

STAT:2010 Statistical Methods and Computing Spring 2024

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

Office hours: MWF 1:00–2:00 pm, or by appointment.

Teaching Assistant (Lab instructor): Ting-Hung Yu, 213 SH, ting-hung-yu@uiowa.edu

Office hours: TBA, or by appointment.

Grader: Ethan Murra, ethan-murra@uiowa.edu

Department Information: Department of Statistics and Actuarial Science, 241 SH, 335-2082.

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

Class Meetings:

Lectures: MW 11:30A–12:20P, 101 BCSB

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

Each student should have registered for one of the lab/discussion sessions and will only need to attend that one session. During most labs, students need to log into UI Virtual Desktop (<https://virtualdesktop.uiowa.edu>) to use SAS.

Required Textbook:

The Basic Practice of Statistics, 9th edition, by Moore, Notz, and Fligner, 2021, Macmillan Learning.

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.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 resources:

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.

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. Check “Modules” regularly for updates.

- Submit homework and do quizzes by their deadlines in “Assignments.”

Communication: UI Email—have your UI email address in the class roster and use it when corresponding with Prof. Li via email (state the course number or title in your email). Important announcements to the class will be emailed via the ICON class roster.

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. GE (General Education): 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: Regular homework will be assigned periodically in ICON; mostly week-long assignments. Students will turn in their assignment using file upload in ICON by its due date and time. Please submit your homework in Word doc, pdf files, or clear, readable scans/images of reasonable size. Please double check your submission each time—points will be deducted if submission cannot be opened or read, or has wrong files or missing pages. All homework assignments are essential, vital practices and will be counted towards overall grade.

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. Discussions among students can be posted on the ICON Discussion Boards; notice that Discussion Board posts are public that everyone in the class will be able to read all of the posts and responses, and respond to them.

Low-stakes Quizzes: Prior to an exam, an online quiz will be given in ICON as a practice and discussed in class.

Exams:

Midterm Exam 1	Monday, February 26
Midterm Exam 2	Monday, April 8
Final Exam	The University will announce.

You can bring one standard letter-size (about 8.5in \times 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.

Any unexcused absence from an exam will result in a score of zero with no opportunity for a makeup. A makeup exam (different but equivalent to the original) will be considered only with documentation of reasons required by the university policy and under prior or prompt arrangement made with Prof. Li, and it should be scheduled as soon as possible.

All exams and makeups are in-person and proctored. These exam rules apply to all exams and makeups.

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

Regular homework	17%
Low-stakes quizzes	3%
Midterm exam 1	24%
Midterm exam 2	24%
Final exam	32%

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

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

At the discretion of Prof. Li, depending on class performance and attendance/participation in lectures and TA discussions, 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.

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.

Topics:

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	observational studies, randomized experiments, data ethics
Week 7-9	Chapters 12-14	introductory probability, rules of probability, conditional probability, independence, random variables, 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 inference about population mean, checking assumptions
Week 13	Chapter 22	confidence interval and hypothesis test of population proportion
Week 13-14	Chapters 21-24	two-sample tests: F test, pooled t test, Satterthwaite test, paired t test
Week 14	Chapter 26	inferences for linear regression
Week 14-15	Chapters 25, 27	chi-square test, one-way ANOVA (if time allows)

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by [the CLAS Code of Academic Honesty](#).

Student Complaints

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor, 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.

University Policies

[Accommodations for Students with Disabilities](#)

[Basic Needs and Support for Students](#)

[Classroom Expectations](#)

[Exam Make-up Owing to Absence](#)

[Free Speech and Expression](#)

[Mental Health](#)

[Military Service Obligations](#)

[Non-discrimination](#)

[Religious Holy Days](#)

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

Sharing of Class Recordings