

Course Information for  
STAT:4580 Data Visualization and Data Technologies  
Semester: Spring 2024  
Lectures: MWF 9:30PM – 10:20PM  
Room: W228 CB

Instructor: Luke Tierney, Schaeffer 209, [luke-tierney@uiowa.edu](mailto:luke-tierney@uiowa.edu).  
Office Hours: Zoom; MWF 10:30 – 11:20 or by appointment.  
Web Page: <https://stat.uiowa.edu/~luke/classes/STAT4580-2024>  
TA Yilin Wang, [yilin-wang-1@uiowa.edu](mailto:yilin-wang-1@uiowa.edu)  
TA Office Hours: Zoom; MTWTH 11:30 – 12:20.  
DEO: Kung-Sik Chan, 241 SH, 335-0712

### Outline

This course introduces common techniques for visualizing univariate and multivariate data, data summaries, and modeling results. Students will learn how to create and interpret these visualizations, and to assess effectiveness of different visualizations based on an understanding of human perception. Data technologies for obtaining and preparing data for visualization and further analysis will also be discussed. Students will also learn how to present their results in written reports and to use version control to manage their work.

### Prerequisites

An introductory statistics course and a regression course. Prior exposure to basic use of statistical programming software, such as R or SAS, as obtained from a regression course, is strongly recommended.

### Text Books

The following are recommended text books:

- Kieran Healy (2018) *Data Visualization: A practical introduction*, Princeton
- Paul Murrell (2009). *Introduction to Data Technologies*, Chapman & Hall/CRC.
- Hadley Wickham, Mine Çetinkaya-Rundel, and Garrett Grolemund (2023) *R for Data Science, 2nd Edition*, O’Reilly.
- Claus O. Wilke (2019) *Fundamentals of Data Visualization*, O’Reilly, Inc.

### Reading and Homework

Homework assignments will be given roughly every week. Assignments will be posted on the class web site. Suggested reading will also be posted on the class web site when appropriate.

Assignments will be written as reports using `Rmarkdown` and submitted electronically. Findings and graphs should always be explained in words, using proper grammar and spelling.

### **Class Project**

Students registered for this class are expected to complete a class project. You can work on this project on your own or in a group of up to three students. Your project should represent about 10 hours of work for each student on developing a visual analysis of a data set of your choosing. A one page proposal for your project is due on Monday, March 18. A final report on your project is due on Friday, May 3. Your project may be shared with the class through the class web page.

### **Grading**

The course grade will be based on quizzes (10%), assignments (70%) and the class project (20%). You may discuss general issues and approaches with your fellow students, but your work must be your own. If you use any references, including solutions to similar problems prepared by other students, you *must* cite and credit your sources.

### **Code of Academic Honesty**

Homework submissions and project submissions are governed by the Code of Academic Honesty. Work you submit must be your own work, not the work of others. If you use ideas or results found elsewhere you must cite them properly. This includes use of an AI-content generator (such as ChatGPT) for any of your work.

**COLLEGE OF LIBERAL ARTS AND SCIENCES**  
**Information for CLAS Undergraduates**  
**Spring 2022**

**ATTENDANCE AND CLASSROOM EXPECTATIONS**

Students are responsible for attending class and for knowing an instructor's attendance policies, which vary by course and content area. All students are expected to attend class and to contribute to its learning environment in part by complying with University policies and directives regarding appropriate classroom behavior or other matters.

**ABSENCES**

Students are responsible for communicating with instructors as soon they know that an absence might occur or as soon as possible in the case of an illness or an unavoidable circumstance. Students can use the CLAS absence form to help communicate with instructors who will decide if the absence is excused or unexcused; the form is located on ICON within the top banner under "Student Tools." Delays by students in communication with an instructor could result in a forfeit of what otherwise might be an excused absence (<https://clas.uiowa.edu/students/handbook/attendance-absences>).

**ABSENCES: ILLNESS, UNAVOIDABLE CIRCUMSTANCES, AND UNIVERSITY SPONSORED ACTIVITIES**

Students who are ill, in an unavoidable circumstance affecting academic work, or who miss class because of a University sponsored activity are allowed by UI policy to make up a missed exam. Documentation is required by the instructor except in the case of a brief illness. Students are responsible for communicating with instructors as soon as the absence is known (<https://opsmanual.uiowa.edu/students/absences-class#8.1>).

**ABSENCES: HOLY DAYS**

The University is prepared to make reasonable accommodations for students whose religious holy days coincide with their classroom assignments, test schedules, and classroom attendance expectations. Students must notify their instructors in writing of any such Religious Holy Day conflicts or absences within the first few days of the semester or session, and no later than the third week of the semester. If the conflict or absence will occur within the first three weeks of the semester, the student should notify the instructor as soon as possible. See [Operations Manual 8.2 Absences for Religious Holy Days](#) for additional information.

**ABSENCES: MILITARY SERVICE OBLIGATIONS**

Students absent from class due to U.S. veteran or U.S. military service obligations (including military service-related medical appointments, military orders, and National Guard Service obligations) must be excused without penalty. Instructors must make reasonable accommodations to allow students to make-up exams or other work. Students must communicate with their instructors about the expected possibility of missing class as soon as possible. (For more information, see <https://opsmanual.uiowa.edu/iv-8-absences-class%2%A0-0>).

**ACADEMIC MISCONDUCT**

All undergraduates enrolled in courses offered by CLAS have in essence agreed to the College's Code of Academic Honesty. Academic misconduct affects a student's grade and is reported to the College which applies an additional sanction, such as suspension. Outcomes about misconduct are communicated through UI email (<https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code>).

**ACADEMIC ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

The University is committed to providing an educational experience that is accessible to all students. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through [Student Disability Services](#) (SDS). SDS is responsible for making Letters of Accommodation (LOA) available to the student. The student must provide a LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated. The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Note that accommodations are not granted retroactively but from the time of the student's request to the instructor onward. Additional information can be found on the [SDS website](#).

**CLASS RECORDINGS: PRIVACY AND SHARING**

Course lectures and discussions are sometimes recorded or live-streamed. These are only available to students registered for the course and the intellectual property of the faculty member. These materials may not be shared or reproduced

without the explicit written consent of the instructors. Students may not share these recordings with those who are not enrolled in the course; likewise, students may not upload recordings to any other online environment. Doing so is a breach of the Code of Student Conduct and could be a violation of the Federal Education Rights and Privacy Act (FERPA); also see <https://dos.uiowa.edu/policies/code-of-student-life/>.

#### **COMMUNICATION: UI EMAIL**

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community ([Operations Manual, III.15.2](#)). Emails should be respectful and brief, with complex matters addressed during the instructor's drop-in hours, for example. Faculty are not expected to answer email after business hours or during the weekends.

#### **COMPLAINTS ABOUT ACADEMIC MATTERS**

Students with a complaint about a grade or a related academic issue should first visit with the instructor and then with the course supervisor (if one is assigned), and next with the Chair of the department or program offering the course. If not resolved, students may bring their concerns to the College of Liberal Arts and Sciences:

<https://clas.uiowa.edu/students/handbook/student-rights-responsibilities>.

#### **FINAL EXAMINATION POLICIES**

The final exam schedule is published during the fifth week of the fall and spring semesters or on the first day of summer classes; *students are responsible for knowing the date, time, and place of their final exams*. Students should not make travel plans until knowing this information. A student with exams scheduled on the same day and time or who have more than two final exams on the same day should visit this page for how to resolve these problems by the given deadline: <https://registrar.uiowa.edu/makeup-final-examination-policies>. No exams may be scheduled the week before finals; some exception, however, have been made for labs, language courses, and off-cycle courses (<https://registrar.uiowa.edu/final-examination-scheduling-policies>).

#### **FREE SPEECH AND EXPRESSION**

The University of Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We are committed to open inquiry, vigorous debate, and creative expression inside and outside of the classroom. Visit Free Speech at Iowa for more information on the University's policies on free speech and academic freedom (<https://freespeech.uiowa.edu/>).

#### **HOME OF THE COURSE**

The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the course's add and drop deadlines, the "second-grade only" option (SGO), and other undergraduate policies and procedures. Different UI colleges may have other policies or deadlines. See <https://clas.uiowa.edu/students/handbook>. Questions? Contact CLAS at [clasps@uiowa.edu](mailto:clasps@uiowa.edu) or 319-335-2633.

#### **MENTAL HEALTH**

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at [counseling.uiowa.edu](https://counseling.uiowa.edu). Find out more about UI mental health services at: [mentalhealth.uiowa.edu](https://mentalhealth.uiowa.edu). Student Health can also address related concerns (<https://studenthealth.uiowa.edu/>). These visits are free to students. After hours, students are encouraged to call the Johnson County Community Crisis Line at (319) 351-0140 or dial 911 in an emergency.

#### **NON-DISCRIMINATION STATEMENT**

The University of Iowa prohibits discrimination in employment, educational programs, and activities on the basis of race, creed, color, religion, national origin, age, sex, pregnancy, disability, genetic information, status as a U.S. veteran, service in the U.S. military, sexual orientation, gender identity, associational preferences, or any other classification that deprives the person of consideration as an individual. The university also affirms its commitment to providing equal opportunities and equal access to university facilities. For additional information on nondiscrimination policies, contact the Director, [Office of Institutional Equity](#), the University of Iowa, 202 Jessup Hall, Iowa City, IA 52242-1316, 319-335-0705, [oi-e-ui@uiowa.edu](mailto:oi-e-ui@uiowa.edu). Students may share their pronouns and chosen/preferred names in [MyUI](#), which is accessible to instructors and advisors.

## **SEXUAL HARASSMENT**

The University of Iowa prohibits all forms of sexual harassment, sexual misconduct, and related retaliation. The [Policy on Sexual Harassment and Sexual Misconduct](#) governs actions by students, faculty, staff and visitors. Incidents of sexual harassment or sexual misconduct can be reported to the [Title IX and Gender Equity Office](#) or to the [Department of Public Safety](#). Students impacted by sexual harassment or sexual misconduct may be eligible for academic supportive measures and can learn more by [contacting the Title IX and Gender Equity Office](#). Information about confidential resources can be found [here](#). Watch the [video](#) for an explanation of these resources.