

Statistical Methods and Computing - STAT:2010, STAT:4200 Fall 2025

The University of Iowa
The College of Liberal Arts and Sciences

Instructor: Prof. Erning Li, 231 SH, phone 335-0820, *erning-li@uiowa.edu*

Office hours: MWF 2:00–3:00pm, or by appointment.

Teaching Assistant (Lab/discussion instructor): TBA

Office hours: TBA

Grader: TBA

Department Information: Department of Statistics and Actuarial Science, 241 SH, 335-2082,
<https://www.stat.uiowa.edu/>

DEO: Professor Kung-Sik Chan, 241 SH, 335-0712, *kung-sik-chan@uiowa.edu*

Class Meetings:

- **Lectures:** 10:30A - 11:20A MW W151 PBB

Prof. Li will cover new materials during lectures. Answers to questions in lecture notes will be discussed and provided in class.

- **Labs/Discussions:** Friday, 41 SH (computer lab)

Each student should have registered for one of the weekly lab/discussion sessions and will only need to attend that one session. The TA will demo SAS and lead discussions. The TA will also post lab/discussion materials in the ICON course website under “Modules” navigation. During most labs, students need to log into UI Virtual Desktop to use SAS (see instructions in ICON).

- **SAS Software:** a statistical software package that is widely used in business, industry, government, and research. Computing using SAS is taught and required throughout the semester. Students can use SAS on the UI Virtual Desktop at no cost.

ICON Course Website: <https://icon.uiowa.edu/> (log into and choose this course)

- Course materials including syllabus, lecture notes, lab/discussion materials, homework assignments, online quizzes, grades, answer keys, etc. will be posted on ICON. See “Modules” regularly for updates. Important announcements to the class will be emailed via the ICON class roster.

My lecture notes posted on ICON in advance will be intensively used. Students are strongly recommended to diligently take additional notes in class.

- See “ICON Direct eTexts” for the eText.
- See “Assignments” for homework assignments and quizzes, and submit them by their deadlines.
- **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.

Required Textbook: *The Basic Practice of Statistics*, 9th edition, by Moore, Notz, and Fligner, 2021, Macmillan Learning. ISBN: 9781319244378

Note: This textbook is provided through ICON Direct, access under “ICON Direct eTexts” in ICON, and your U-Bill will be charged for this e-text, unless you *opt out* <https://teach.its.uiowa.edu/icon-direct-opt-out> prior to the “tuition and fee reduction” course deadline (<https://registrar.uiowa.edu/course-deadlines>).

Faculty are not responsible for providing students with alternative materials or waiving course requirements. I impose no restriction on the version (e-book, paper book, loose-leaf, or used) of the textbook that students obtain. Nearly all of the textbook contents will be covered in this course and many exercises from the textbook will be assigned.

Recommended resource for SAS: *The Little SAS Book*, Delwiche and Slaughter, 2012, SAS Institute. Search for the book title with infoHawk+ at <https://www.lib.uiowa.edu> to access this e-book for free.

Course Description and Objectives: Through hands-on experience with real data from a wide variety of applications, students will learn basic methods required for data analysis and interpretation. The emphasis will be on formulating questions, choosing appropriate statistical techniques for a given problem, verifying whether the assumptions behind the techniques are met by the dataset, drawing appropriate conclusions from the analysis, and communicating the results. Students will learn to use SAS to produce data visualization and analysis results. STAT:2010 is a GE (General Education) in Quantitative or Formal Reasoning.

This is an introductory statistics course with focus on methodology and reasonings, applications and hands-on data analysis, and basic statistical computing. Upon completion of the course students are expected to

- gain good understanding of statistical concepts, reasoning, and logic of statistical inference;
- understand and interpret basic statistical analysis results;
- conduct basic data visualization and analysis using SAS;
- appropriately deliver statistical findings.

Regular Homework:

- As an essential component of the course, regular homework will be assigned periodically in ICON; mostly week-long assignments. Students submit homework using file upload in ICON by its due date and time—have all your pages in a single file (Word doc, PDF, or clear and readable images/scans) of a reasonable size. Please double check your submission each time—a score of zero will be given if a submission contains a wrong file or cannot be opened, and points will be deducted in case of missing pages. Submission via email won’t be accepted/graded.
- The grade from the single lowest-scoring homework assignment (only one) will be dropped.
- Unless prior or prompt arrangements are made for reasons judged to be acceptable by Prof. Li, homework turned in after it is due will receive 0 (zero) credit. Homework submitted via email to me or grader won’t be accepted/graded. Additionally, as answer keys will be posted soon after an assignment is graded, late homework submission will only be considered in exceptional circumstances and with prior or prompt notification.

- Students are allowed to discuss homework assignments, but every student is responsible for submitting their own work, reflective of their own effort (write up their own individual answers and do their own computing). If “blind copying” in a student’s answer sheets is identified, all involved students will receive zero score and be considered as plagiarism.

Low-stakes Quizzes: There are 3 quizzes; prior to an exam, an online quiz will be given in ICON as a practice and discussed in class.

Exams:

Midterm 1 **Monday October 6, 10:30A - 11:20A**

Locations: TBA

Midterm 2 **Monday November 10, 10:30A - 11:20A**

Locations: TBA

Final Exam TBA by the University

The following rules apply to all exams and makeups:

- Any unexcused absence from an exam will result in a score of zero with no opportunity for a makeup. A makeup exam will be considered *only* with documentation of reasons required by university policy and under prior or prompt arrangement made with Prof. Li (e.g., no later than the exam day). If a documented excuse is accepted, a makeup exam will be given *as soon as possible*.

To request a makeup exam, you must provide full, irrefutable, and truthful documentation of a university-approved excuse. Acceptable examples include a doctor’s note, a police report for an accident, a pastor’s note for a funeral, or a web link to an obituary. The documentation must include your name, indicate a university-approved excuse that conflicts with the exam date, and be subject to verification for authenticity. This policy ensures fair and consistent treatment for all students in the class.

- All exams and makeups will be in-person, proctored, and must be completed on time. Exams not turned-in within the allotted time will not be accepted.
- You can bring one standard letter-size (about 8.5in × 11in) sheet of paper with anything you want written or typed on both sides to each midterm exam, and three such self-prepared help sheets to the final exam. Also bring a scientific calculator (any type) to each exam. Other than these, all exams are closed-book, closed-notes, and no-computer. A review for each exam will be given in class.
- The midterm exams are given at regular class meeting times.
- The final examination date and time will be announced by the Registrar generally by the fifth week of classes. 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 the 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 scheduled for the same day (see the policy here). See the University Final Exam Policies at <https://registrar.uiowa.edu/final-exam-policies>.

Grading: A numerical final score on the scale of 0 to 100 will be determined according to the following breakdown:

$$(\text{Homework}) \times 18\% + (\text{Quizzes}) \times 4\% + (\text{Midterm 1}) \times 24\% + (\text{Midterm 2}) \times 24\% + (\text{Final exam}) \times 30\%.$$

Conversion of these scores into letter grades will be made according to the following scale:

For STAT:2010

[100, 90] A+, A; (90, 80] A-, B+, B; (80, 65] B-, C+, C; (65, 45] C-, D+, D, D-; < 45 F.

- At the discretion of Dr. Li, depending on class performance and attendance/participation in lectures and labs, these ranges may be adjusted, but only downward - criteria will only become easier, not harder.
- Plus (+) and minus (-) gradings will be given as deemed appropriate. A+ grade will be used to indicate rare and extraordinary academic achievement.

For STAT:4200

[100, 90] A+, A, A-; (90, 80] B+, B, B-; (80, 65] C+, C, C-; (65, 50] D+, D, D-; < 50 F.

Integrity of Course Materials: I request that you preserve the integrity of the course materials.

This means that under no circumstance should you make public (either in print or via web postings, social networks, etc.) or disseminate any course materials such as lecture notes, handouts, assignments, exams, quizzes, solutions, recordings, textbook, reference books, etc. You must also strive to avoid making use of any solutions provided by anyone outside of this class. Compliance with this request will be considered part of the academic honesty requirements discussed further below under Administrative Policies.

Attendance and Classroom Environment: Participation in course activities (in both lectures and labs) is very vital to your success in this course. Students are expected to attend all lectures and labs. Roll may be taken on random days. Students who are absent from class without acceptable excuse should not seek help regarding missed lectures during my office hours.

When in class, please refrain from talking on cell phones, texting, using laptops/tablets (if not for note-taking purpose), and prolonged conversation with a fellow student. Wireless-capable devices such as laptops, tablets, smart phones, etc. must be put away during exams.

Comment on AI: AI tools are widely available and sometime useful for learning and practices.

However, to learn well and master the course material, you need to study and practice by yourself and don't rely on AI to do assignments for you; it will not be available for use on exams.

Extra Help:

- Hours for the free Statistics Tutorial Lab: <https://stat.uiowa.edu/resources/tutoring>
- A list of Private For-Pay Tutors: <https://stat.uiowa.edu/resources/tutoring>

Topics:

Schedule	Reading	Coverage
Week 1-2	Chapters 1-2	Fundamental concepts, variables types, SAS computing tutorial, graphical displays of data, numerical summaries of data.
Week 3-4	Chapter 3	Normal distributions, Standard Normal, Normal probability plot.
Week 4-5	Chapters 4-5, 7	Scatterplot, correlation, linear regression.
Week 6	Chapters 8-11	Random sampling, observational studies, experiments, data ethics.
Week 7-9	Chapters 12-14	Introductory probability, counting techniques, rules and theorems of probability, conditional probability, independence, random variables, pmf, pdf, cdf, Binomial distribution, Normal approximation to Binomial.
Week 9-10	Chapters 15-16	Estimator, standard error, sampling distributions, sampling distribution of sample mean, Central Limit Theorem, basics of confidence intervals, confidence interval for population mean.
Week 11	Chapter 17	Basics of hypothesis test, p-value, one-sample z test.
Week 11-12	Chapters 18-20	More about inference, sample size determination, one-sample t test and confidence interval about mean, checking assumptions.
Week 13	Chapter 22	z test for proportion, checking assumptions.
Week 13-14	Chapters 21-24	Two-sample tests: F test for variance comparison, pooled t test, Satterthwaite t test, and paired t test for mean comparison.
Week 14	Chapter 26	Inferences for linear regression, checking assumptions.
Week 14-15	Chapters 25, 27	One-way ANOVA, Chi-square test (if time allows).

Course's College (Administrative Home)

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.

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 DEO (Chair) of the department, school or program offering the course. Sometimes students will be referred to the department or program's Director of Undergraduate Studies (DUS) or Director of Graduate Studies (DGS). See the CLAS Student Academic Handbook.

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 Graduate Affairs Manager when additional support is needed.

Drop Deadline for this Course

You may drop an individual course before the drop deadline; after this deadline you will need collegiate approval. 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. To discuss how dropping (or staying in) a course might affect your academic goals, please contact your Academic Advisor. Directions for adding or dropping a course and other registration changes can be found on the Registrar's website. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the college's standards 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.

<http://clas.uiowa.edu/academics/handbook/standards/academic-honesty>

Accommodations for Students with Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which include but are not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS.

See <http://sds.studentlife.uiowa.edu/> for more information.

Absences from Class

University regulations require that students be allowed to make up examinations which have been missed due to illness, religious holy days, military service obligations, including service-related medical appointments, jury duty, or other unavoidable circumstances or other university-sponsored activities. Students should work with their instructors regarding making up other missed work, such as assignments, quizzes, and classroom attendance.

Absences for Religious 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 Policy Manual 8.2 Absences for Religious Holy Days for additional information

Absences for Military Service Obligations

Students absent from class or class-related requirements due to U.S. veteran or U.S. military service obligations (including military service-related medical appointments, military orders, and National Guard Service obligations) shall be excused without any grading adjustment or other penalty. Instructors shall make reasonable accommodations to allow students to make up, without penalty, tests and assignments they missed because of veteran or military service obligations. Reasonable accommodations may include making up missed work following the service obligation; completing work in advance; completing an equivalent assignment; or waiver of the assignment without penalty. In all instances, students bear the responsibility to communicate with their instructors about such veteran or military service obligations, to meet course expectations and requirements.

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 the Free Speech at Iowa website for more information on the university's policies on free speech and academic freedom.

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 (including childbirth and related conditions), disability, genetic information, status as a U.S. veteran, service in the U.S. military, sexual orientation, gender identity, or associational preferences. The university also affirms its commitment to providing equal opportunities and equal access to university facilities. For additional information on nondiscrimination policies, contact the Senior Director, Office of Civil Rights Compliance, the University of Iowa, 202 Jessup Hall, Iowa City, IA 52242-1316, 319-335-0705, ui-ocrc@uiowa.edu. Although not required, students have the option to share their pronouns and chosen/preferred names in class and through MyUI. Instructors and advisors can find information about a student's chosen/preferred name in MyUI.

Classroom Expectations

Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life. While students have the right to express themselves and participate freely in class, it is expected that students will behave with the same level of courtesy and respect in the virtual class setting (whether asynchronous or synchronous) as they would in an in-person classroom. Failure to follow behavior expectations as outlined in the Code of Student Life may be addressed by the instructor and may also result in discipline under the Code of Student Life policies governing E.5 Disruptive Behavior or E.6 Failure to Comply with University Directive.

Policies on sexual harassment and other policies and resources

<https://provost.uiowa.edu/student-course-policies>

The policy regarding severe weather

<https://opsmanual.uiowa.edu/community-policies/extreme-weather-protocol>