STAT 3200: Applied Linear Regression

Spring 2021
2:30 pm – 3:20 pm MWF in 106 GILH (Gilmore Hall)

| Instructor: | Sanvesh Srivastava |
| Email: | sanvesh-srivastava@uiowa.edu |
| Office: | 219 SH |
| Office hours: | Mondays, Wednesdays, and Fridays from 3:25 pm – 4:25 pm via Zoom |
| Lectures: | 2:30 pm – 3:20 pm MWF in 106 GILH |
| Website: | Canvas [https://uiowa.instructure.com/](https://uiowa.instructure.com/) |

Departmental Information and Executive Officer

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Website: [http://www.stat.uiowa.edu](http://www.stat.uiowa.edu)

Textbook, software, and course materials

*Applied Regression Analysis & Generalized Linear Models, 3rd edition*, by John Fox.

We will use the R software extensively in this course. R is open-source statistical software and is freely available at [http://www.r-project.org](http://www.r-project.org). I also recommend using RStudio, integrated development environment, to interact with R. You can download and install these software as follows:

- **Windows:** Download and install R from the website [http://cran.r-project.org/bin/windows/base/](http://cran.r-project.org/bin/windows/base/) Similarly, download and install RStudio from the website [https://rstudio.com/products/rstudio/download/](https://rstudio.com/products/rstudio/download/).
- **Macintosh:** In my opinion, the best way to install R on Macintosh is through brew, which is available at [https://brew.sh/](https://brew.sh/)
  - install brew by pasting
  ```bash
  /bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"
  ```
  in your terminal *(note: please type the quotes in the command otherwise it may not work)*;
– paste the following two commands in your terminal to install R and RStudio using brew
  * install R by pasting `brew cask install r` in your terminal; and
  * install RStudio by pasting `brew cask install rstudio` in your terminal.

**Course Description and objectives**

Regression analysis with focus on methodology and theoretical background, applications, and hands-on data analysis with computer software (primarily R). Coverage includes examining and transforming data; modelling strategies; simple, multiple and dummy variable regressions; single- and multi-factor ANOVAs; ANCOVA; diagnostics of influential data; model adequacy checking; model selection; generalized linear models including logistic regression; interpretation and presentation of analysis results; simulations.

Upon completion of the course students are expected to

- acquire a strong foundation in classical methods required for analysis of various data types, including modelling, estimation, inference, computation and interpretation/delivery of statistical findings;
- have a good understanding of theoretical foundation and reasoning behind methodology and applications;
- be able to conduct comprehensive and thorough data analysis using classical methods; and
- gain critical thinking in data analysis and be able to evaluate, justify or improve data analysis.

**Pre-requisites**

STAT 2020 or STAT 2010 or STAT 3120.

**Attendance**

Attending classes is required, but I won’t take attendance.

**Office hours**

The instructor is *available for office hours via Zoom*. The available slots for scheduling the office hour meetings are every Monday, Wednesday, and Friday from 3:25 pm – 4:25 pm. If you are unable during these times, then you should email the instructor for an appointment and suggest a set of time slots that suit you. *You should email early enough so that the instructor has enough time to schedule a meeting.*

The *zoom link* for all the personal meetings for office hours is [https://uiowa.zoom.us/j/4107308187](https://uiowa.zoom.us/j/4107308187)
Grades

Your grade will consist of Homework (30%), Midterm I (20%), Midterm II (20%) and a Final Exam (30%). At the end of the semester, HW, Quizzes, Midterm I and II, and Final grades will be normalized within each category in order to calculate the final course grade. Specifically, your final numerical grade percentage is calculated using the following formula

\[ 0.30 \text{ HW} \% + 0.20 \text{ Midterm I}\% + 0.20 \text{ Midterm II}\% + 0.30 \text{ Final}\% . \]

The two midterms will be conducted in class. The duration of the final exam will be 2 hours, and its timing is decided by the university administration.

A plus-minus grading system will be used. Here is a tentative grading scale: A,A-: 88%–100%, B+,B,B-: 72%–88%, C+,C,C-: 55%–72%, D: 40%–55%, F:<40%. A+ will be given only in exceptional cases. I reserve the right to change the grade distribution by 10% so that it suits the diversity of students in the class.

Homework

Homework will be assigned periodically and posted on Canvas. Homework submission will be online and the students are expected to upload a scanned (or typed) copy of their homework. Your work and its scanned copy must be legible and include your name at the top to receive credit. Any exceptions will be announced in class or in Canvas. Due to time constraints, the grader may grade only some of the assigned questions, but you are responsible for understanding all questions. Homework will be usually assigned each week on Fridays and will be due on the following Friday at the beginning of the class. Any exceptions will be announced in class or on Canvas. Due to time constraints, the grader may grade only some of the assigned questions, but you are responsible for understanding all questions.

Students are allowed to discuss homework assignments, but everyone should do their own programming and write up their own answers; no blind “copying” is permitted.

All homework will contribute towards your final grade. Unless prior arrangements are made well in advance, for reasons judged to be acceptable by me, late homework will receive zero credit as solutions will be posted soon after the homework is due.

Exams

There will be two midterm exams and one final exam. The final exam will be comprehensive and cumulative. All exams will be closed book. You will be allowed one A4-sized handwritten “cheat-sheet” in each midterm. For the final exam, you will have three “cheat-sheets,” one for the final and two previously used in the midterms.

Grading Errors

Although every effort will be made to mark your work accurately, sometimes grading mistakes happen. If you believe that an error has been made on an in-class problem or exam, return the paper to the instructor immediately, stating your claim in writing.
Important Dates

Check the office of the registrar website for the academic calendar:
https://registrar.uiowa.edu/academic-calendar#!spring-2020

Some important tentative dates for STAT 4101:001 are as follows:

<table>
<thead>
<tr>
<th>Midterm I:</th>
<th>Tue, Feb 25</th>
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<tr>
<td>Midterm II:</td>
<td>Tue, Apr 07</td>
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<tr>
<td>Final Exam:</td>
<td>Mon, May 11 – Fri, May 15 (to be decided by the university)</td>
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College of Liberal Arts and Sciences: Policies and Procedures

http://clas.uiowa.edu/faculty/teaching-policies-resources

Administrative Home of the Course The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed in 120 SH or see the CLAS Student Academic Handbook:
www.clas.uiowa.edu/students/academic_handbook/index.shtml

Electronic Communication University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa email address (@uiowa.edu). Students should check this account frequently. (Operations Manual, III.15.2. Scroll down to k.11.)

Academic Fraud Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Student Academic Handbook.

Making a Suggestion or a Complaint Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Accommodations for Disabilities A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. www.uiowa.edu/~sds/

Understanding Sexual Harassment Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment at www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. (Operations Manual, IV.16.14. Scroll down to e. h. and i.)