Required Text:


Supplementary Texts (ordered by degree of difficulty):


Course Description:

This is the second course in the two-semester mathematical statistics sequence 22S:153-4. This course gives a mathematical introduction to the foundations of statistical inference primarily from the Frequentist perspective. We discuss sampling distribution theory, estimation theory, and the theory of hypothesis testing, as covered in Chapters 5-8 in Hogg, McKeen, and Craig (2005). Time-permitting, we will also cover select topics from Chapters 9-11. Chapter 5 gives an overview of basic statistical inference concepts such as, sampling, order statistics, confidence
Course Objectives:

The successful student will leave this course with a basic understanding of many of the important foundational concepts in statistical inference. In addition, he or she will be comfortable using a wide variety of mathematical tools for solving statistical inference problems.

Course Organization:

Lectures. The 50 minute meetings on MWF will typically be used to work through examples and to give a running summary of the material ("the big picture"), as seen from the instructor's perspective. Students will be expected to participate in the worked examples. We will cover the material from Chapters 5-8 and, time permitting, some of Chapters 9 through 11, all from HMC (2005). We will not necessarily cover this material one section at a time. At times, we will use an integrated approach that illustrates the concepts of several sections through multi-part examples. It follows that you will be expected to read several sections at a time with the goal of understanding the big picture.

Homework Exercises. Homework problems will be assigned about once per week. You will typically have one week to turn in the assigned problems. Many of the problems will be assigned during the course of working through an example in lecture. Most of these problems will come from the book, or at least they will be based on problems in the book.

Computing. Some of your homework will require the use of the computer. I will give sample code as needed. The freeware package R (or its commercial relative Splus) will typically be used to perform calculations, create graphics, and carry out small-scale simulation studies.

Note: Splus, and R are available on the HP machines in the UNIX Computing Lab (346 SH). They are also available in the Myers Computing Lab (41 SH). The software R can be downloaded from http://cran.us.r-project.org to your personal computer.

Exams and Quizzes. There will be two in-class midterms (Fri, Sep 26 and Fri, Oct 31) and one final exam (Monday, Dec 15, 12:00 pm, 66 SH) in this course. Quizzes will be given on a regular basis; some will be pre-announced.

Course Pace (tentative):

Chapter 5  Weeks 1 through 4
Chapter 6...Weeks 5 through 8
Course-Specific Guidelines and Policies:

**Reading Ahead.** It is vitally important that you read ahead. If the material in a lecture is completely new to you, you will find it very difficult to get much out of lecture.

**Effort Expectations.** My effort expectations align with the guideline adopted by the college of LAS: "for each semester hour credit in the course, students should expect to spend two hours per week preparing for class sessions (e.g., in a three-credit-hour course, standard out-of-class preparation is six hours)." Of course, you need to keep in mind that the '6 hours per week' is an average taken over the weeks in the semester. It is also an average taken over a heterogeneous collection of students and courses. Thus, effort amounts will vary. It is fair to say, however, that the more effort you put in, the more you will get out of the course.

**Participation and Attendance.** Students are expected to attend, and participate in, class. You will be asked many questions, and you will be strongly encouraged to ask lots of questions. If you miss a class, you run the risk of missing a quiz, which cannot be made-up.

**Working Together.** Unless instructed otherwise, you may work together on the homework problems. However, you must write up your own solutions in your own words. If you are personally asked to please write up your own solutions and subsequently turn in material that is obviously in the same words as a fellow student, the work will be considered to be plagiarized. Plagiarism will be dealt with according to the policies of the College of Liberal Arts and Sciences and the University (see additional information at the end of this syllabus).

**Exams.** The exams will all be closed-book. You are allowed to use one (two-sided) crib sheet for the midterms and two (two-sided) crib sheets for the final. Bring along a calculator.

**Quizzes.** You should always be prepared for the possibility of an unannounced quiz, e.g. always bring along the book and a calculator. Missed quizzes (and exams) cannot be made up unless you have a legitimate excuse. See Section VIII. Grading--Attendance and Examinations in the CLAS Student Academic Handbook. Your lowest quiz score will be dropped.

**Late Homework.** Unless otherwise instructed, homework is due at 1:30pm. Late homework has a discrete half-life of 24 hours; that is you get 50% credit if it is handed in late, but within 24 hours of the due time; you get 25% credit for the next 24 hours, etc. Homework not handed in directly to me must be handed in to a department secretary (located in 241 SH)--it must include a hand-in time and date, and must be signed by the department secretary. (It follows that you cannot hand in homework after the main office is closed.)
Grading Questions. Questions about grading must be asked within one week of the graded work's return.

Grading and Components for Evaluation

Your final score $S$ will be computed as $S = 0.20M_1 + 0.25M_2 + 0.25F + 0.25H + 0.05Q$, where $M_i =$ percent correct on midterm $i$, $F =$ percent correct on final, $H =$ percent correct on homework and $Q =$ percent correct on quizzes. [Your lowest quiz score will not be included in the calculation of $Q$.]

Letter grades (including +'s and -'s) will be awarded according to a 90-80-70-60 schedule (e.g. if $S \geq 90$ then a grade of A- or better will be awarded). Class participation will be considered when a student "falls on the borderline" between two grades. These are guaranteed cutoffs, so it is possible (but unlikely) that everyone receives an 'A.' I do, however, reserve the right to lower (but not raise) the cutoffs. Note that with this grading scheme you are not "graded on a curve," and so you are not competing with fellow students. Therefore, you are not penalized for working together to better understand concepts.

Miscellaneous

Help outside of class:

I have regular office hours. Sometimes it is effective to ask specific questions via email.

Course web pages; start at http://www.stat.uiowa.edu/~jblang/s154.

A list of tutors is maintained by the Department of Statistics and Actuarial Science at http://www.stat.uiowa.edu/courses/tutors.html.

Help with R software:

SimpleR. Go to http://www.math.csi.cuny.edu/Statistics/R/simpleR/index.html (N.B. You may have to scroll down a bit to get to the simpleR table of contents.)

An Introduction to R, by Elizabeth Slate and Elizabeth Hill.

College of Liberal Arts and Sciences: Policies and Procedures

Administrative Home of the Course

The administrative home of this course is the College of Liberal Arts and Sciences, which governs academic matters relating to the course such as the add/drop deadlines, the second-grade-only option, issues concerning academic fraud or academic probation, and how credits are applied for various graduation requirements. Different colleges might have different policies. If you have questions about these or other CLAS policies, visit your academic advisor or 120 Schaeffer Hall and speak with the staff. The CLAS Academic Handbook also contains important CLAS academic policies: www.clas.uiowa.edu/students/academic_handbook/index.shtml
**Academic Fraud**
All forms of plagiarism and any other activities that result in a student presenting work that is not his or her own are academic fraud. All academic fraud is reported first to the departmental DEO and then to the Associate Dean for Academic Programs and Services. See [Academic Fraud](http://www.clas.uiowa.edu/students/academic_handbook/ix.shtml) for the complete policy.

**Making a Suggestion or a Complaint**
Students have the right to make suggestions or complaints and should first visit with the instructor, then with the course supervisor if necessary, and next with the departmental DEO. All complaints must be made as soon as possible. For more information visit, [Student Complaints](http://www.clas.uiowa.edu/students/academic_handbook/ix.shtml#5)

**Accommodations for Disabilities**
Under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, instructors must provide reasonable academic accommodations for qualified students with disabilities. Students seeking academic accommodations first register with Student Disability Services and meet with a counselor in that office who reviews documentation and determines eligibility for services. Students approved for accommodations arrange to meet privately with course instructors. Visit [Student Disability Services](http://www.uiowa.edu/~sds/).

**Understanding Sexual Harassment**
Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the well-being of students, faculty, and staff. Visit this [site](http://www.sexualharassment.uiowa.edu/) for definitions, assistance, and the full University policy.

**Resources for Students**
- **Writing Center** 110 English-Philosophy Building, 335-0188, [www.uiowa.edu/~writingc](http://www.uiowa.edu/~writingc)
- **Speaking Center** 12 English-Philosophy Building, 335-0205, [www.uiowa.edu/~rhetoric/centers/speaking](http://www.uiowa.edu/~rhetoric/centers/speaking)
- **Mathematics Tutorial Laboratory** 314 MacLean Hall, 335-0810, [www.uiowa.edu/mathlab](http://www.uiowa.edu/mathlab)
- **Tutor Referral Service** Campus Information Center, Iowa Memorial Union, 335-3055, [www.imu.uiowa.edu/cic/tutor_referral_service](http://www.imu.uiowa.edu/cic/tutor_referral_service)

**Student Classroom Behavior**
Students have the right to a classroom environment that encourages learning. The ability to learn is lessened when students engage in inappropriate classroom behavior, distracting others; such behaviors also is a violation of the [Code of Student Life](http://www.uiowa.edu/studentlife/code). When disruptive activity occurs, a University instructor has the authority to determine classroom seating patterns and to request that a student exit the classroom, laboratory, or other area used for instruction immediately for the remainder of the period. One-day suspensions are reported to appropriate departmental, collegiate, and Student Services personnel (Office of the Vice President for [Student Services](http://www.uiowa.edu/studentlife/student_services) and Dean of Students).

**University Examination Policy**
**Final Examinations.** An undergraduate student who has two final examinations scheduled for
the same period or more than three examinations scheduled for the same day may file a request for a change of schedule before the published deadline at the Registrar's Service Center, 17 Calvin Hall, 8-4:30 M-F, (384-4300).

**Missed exam policy.** University policy requires that students be permitted to make up examinations missed because of illness, mandatory religious obligations, certain University activities, or unavoidable circumstances. Excused absence forms are required and are available at the Registrar web site: [http://www.registrar.uiowa.edu/forms/absence.pdf](http://www.registrar.uiowa.edu/forms/absence.pdf)

*I hope you all have an enjoyable and successful semester. Good luck in all of your courses*