Syllabus for Statistics 3460: Principles of Statistics for Engineers

Instructor: Dr. Kubatko
Office: 219 Cockins Hall
Office Hours: M 9:15-10:15am, W 9:15-11:15am, other times by appointment
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Graders: Chenggong Han, Min Ho Cho, Yuan Gao

Assumed Knowledge and Prerequisites: Calculus, integration, exponential function, finite and infinite sums, union and intersection of sets. Prerequisite courses are Math 1152, 1161.xx, 1172, 1181H, 153, or 254.

Required Text: *Principles of Statistics for Engineers and Scientists* by William Navidi. The book is available on reserve in the Science and Engineering Library.

Course Description: The course provides an introduction to probability and statistics targeted toward students studying biomedical engineering. Topics covered include probability, random variables, the normal and binomial distributions, confidence intervals for means, hypothesis tests for means, simple and multiple regression, analysis of variance, multi-factor experiments, and experiments with blocking. A more detailed list of topics can be found on the sample schedule below. Students are responsible for all material covered in class, in the assigned readings, and in homework problems.

College of Arts and Sciences GEC Statement: Statistics 3460 is a Data Analysis course in the Quantitative and Logical Skills category of the GEC. The goals and expected learning outcomes are:

- Goals/Rationale: Courses in quantitative and logical skills develop logical reasoning, including the ability to identify valid arguments, use mathematical models, and draw conclusions based on quantitative data.

- Learning Objectives: Data Analysis. Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

Website: Please visit `http://www.carmen.osu.edu/`. Check Carmen periodically for announcements about the class and other class material.

Homework: Homework problems will be assigned and graded for each topic covered in the course. Homework must be turned in during lecture on the date it is due. If you are unable to attend lecture when the homework is due, you must bring it to me in my office **earlier** in the day. Please write your name on the top of each page of your assignment, and staple the pages together.

Exams: There will be two in-class exams and a final exam. Statistical tables will be provided as needed. Calculators may be used on the exams, but the calculators on cell phones, PDAs, or any other communication device are NOT allowed.

Notes for use on the exams: You may use one 8.5 x 11 inch sheet of paper (both sides), with whatever facts, formulas, or explanations you find helpful, for the first exam. Two sheets of paper (as described above) may be brought to the second exam and to the final exam.

Makeup exams: If you absolutely need a makeup exam and have a valid excuse, please see me for the necessary arrangements. However, you must notify me in advance in such a situation. A make-up exam may be a bit harder than the regularly scheduled exam and must be taken within a week of the missed exam. Exceptions to this policy will be permitted only in extreme situations such as serious injury immediately prior to an exam or severe illness requiring hospitalization.

Full credit on homework and exam problems: You need to show your justification for or work on each homework or exam problem. Answers without work will not receive full credit.

Final Grade: Your final course grade will be based on the following weighting of assessment components:
Homework – 20%
Midterm exams (2) – 25% each
Final exam – 30%

Software: We will use Minitab in class. If you would like to rent or buy a copy of Minitab, please see `http://www.onthehub.com/minitab/` for information. Note that Minitab is only available for PCs, not for Macs. Minitab is also available at all Student Computer Centers (see `http://lt.osu.edu/locations-hours/` for information). While we will use Minitab in class, you can use whatever statistical package you would like for your homework.

Study Rooms and Help Hours: Our TAs hold office hours in the Mathematics and Statistics Learning Center in 134 Cockins Hall starting the second week of classes. The hours during which Stat 3460 TAs will be available are posted at `http://www.mslc.ohio-state.edu/`.

Academic Misconduct: Please help us to maintain an academic environment of mutual respect, fair treatment, and personal growth. You are expected to produce original and independent work for exams. Although students are often encouraged to work together on homework assignments, all students must submit their own written work IN THEIR OWN WORDS. Academic misconduct will not be tolerated and will be dealt with procedurally in accordance with University Rule 3335-31-02. (This policy can be found at http://oaa.osu.edu/procedures/1.0.html.)

E-mail Correspondence: In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account. If you have not activated your OSU email account, you can activate your account at https://acctmgt.service.ohio-state.edu/cgi-bin/KRB1EntryAdd.

Special Accommodations: All students who feel they may need accommodations based on the impact of a disability should contact the instructor privately to discuss their specific needs. Students with documented disabilities must also contact the Office of Disability Services (ODS) in 150 Pomerene Hall (phone: 292-3307) to coordinate reasonable accommodations for the course. ODS forms must be given to your instructor as early in the quarter as possible to be filled out and returned to you.

Drop dates: The last day to drop the course without a "W" appearing on your record is Friday, February 5. The last day to drop the course without petitioning is Friday, March 25.

TENTATIVE LECTURE AND RECITATION SCHEDULE
Please note that topics covered may change depending on the pace of the course.

Week 1			
M	1/11	Sampling, summary statistics, graphical summaries	1.1 - 1.3
W	1/13	Probability rules	3.1
F	1/15	Conditional probability, independence	3.2
Week 2			
M	1/18	No class - Martin Luther King Day	
W	1/20	Discrete random variables	3.3
F	1/22	Expected values, variances	3.3
Week 3			
M	1/25	Continuous random variables	3.3
W	1/27	Continuous random variables	3.3
F	1/29	Expected values, variances for continuous RVs	3.3
Week 4			
M	2/1	Functions of RVs, Linear combinations	3.4
W	2/3	Random samples, sample mean	3.4
F	2/5	Review for Exam 1	
Week 5			
M	2/8	Exam 1	Ch. 1 - 3
W	2/10	Binomial distribution	4.1
F	2/12	Normal distribution	4.3
Week 6			
M	2/15	Linear combos of normal RVs; normal prob plots	4.3, 4.7
W	2/17	CLT; Normal approx to Binomial	4.8
F	2/19	Confidence intervals for means	5.1-5.2
Week 7			
M	2/22	Confidence intervals for proportions	5.3
W	2/24	Intervals based on the t-distribution	5.4
F	2/26	Prediction intervals	5.5
Week 8			
M	2/29	Hypothesis tests for means	6.1
W	3/2	Hypothesis testing - significance levels, p-values, power	6.2, 6.6, 6.7
F	3/4	t-tests	6.4
Week 9			
M	3/7	Exam 2	Ch. 4-6
W	3/9	Two-sample problems	7.3
F	3/11	Paired data	7.4
SPRING BREAK			

Week 10			
M	3/21	Two-sample problems	7.3 - 7.4
W	3/3	Simple linear regression	2.1 - 2.3
F	3/25	Inference for slope and intercept	8.1]
Week 11			
M	3/28	Inference for E[Y]; prediction intervals	8.1
W	3/30	Checking assumptions, transformations	8.1 - 8.2
F	4/1	Multiple regression	8.3
Week 12			
M	4/4	Model selection; forward, stepwise, subset	8.4
W	4/6	Experiments, randomization, F-test, ANOVA	9.1
F	4/8	Experiments, randomization, F-test, ANOVA	9.1
Week 13			
M	4/11	Two factor experiments; balance	9.3
W	4/13	Blocking	9.4
F	4/15	Saturated 2^p factorial experiments	9.5
Week 14			
M	4/18	Saturated 2^p factorial experiments	9.5
W	4/20	Fractional factorial experiments	
F	4/22	Fractional factorial experiments	
Week 15			
M	4/25	Course review	

FINAL EXAM: Thursday, April 28, 8:00-9:45am