

**The University of Iowa
The College of Liberal Arts and Sciences
Fall 2023**

Title of Course: Bayesian Statistics, STAT:4520

Course meeting time and place: 10:30-11:20 AM MWF 60 SH

Department of Statistics and Actuarial Science: <https://stat.uiowa.edu>

Course ICON site: To access the course site, log into [Iowa Courses Online \(ICON\)](https://icon.uiowa.edu/index.shtml) <https://icon.uiowa.edu/index.shtml> using your Hawk ID and password.

Course Home:

For Undergraduate Courses: The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the “second-grade only” option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.

For Graduate Courses: The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the [academic deadlines set by the Graduate College](#).

Prerequisites: STAT:3200 and (STAT:3101 or STAT:4101 or STAT:3120)

Instructor: Joyee Ghosh

Office location: 372 SH

Student drop-in hours:

Monday: 4:30-5:30 PM and Friday: 2:00-3:00 PM by Zoom

Wednesday: 2:00-3:00 PM in 241B SH

Students are invited to drop by during these hours to discuss questions about the course material or concerns. I am available by appointment if you are unable to attend my drop-in hours.

Phone: 319-335-0816

E-mail: joyee-ghosh@uiowa.edu

DEO: Professor Kung-Sik Chan, Office: 241 SH, Email: kung-sik-chan@uiowa.edu

Description of Course and Learning Objectives:

Students will learn to do statistical analysis of data from a Bayesian perspective. Different models will be considered, including linear regression models, hierarchical models, and logistic regression models. Issues of model formulation, computation, model checking, and sensitivity analysis will be considered, and illustrated with real statistical analyses.

Students will learn to use software packages and R for carrying out Bayesian data analysis. Tentatively, the plan is to cover chapters 7 through 13 of the textbook, and additional topics if time permits.

Software: We will use the statistical language R for this course, which can be downloaded from <https://cran.r-project.org/>.

Textbook/Materials: Required: Probability and Bayesian Modeling, Albert and Hu (Bookdown version available at <https://bayesball.github.io/BOOK/probability-a-measurement-of-uncertainty.html>)

Supplementary: Applied Bayesian Statistics, Cowles

Supplementary: A First Course in Bayesian Statistical Methods, Hoff

Academic Honesty and Misconduct:

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to [these procedures](#). Graduate academic misconduct must be reported to the Graduate College according to Section F of the [Graduate College Manual](#).

Student Complaints:

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS [Associate Dean for Graduate Education and Outreach and Engagement](#) when additional support is needed.

Drop Deadline for this Course:

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar’s website](#). Undergraduate students can find policies on dropping and withdrawing [here](#). Graduate students should adhere to the [academic deadlines](#) and policies set by the Graduate College.

Homework assignments:

I expect to give homework assignments almost every week. I will usually assign the homework on Wednesday and it will be due on ICON the following Wednesday.

HW should show name and HW number written at the top of the first page. Please upload HW as Word or [PDF](#) documents. You may take a picture of your handwritten

HW and embed in Word. If you have an iPhone, you can use the ``Notes'' app to create a new note. Choose the camera icon and then select ``Scan Documents''. This automatically saves all the scanned handwritten pages in a single PDF file. Please be considerate to the grader and double check that your uploaded scanned documents are readable (not too small or large fonts etc.).

You can discuss homework assignments with me or other students, but the final write-up should be from your own understanding. While assignments do not have to be type-written, please provide figures or R code, when applicable. For written problems always show your work, not just the final answer.

Exams:

There will be two closed book 50 minutes midterm exams in class, in the weeks of October 4, 2023 and November 8, 2023 tentatively. You may bring a 8.5'' by 11'' hand-written formula sheet (both sides written).

There will be a closed book two hours final exam (date to be announced later). You may bring three 8.5'' by 11'' hand-written formula sheet (both sides written).

If an exam is missed, a make-up exam will be permitted only if the circumstances of missing the exam satisfy university policy (documentation will be required in such a case).

Attendance:

Regular attendance is expected.

Grading System and the Use of +/-:

A plus-minus grading system will be used. As a rough guide A, A-: 88-100%, B+,B,B-: 75-88%, C+,C,C-: 50-75%, D+,D,D-: 40-50%, F:<40%.

I may lower the cut-offs depending on the difficulty of the exam. The A+ grade is rarely awarded.

Course Grades:

Final course grades will be assessed based on the following:

- Homework assignments (15%)
- Midterm exams (25% each)
- Final exam (35%)

Date and Time of the Final Exam:

The final examination date and time will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. **Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam.** According to Registrar's final exam policy, students **have a**

maximum of two weeks after the announced final exam schedule to request a change if an exam conflict exists or if a student has more than two exams in one day (see the [policy](#) here).

Other Expectations of Student Performance

Activities which are unacceptable are (1) prolonged conversation with a fellow student, (2) the use of cell phones, and (3) the use of laptops/tablets etc. in class unless it is used for taking notes. **Please remember to switch your phones to silent mode before class starts and put away laptops/tablets/phones etc. when in class.**

College of Liberal Arts and Sciences (CLAS) Course Policies:

Attendance and Absences

[University regulations require that students be allowed to make up examinations](#) that have been missed due to illness, religious holy days, military service obligations (including service-related medical appointments), or other unavoidable circumstances or University-sponsored activities. Students with UI-authorized activities must discuss their absences with the instructor as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

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. For the privacy and the protection of student records, UI faculty and staff can only correspond with UI email addresses.

Where to Get Academic Support for this Course

Students can use drop-in student hours listed in syllabus. Tutor Iowa central academic support site lists private tutors for some courses: <https://tutor.uiowa.edu/>.

Mental Health Resources and Student Support

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. Find out more about UI mental health services at mentalhealth.uiowa.edu.

[Student Care and Assistance](#) provides assistance to University of Iowa students who are experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs

such as food and shelter. More information on the resources related to basic needs can be found at basicneeds.uiowa.edu/resources/. Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, dos-assistance@uiowa.edu, or 319-335-1162) for support and assistance with resources.

[University Policies](#)

[Accommodations for Students with Disabilities](#)

The University is committed to providing an educational experience that is accessible to all. 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. **The student must provide an 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. Additional information can be found on the [SDS website](#).

[Free Speech and Expression](#)

[Absences for Religious Holy Days](#)

[Classroom Expectations](#)

[Non-discrimination](#)

[Sexual Harassment/Misconduct and Supportive Measures](#)