

STAT:3510:0AAA BIostatISTICS Spring 2023

(Cross References IGPI:3510:0AAA)

Lecture: MWF 8:30–9:20 am 101 BBE

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

Office hours: Mon & Wed 10:00–11:00 am, Fri 12:40–1:40 pm; and by appointment.

Teaching Assistant: Qian Tang, qian-tang@uiowa.edu

Office hours: TBA

The TA is the instructor of all discussion sessions and also holds regular office hours. The TA will post discussion materials in ICON main course website under “Modules.”

Grader: Yiran Zeng, yiran-zeng@uiowa.edu

Please contact the grader in case of grading issues about homework.

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

Required Textbook:

An Introduction to Biostatistics, 3rd edition, by Thomas Glover and Kevin Mitchell, 2016, Waveland Press. <https://www.waveland.com/browse.php?t=203>

Note: This required text is provided through ICON Direct 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>). For most Spring 2023 16-week courses the opt-out deadline is Monday January 30, 2023, 6:00 pm CST.

Faculty are not responsible for providing students with alternative materials or waiving course requirements. I impose no restriction on the version (ebook, 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.

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

ICON Course Website: Course materials including syllabus, lecture notes, homework assignments, TA discussion materials, grades, answer keys, etc. will be posted on ICON <https://icon.uiowa.edu/>.

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

Prerequisite: MATH:0100 or MATH:1005 Basic Algebra or equivalent.

Course Description and Objectives: Introduction to statistical concepts and methods for life, biological and health sciences; coverage includes descriptive statistics, introductory probability theory, random variables and distributions, sampling distributions, estimation, confidence intervals, hypothesis tests, parametric and nonparametric methods, one-way ANOVA, correlation and linear regression, as well as computing using R. This is a comprehensive 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 solid knowledge of fundamental probability, statistical concepts and methods;
- understand and interpret basic statistical analysis reported in the life, biological and health sciences literature;
- evaluate, justify or even improve basic data analysis results in their scientific field;
- conduct basic data analysis and appropriately deliver statistical findings.

R Software: Basic statistical computing using R will be taught and used in assignments.

R is open-source statistical software—one of the most popular and powerful for data analysis. It is freely available at <https://www.r-project.org/> and can be downloaded to personal computer for free use. It is also available on the university Virtual Desktop and at the Instructional Technology Centers (ITCs) such as 41 SH.

See the instructions of R installation and an R introduction in ICON.

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, as points will be deducted if submission cannot be opened or read, or has missing pages. All regular 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 Dr. Li, homework turned in after it is due will receive 0 (zero) credit. 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 everyone should write up their own individual answers and do their own individual calculations and 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 **Friday, February 24**, 8:30-9:20 am

Midterm Exam 2 **Friday, April 7**, 8:30-9:20 am

Final Exam **TBD by the University**

You can bring one standard letter-size (8.5in × 11in like regular printer paper) 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 and closed-notes.

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 Dr. 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.

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. It is your responsibility to know the date, time, and place of the final exam. Do not schedule your end-of-semester travel plans until the final exam schedule is announced by the University.

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	25%
Midterm exam 2	25%
Final exam	30%

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 Dr. 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, solutions, recordings, as well as other materials that I prepare. 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.

Participation and Classroom Environment: Participation in course activities is very vital to your success in this course. Regular attendance is expected and 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.

Course Schedule:

Week 1-2	Chapter 1	Introduction, R, basic concepts, displaying and describing data
Week 2-3	Chapter 2	Fundamentals of probability, methods of enumeration, set theory, theorems of probability, conditional probability, independence
Week 4-5	Chapter 3.I	Discrete random variable, discrete distributions
Week 6	<u>Midterm 1</u>	covering Chapters 1, 2, 3.I
Week 6-7	Chapter 3.II	Continuous random variables, Normal distributions, Normal approximation to Binomial, Normal probability plot
Week 7-9	Chapter 4	Sampling distributions, confidence intervals for population mean, variance, and proportion
Week 10	Chapter 5	Basic concepts of hypothesis testing
Week 10-11	Chapter 6	One-sample hypothesis tests for population mean, variance, and median
Week 12	<u>Midterm 2</u>	covering Chapters 3.II, 4, 5, 6
Week 12-13	Chapter 7	Two-sample hypothesis tests under normality, two-sample non-parametric tests
Week 14	Chapter 8	One-way ANOVA, Bonferroni t tests
Week 14-15	Chapter 10	Correlation, linear regression
Week 16	<u>Final exam</u>	emphasizing Chapters 7, 8, 10 and fundamental concepts throughout the semester

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 [Registrars 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](#)