Stat 585 Spring 2023 - Syllabus

Stat 585 Data Technologies for Statistics

- Department of Statistics
- TR 2:10 - 3:25 pm Lagomarcino 1445
- synchronous zoom link: **https://iastate.zoom.us/j/95081380316?pwd=R2M4SjFzbXByL0hKQXVrMVFpZ0VhUT09 (https://iastate.zoom.us/j/95081380316?pwd=R2M4SjFzbXByL0hKQXVrMVFpZ0VhUT09&from=addon)**
- office hours:
  - TBD

The information in this syllabus is subject to change in extenuating circumstances. Changes to the course syllabus will be provided in writing and announced via course-wide announcements.

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Instructor Information and Student Hours

- Instructor's name: Professor Heike Hofmann
- Instructor's email address: **hofmann@iastate.edu (mailto:hofmann@iastate.edu)**
- Office address: Snedecor 2413

- TA's name: Ganesh Krishnan
- TA's email address: **ganeshk@iastate.edu (mailto:ganeshk@iastate.edu)**
- Student campus hours: TBD
- Student virtual hours: TBD

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Course Format

This course is administered as an in-person, face-to-face course. Our regular meeting times are 2:10-3:25 pm on Tuesdays and Thursdays in 1445 LagoMarcino.

We will be using a lot of hands-on examples in class, so make sure to bring along your laptop to get the most out of the class session.

Attendance is encouraged, however, if you feel unwell, please stay at home and take care of yourself. You can also attend via the synchronous zoom link given above.

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Course Goals and Learning Objectives (CO)

Not all data lives in nice, clean spreadsheets, not all data fits in a computer's main memory. As statisticians, we cannot always rely on other people and sciences to get the data into formats we can deal with: we will discuss aspects of statistical computing as they are relevant to data analysis. Read and work with data in different formats: flat files, databases, and web technologies. Elements of literate programming help us with making our workflow transparent and analyses reproducible. We will discuss the communication of results in the form of R packages and interactive web applications.

Learn how to...

- read and combine data from flat files, SQL database, binary netCDF, and use web technologies as a data source.
- compute with data.
- clean the data, check the quality, impute missing values.
- write efficient and reproducible code, so others can replicate the analysis.
- develop software, individually and collaboratively, debug, profile, and package R code.
- experiment with event-driven programming to build an interactive web app, and a GUI.
- pull data together to solve a contemporary problem.

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Course Materials

There is no single book suitable for this course. Instead, we will use a mix of different textbooks and papers.

Required materials

- Hadley Wickham: Advanced Programming in R, **https://github.com/hadley/adv-r (https://github.com/hadley/adv-r)**
- Hadley Wickham: R packages, **http://r-pkgs.had.co.nz/ (http://r-pkgs.had.co.nz/)**
- Yihui Xie: Dynamic Documents with R and knitr, **https://github.com/yihui/knitr-book (https://github.com/yihui/knitr-book)**
- Yihui Xie, bookdown: Authoring Books and Technical Documents with R Markdown, **https://bookdown.org/yihui/bookdown/ (https://bookdown.org/yihui/bookdown/)**
- Additional readings will be made available through Canvas.

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Learning Activities and Assessments

Learning Activities

To successfully complete this course, students will do the following:

- Read assigned materials
- Write weekly blog posts
- Participate as active team members in small group labs
- Complete a final project as an active member of a small team of students
- Present the final project to the class

Assessments

Blogs (10):

There will be ten blogs asking for reflections based on an assigned reading. Each blog post is worth 10 points. Blog prompts will be made available on Thursdays and are due on Thursdays the following week.

Lab (4):

Students are asked to participate as active members of small, randomly assigned teams. Lab materials will be assigned every second Thursday in class. Finished products are due by 10 pm on Monday the following week.

Final Project (1):

For a final project, students are asked to work in small teams on a problem of public interest. Students can choose topics by themselves, Approaches to the topic should use the methodology taught in the course.
The final project consists of a written report (vignette of documented package) and a presentation to the class.

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Grading Policies

Grading Schema

You can accumulate points by participating in the following way:

Table 1. Maximum Number of Points

Participation area	Total Points	Percentage of Final Grade
Readings and Blogs (10)	100	15
Labs (4)	400	40
Final Project - Written Report	100	30
Final Project - Presentation	25	15

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Free Expression

Iowa State University supports and upholds the **First Amendment protection of freedom of speech (https://www.studentconduct.dso.iastate.edu/know-the-code-resources/resources-for-students/harassment-and-free-speech/free-speech)** and the **principle of academic freedom (https://www.iowaregents.edu/plans-and-policies/board-policy-manual/310-academic-freedom)** in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the **Dean of Students Office (https://www.studentconduct.dso.iastate.edu/academic-misconduct/armfacultystaff)**.

Accessibility

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a

documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at **http://www.sas.dso.iastate.edu, (http://www.sas.dso.iastate.edu/)** by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu.

Prep Week

This class follows the Iowa State University Prep Week policy as noted the ISU Policy Library; as well as section 10.6.4 of the Faculty Handbook. Visit the **ISU Policy Library website (https://www.policy.iastate.edu/)** (http://www.policy.iastate.edu/) for policy wording.

Religious Accommodations

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the **Dean of Students Office website (https://dso.iastate.edu/)** (http://dso.iastate.edu/) or via phone 515-294-1020 or the **Office of Equal Opportunity website (https://www.eoc.iastate.edu/)** (https://www.eoc.iastate.edu/) or via phone 515-294-7612.

Contact Information for Academic Issues

If you are experiencing, or have experienced, a problem with any of the above statements, email academicissues@iastate.edu.

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