

Intro to Statistics and Data Science (STAT 202)

Summer 2023

Northwestern

Department of Statistics
and Data Science

Course Description

THIS COURSE INTRODUCES students to the discipline of statistics as a science of understanding and analyzing data. Students will learn the importance of data collection and sampling, methods to analyze data, and how to use data to make inferences and conclusions about real world phenomena. Students will be introduced to the free statistical programming software, Posit Cloud, to apply both descriptive and inferential statistics to real data sets.

When:

Asynchronous

Prerequisite: High School Algebra

Instructional Team

Danielle Sass, PhD

Assistant Professor of Instruction

✉ danielle.sass@northwestern.edu

Office Hours - held virtually

📞 [998 6392 3813](tel:99863923813)

MAKE INDIVIDUAL APPOINTMENT/MEETING requests through Campuswire (discussed below) by selecting *Post to instructors and TAs*.

Course Goals

1. USE STATISTICAL SOFTWARE to manage and process data.
2. USE STATISTICAL SOFTWARE to perform exploratory data analyses. That is, explore data numerically and visually to gain understanding through data and generate hypotheses and inferences to later test.
3. RECOGNIZE THE IMPORTANCE of data collection, identify limitations in data collection methods, and determine how they affect the scope of inference.
4. BUILD A CONCEPTUAL UNDERSTANDING of the unified nature of statistical inference.
5. APPLY ESTIMATION AND TESTING METHODS to analyze single variables or the relationship between two variables in order to understand natural phenomena and make data-based decisions.
6. MODEL NUMERICAL RESPONSE VARIABLES using a single or multiple explanatory variables.
7. INTERPRET RESULTS in context without relying on statistical jargon.
8. CRITIQUE AND EVALUATE data-based claims and decisions.



Course Structure

THIS CLASS WILL BE RUN ASYNCHRONOUSLY. Each lesson will feature a short 10-20 minute lecture video, a reading with a corresponding reading check, followed by an activity. There will typically be around 4 lessons a week and a proficiency exam every 2 weeks. To be successful you need to be an independent learner and keep up on the assignments and due dates.

Textbook (Free Online)

WE WILL BE USING [Introduction to Statistics and Data Science](https://nustat.github.io/intro-stat-data-sci/)¹ which is a free online book that we have been developing for this course.

¹ <https://nustat.github.io/intro-stat-data-sci/>

Software

WE WILL BE USING/INTRODUCING the free statistical software [Posit Cloud](https://posit.cloud/).

Posit Cloud (formerly called RStudio Cloud),
<https://posit.cloud/>

Hardware

STUDENTS WILL NEED a laptop or Chromebook to be able to follow lectures and to work with Posit Cloud to complete activities. If access to a laptop is an issue, then please contact the course instructor and we will work to find an accommodation.²

² This requirement will not prevent students from taking this course.

Asking Questions & Course Communication

This term we will be using [Campuswire](#) as our preferred platform for questions about activities, reading checks, 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 questions³, but we strongly encourage students to answer each other's questions. To this end, student will be able to earn bonus points — see Canvas for details.

Enrollment Code: 2776

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

³ Please do not expect answers during weekends and evenings.

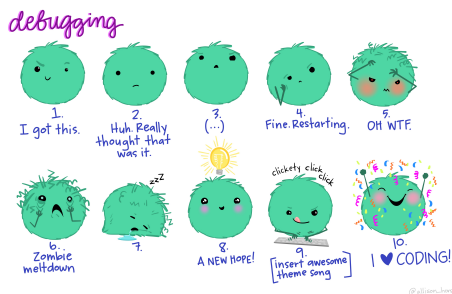
Tips for Success

- DEDICATE YOURSELF to being an active and engaged learner.
- PREPARE FOR CLASS by *reading and working* through code *before* class.⁴
- WORK IN GROUPS TO learn and complete activities⁵.
- ASK QUESTIONS! Ask them during class, office hours, or on Campuswire⁶.
- CONTRIBUTE TO a welcoming and inclusive learning environment.
- DON'T BE AFRAID to make mistakes, you learn from mistakes.

⁴ Complete the reading checks!

⁵ Don't just copy, help each other.

⁶ Be active on Campuswire!



Debugging code is something we all struggle with and go through. It is a process and you will get better over time, but no matter your skill level there will always be struggles.

Illustration by [Allison Horst](#)

Evaluation

STUDENTS WILL BE EVALUATED through (1) reading checks; (2) activities and small assignments; (3) 3 exams; and a (4) final project.

Reading checks will be completed using “Tutorials” on Posit Cloud and uploaded to the course Canvas page. Daily activities will be worth 10 points and graded for completeness.

There will be 3 in-class exams; they will be structured very similarly to your reading checks. Students will be allowed one 8.5 x 11 inch cheat sheet (front & back) on each in-class exams. The exams are not cumulative.

There will be 1 final project. You can complete this individually or in groups of up to 4 people. More information will be provided later in the quarter.

Each reading check will be scaled to be worth 10 points.

Since activity exercises are not graded for correctness, make sure that you check your answers against the solutions.

Missed Exam Policy

There are no make-up exams. The exam must be completed and submitted during the exam window.

Late Policy

NO LATE WORK WILL BE ACCEPTED. Absolutely no assignments will be accepted late without prior approval. Summer is a shortened schedule and moves quickly; activity solutions will be posted immediately after they are due which is why we do not accept late work. To account for these strict due dates, we will drop your 2 lowest reading check scores **and** your 2 lowest activities.

Grading

GRADING SCALE	CATEGORY	WEIGHT
93.0 - 100% A	Activities + Small Assignments	15%
90.0 - 92.9% A-	Reading Checks	15%
87.0 - 89.9% B+	Exam 1	20%
83.0 - 86.9% B	Exam 2	20%
80.0 - 82.9% B-	Exam 3	20%
77.0 - 79.9% C+	Final Project	10%
73.0 - 76.9% C		
70.0 - 72.9% C-		
60.0 - 69.9% D		
Below 59.9% F		

Final grades will be rounded to nearest tenth of a percent. There is NO curve to this course. The exams are open notes.

Students opting to take this course Pass/No Pass must (1) take and pass the final exam with at least a D and (2) earn a course grade of at least a D.

Accessibility & Accommodations

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 process⁷. 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.

⁷ email: accessiblenu@northwestern.edu; phone: 847-467-5530

COVID-19 Policies

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.

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** and update your Symptom Tracker application right away to connect with Northwestern's Case

Management Team for guidance on next steps. Also contact the instructor as soon as possible to arrange to complete coursework. We plan to record sessions for students that miss to to COVID-19 related issues.

STUDENTS WHO EXPERIENCE a personal emergency 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 is prohibited.⁸ Unauthorized recording is unethical and may also be a violation of University policy and state law.

⁸ Including advising sessions or office hours.

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.

This class or portions of this class will be recorded by the instructor for educational purposes. Your instructor will communicate how members of the class can access the recordings. Portions of the course that contain images, questions or commentary/discussion by students will be edited out of any recordings that are saved beyond the current term.

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>

Diversity, Equity, and Inclusion

This course strives to be an inclusive learning community, respecting those of differing backgrounds and beliefs. As a community, we aim to be respectful to all students in this class, regardless of race, ethnicity, socio-economic status, religion, gender identity or sexual orientation.

Sexual Misconduct & Reporting

NORTHWESTERN UNIVERSITY IS COMMITTED to fostering an environment where students are safe and free from sexual misconduct. Confidential resources are available to those who have experienced sexual misconduct.⁹

Faculty, instructors, and TAs are **not** confidential resources and are required to report incidents of sexual misconduct, whether discussed in your assignments or in person, to the Title IX Coordinator, who can provide information about resources and options.

We encourage students who have experienced sexual misconduct to talk with someone to get support. For more information visit the [Get Help](#)¹⁰.

⁹ See <http://www.northwestern.edu/sexual-misconduct/get-help/confidential-support.html> for details.

¹⁰ <http://www.northwestern.edu/sexual-misconduct/get-help/index.html>

Discrimination & Sexual Harassment

NORTHWESTERN UNIVERSITY'S policies on Discrimination, Harassment, and Sexual Misconduct apply to all members of the University community, including students, staff, faculty, and third parties. Any student, staff, or faculty member, or third party, who believes that they have been discriminated against or harassed on the basis of their race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, pregnancy, parental status, marital status, age, disability, citizenship, veteran status, genetic information or any other classification protected by law, should contact the Office of Equity¹¹.

Additional information about the University's discrimination and harassment policies, including the campus resources available to assist individuals with discrimination or harassment concerns, is available online on the [Office of Equity website](#).

NORTHWESTERN STRICTLY PROHIBITS retaliation against any member of its community for reporting or inquiring about wrongful or unlawful activity. For more details see <https://policies.northwestern.edu/docs/non-retaliation-policy-FINAL.pdf>.

¹¹ 847.491.7458

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/>

Student Resources

STUDENT ENRICHMENT SERVICES (SES) PARTNERS with FGLI students – pronounced figly – who are first-generation, lower-income, and/or DACA/Undocumented. SES works with these students to foster identity development, navigate campus resources, and build community. Through campus-wide partnerships and advocacy, SES strives to build an inclusive Northwestern community that is welcoming, supportive, and accessible for all students. SES can connect you to a number of resources (emergency aid assistance, books, supplies, laptops, food accessibility and much more!) both within the SES office and across campus. For more information please visit <https://www.northwestern.edu/enrichment>.

Tentative Course Schedule

Posted on the Course Website!