

The University of Iowa
College of Liberal Arts and Sciences
Department of Statistics and Actuarial Science

22S:039

Probability and Statistics for the Engineering and Physical Sciences

Fall 2009

Instructor:

Rhonda DeCook
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DEO: Dr. Luke Tierney, 241 Schaeffer Hall

Time and Location:

MWF 12:30-1:20 LR2 Van Allen Hall

Course Goals and Objectives:

In this course we will develop probabilistic reasoning and statistical solutions for problems encountered in engineering and the physical sciences.

Course Website: <http://www.stat.uiowa.edu/~rdecook/s39/s39.html>

Instructor Office Hours (or by appointment):

Wednesday 10:30-11:20am and 1:30-2:20pm
Thursday 1:30-2:20pm

Teaching Assistants:

Yi Su	Yunlong Xie
Email: yi-su@uiowa.edu	Email: yunlong-xie@uiowa.edu
350 Schaeffer Hall, 335-2297	267 Schaeffer Hall, 335-0723
Office Hours: see course website	Office Hours: see course website

Required Text:

Applied Statistics and Probability for Engineers. Fourth edition by Douglas C. Montgomery and George C. Runger.

Final Exam: Thursday, December 17 2009, noon - 2 P.M.

Tutorial Lab:

Extra help beyond office hours is available at the Statistics Tutorial Lab.
See <http://www.stat.uiowa.edu/courses/tutorial-lab.html>

MINITAB Software:

Available in all Instructional Technology Centers (ITCs) such as 41 Schaeffer Hall. For a free on-line version, see <http://virtualdesktop.uiowa.edu>. If you want a personal copy of the academic version, check out <http://www.minitab.com> which has a free academic short-term option (30 days), and longer options for purchase.

Lecture:

Students should read material prior to lecture. In the case of an absence, students are responsible for the material covered and must get the notes from a fellow student. Quizzes may be given during lecture (or discussion). Quiz make-ups will not be given.

Weekly Discussions:

Attendance at Discussion is important. Quizzes may be given during this time period, and worksheets for extra practice may also be used. Quiz make-ups will not be given.

Topics Covered:

The collection, analysis, and display of information are discussed. Probability theory and statistics teach us how to characterize and model variability in processes and measurements. Probability theory, random variables, important discrete and continuous distributions, estimation of parameters and testing of hypotheses using sample data will be discussed. Regression methods will also be introduced. MINITAB, an interactive statistical computer package will be introduced and used.

Midterm Exams:

Two midterm exams will be given at times outside of the usual class time (see below).

LOCATION FOR MIDTERMS: LR1 Van Allen Hall (not usual lecture hall)

Exam 1: Thursday, September 24, 8:00-10:00pm

Exam 2: Thursday, November 5, 8:00-10:00pm

Grading Policy:

Assessment in this course will be based on the following components:

- **Homework (10%)** - Assigned on a Friday and due the following Friday in class. Due to time constraints, the grader will grade only some of the assigned questions, but you are responsible for understanding all questions. I will not accept late homework, but will instead throw-out your lowest homework score.
- **Scheduled Quizzes* (10%)** - Short quizzes may be given in two manners: 1) written quizzes in lecture and 2) written quizzes in discussion. There are no quiz make-ups, but I will instead throw-out your lowest scheduled quiz score.
- **Unscheduled Quizzes* (5%)** - Again, short quizzes may be given in two manners: 1) written quizzes in lecture and 2) written quizzes in discussion. There are no quiz make-ups, but I will instead throw-out your lowest unscheduled quiz score.

- **MINITAB Projects (5%)** - Two projects will be assigned. They will give you experience with MINITAB software, and with reporting results of a statistical analysis.
- **Exams* (70%)** - There will be 2 midterm exams and a final exam:
 Midterms (20% each) given at the dates and times (and location) listed above.
 The Final (30%) Thursday, December 17 2009, at noon.

	90-100	A
	80-89	B
As an approximate guide, grades will be given as:	70-79	C
	60-69	D
	Below 60	F

Plus and minus grades will be given as deemed appropriate.

*No make-up exams or quizzes will be given unless there is an absence due to unavoidable circumstances as stated by University policy (documentation will be required in such a case). Missed exams and quizzes will receive a score of 0.

Tentative Class Schedule:

<u>Week</u>	<u>Topic</u>	<u>Chapter</u>
1	Introduction , Sample Spaces and Event	1 & 2
2	Probability Rules, Counting Techniques, Conditional Probability	2
3	Independence, Random Variables, Discrete Random Variables	2 & 3
4	Common Discrete Distributions	3
5	Continuous Random Variables	4
	Exam 1: Thursday, Sept 24, 8:00-10:00pm LR1 Van Allen.	
6	Continuous Random Variables	4
7	Joint Distributions	5
8	Correlation, Bivariate Normal, Numerical Summaries	5 & 6
9	Central Limit Theorem, Point Estimators	7
10	Confidence Intervals for μ and proportion p , t -distribution	8
11	Hypothesis testing for μ and p , Goodness of Fit tests	9
	Exam 2: Thursday, Nov 5, 8:00-10:00pm LR1 Van Allen.	
12	Inference for $\mu_1 - \mu_2$ and $p_1 - p_2$	10
13	Simple Linear Regression (SLR), Least-Squares Estimators	11
	-Thanksgiving Break-	
14	Hypothesis test in SLR, Correlation, Checking Assumptions	11
15	Multiple Linear Regression	12
16	Final Exam: Thursday, Dec 17, at noon	

Tentative days of no class (may change if so needed):

- Friday Sept. 25, compensation for night exam 1
- Friday Nov. 6, compensation for night exam 2
- Nov 21-29, Thanksgiving Break

Calculator:

There are many calculators out there that are appropriate for this class. Your calculator should be able to calculate *one-variable* and *two-variable statistics*. Whichever you choose, just make sure you are familiar with your own calculator.

Some calculators that perform such statistics:

TI 83 Plus, TI 86 (more expensive graphing calculators)

TI 30XIIB, TI 30XIIS, TI36X (less expensive, but have correct capabilities)

Resources for additional help:

Supplementary materials, such as handouts, will be distributed during class. If you miss class, please inquire if any materials were handed out. The Department of Statistics and Actuarial Science maintains a list of private tutors. See <http://www.stat.uiowa.edu/courses/tutors.html>

Administrative Home of the Course:

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed in 120 Schaeffer Hall or see the CLAS Student Academic Handbook:
www.clas.uiowa.edu/students/academic_handbook/index.shtml

Electronic Communication :

University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa e-mail address (@uiowa.edu). Students should check this account frequently. (Operations Manual, III.15.2. Scroll down to k.11.)

Academic Fraud :

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Student Academic Handbook.

Making a Suggestion or a Complaint :

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Accommodations for Disabilities :

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. www.uiowa.edu/~sds/

Understanding Sexual Harassment :

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment at www.uiowa.edu/eod/policies/sexual-harassment-guide/index.html for assistance, definitions, and the full University policy.

CLAS Final Examination Policies:

Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Reacting Safely to Severe Weather :

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. (Operations Manual, IV.16.14. Scroll down to e. h. and i.)