2025 SYLLABUS

## MAT 422, Statistical Computing

### General Information

Course Meetings: MAT 422-M001 (44177), TuTh 9:30AM - 10:50AM, Carnegie 100

Instructor: Thomas John, Ph.D., Carnegie-313D, email: [thjohn@syr.edu](mailto:thjohn@syr.edu), Office Hours: TBA.

### Course Catalogue Description:

Characteristics of data, data preparation and reformatting, accessing data from various sources, programming principles for statistical computing, data summary and visualization, statistical study design aspects of sampling and randomization, introduction to statistical simulation.

Prereq: MAT 222 or permission of instructor

### Shared Competencies:

MAT 422 supports two of Syracuse University's Shared Competencies:

- Scientific Inquiry and Research Skills
- Information Literacy and Technological Agility

### Course Overview:

The goal of the course is to familiarize the student with dealing with aspects of statistical computing. These aspects will have the following major themes:

(1) data preparation and/or reading data from delimited files; (2) organizing data by recoding, relabeling, stacking, and unstacking; (3) basic database queries; (4) basic programming concepts such as functions and loops; (5) data in matrix and multidimensional array forms; (6) data visualization; (7) data summary and basic statistical analyses; (8) basic sampling size determinations; (9) basic randomization schemes; and (10) basic statistical simulation.

### Text:

- *R for Data Science (2e)*, by Hadley Wickham, et. al., [r4ds.hadley.nz](http://r4ds.hadley.nz)
- *Using the R commander : a point-and-click interface for R*, Fox, J. (2017).
  - CRC Press, Taylor & Francis Group.
  - <https://doi-org.libezproxy2.syr.edu/10.1201/9781315380537>
- Useful: R Cookbook, 2nd Ed ([rc2e.com](http://rc2e.com)); R Graphics Cookbook, 2nd ed ([r-graphics.org](http://r-graphics.org))
- Links to additional resources will be announced and provided on the course blackboard page.

### Exam Dates:

- Semester Exam 1: Thursday, February 20<sup>th</sup>
- Semester Exam 2: Thursday, April 3<sup>rd</sup>
- **CUMULATIVE FINAL EXAM:**
  - **Thu, May 1, 2024** (Finals Day 1), **8:00AM-10:00AM** (Period 01)
  - for class periods: TH 9:30AM – 10:50AM

### Special Note on the Final Exam:

**All students must take the cumulative final exam at their scheduled time.**

There will be no exceptions.

### Grading:

Your final grade will be based on two semester exams (15% each), a cumulative final exam (20%), projects (25%) HW/class engagement (25%). Final letter grades will be given according to the following scale:

A (93-100); A- (90-92); B+ (87-89); B (83-86); B- (80-82);  
C+ (77-79); C (73-76); C- (70-72); D (60-70); F (0-59)

### (No) Makeup Policy:

There will be absolutely no make-ups for any reason. If you miss a quiz/test for a valid reason (which must be verified by a documentation from a physician or from SOaR (Student Outreach and Retention) see <https://experience.syracuse.edu/soar/student-support/absence-notifications/>), performance from the corresponding part of a test/final will be used as replacement.

### Homework:

Homework will be assigned regularly and some of the problems may be asked to be turned in. You may discuss these problems with other students, but each of you is expected to write up your own solutions independently. The **best** way to learn this material is to do homework problems. Try as much as possible to do the homework on your own.

### No Extensions on Submission Deadlines:

No extension will be given in any circumstances. If you have a valid excuse, you may be exempted from that assignment, *as long as your excuse covers the entire assignment period- not just the due date only*. Do not wait until the due date to do your assignment. "Internet problems," "Broken laptops," "homework portal down on due date," etc. are not valid excuses.

*This policy is in place also from the perspective of professional responsibilities. A data analyst (or some related title) almost often works under expectations and deadlines (from a team, a client, brand competition, delivery opportunity, regulatory, etc.) and these deadlines are almost always unmovable.*

### Attendance:

You are expected to attend every class and every exam. If you miss a class, it is your responsibility to obtain a copy of the lecture notes for that class from another student. You are also responsible for any announcements about changes to the course schedule, the exam schedule, or the course requirements that were made during that class.

It is a federal requirement that faculty promptly notify the university of students who do not attend or cease to attend any class. Faculty will use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office on non-attendance.

### Phone, Laptop, Tablet in class policy:

Phones, laptops, tablets, and similar electronics are not allowed to be out during class. *This policy will be strictly enforced in class. Repeated violations of this policy will be recorded.* Students who repeatedly violate this policy will be asked to leave the room and the overall course grade will be affected by such behavior. Particularly, calculators on cell phones cannot be used on quizzes/tests.

### Calculators:

You will need a calculator to do the computations that will arise throughout the course. Calculators are not to be shared during exams and quizzes. Also, calculators on cell phones cannot be used on exams.

### Statistical Software:

Students are expected to learn to use statistical software appropriately. R is a free and very reputable software; I will be using it for illustration. Students are expected to learn to use it on their own using the rich resources available on the internet.

### Email Policy:

Syracuse University has established email as a primary vehicle for official communication with students, faculty, and staff. An official email address is established and assigned by Information Technology Services (ITS) for each registered student, as well as for all active faculty and staff members. All University communications sent via email will be sent to this address. Faculty and staff members must use the officially established University email address to communicate with students registered in their classes.

Keep in mind that student records sent to a non-syr.edu email address may create a FERPA violation (See the complete policy at Syracuse University Email Policy).

### Use of Class Materials and Recordings:

Original class materials (handouts, assignments, tests, etc.) and recordings of class sessions are the intellectual property of the course instructor. You may download these materials for your use in this class. **However, you SHALL NOT provide these materials to other parties (e.g., web sites, social media, and other students). Doing so is a violation of intellectual property law and of the student code of conduct.**

### Students with disabilities:

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the Center for Disability Resources (CDR) in this process.

If you would like to discuss disability-accommodations or register with CDR, please visit their website (<https://disabilityresources.syr.edu>). Please call (315) 443-4498 or email [disabilityresources@syr.edu](mailto:disabilityresources@syr.edu) for more detailed information. The CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process.

### Academic Integrity:

As a pre-eminent and inclusive student-focused research institution, Syracuse University considers academic integrity at the forefront of learning, serving as a core value and guiding pillar of education. Syracuse University's Academic Integrity Policy provides students with the necessary guidelines to complete academic work with integrity throughout their studies. Students are required to uphold both course-specific and university-wide academic integrity expectations such as crediting your sources, doing your own work, communicating honestly, and supporting academic integrity. The full Syracuse University Academic Integrity Policy can be found by visiting [class.syr.edu](http://class.syr.edu), selecting, "Academic Integrity," and "Expectations and Policy."

Upholding Academic Integrity includes the protection of faculty's intellectual property. **Students should not upload, distribute, or share instructors' course materials, including presentations, assignments, exams, or other evaluative materials without permission. Using websites that charge fees or require uploading of course material (e.g., Chegg, Course Hero) to obtain exam solutions or assignments completed by others, which are then presented as your own violates academic integrity expectations in this course and may be classified as a Level 3 violation.** All academic integrity expectations that apply to in-person assignments, quizzes, and exams also apply online.

Specifically for this course, the academic integrity aspects relate to quizzes/exams. A student is not allowed to use ANY electronic device except for their calculator during the quiz/exam until the quiz/exam is handed in. Accessing material beyond standard calculator functionalities and any statistical table provided during the quiz/exam will be a violation of academic integrity.
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Students found in violation of the policy are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered. Students may not drop or withdraw from courses in which they face a suspected violation. Any established violation in this course may result in course failure regardless of violation level.

### Artificial Intelligence:

Based on the specific learning outcomes and assignments in this course, artificial intelligence is permitted on certain assignments. See each assignment, quiz, or exam instructions for more information about what artificial intelligence tools are permitted and to what extent, as well as citation requirements. If no

instructions are provided for a specific assignment, then no use of any artificial intelligence tool is permitted. Any AI use beyond that which is detailed in course assignments is explicitly prohibited except when documented permission is granted.

### Religious observances policy:

[Syracuse University's Religious Observances Policy](#) recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their traditions. Under the policy, students are given an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance, provided they notify their instructors no later than the academic drop deadline. For observances occurring before the drop deadline, notification is required at least two academic days in advance. Students may enter their observances in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

### Learning Objectives:

After taking this course, students will be able to:

- access, organize, and re-format data,
- understand and utilize general programming concepts for statistical computing purposes,
- perform data summary and basic statistical analyses,
- generate data visualization and interpret such outputs.

### Key Dates:

Please see <https://www.syracuse.edu/academics/calendars/academic-year/#spring-2025> for the key dates for the semester.

A few are highlighted below:

- First day of classes: Monday, January 13
- Academic/financial drop deadline: Monday, February 3
- Spring break: Sunday, March 9 – Sunday, March 16
- Mid-semester progress report period: Tuesday, March 4 - Tuesday, March 18
- Withdrawal deadline: Tuesday, April 15
- Last day of classes: Monday, April 28