

SIE 430/530 ENGINEERING STATISTICS - Fall 2008
(Tuesday and Thursday 9:30 – 10:45am, Harvill 211)

Instructor: Jian Liu
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Prerequisites: Calculus + SIE 305 : Introduction to Engineering Probability and Statistics

Textbook: D. Wackerly, W. Mendenhall and R.L. Scheaffer, *Mathematical Statistics with Applications*, 7th ed., Duxbury Press, Belmont, California, 2008.

Course Website: We will be using the D2L system. (<http://d2l.arizona.edu/>). All class materials, including HW, handouts, etc. will be distributed from D2L. After each lecture, I will be posting the link of the lecture video on the streamed sever for distance-learning students. I will also be sending emails to the whole class throughout the semester using the class list in D2L. Please make sure you forward your D2L email to an email account that you frequently use.

References:

- G. Casella and R.L. Berger, *Statistical Inference*, 2nd ed., Duxbury Thomson Learning, Pacific Grove, CA, 2002.
- A. Gut, *An Intermediate Course in Probability*, Springer, New York, 1995.
- W.W. Hines, D. C. Montgomery, D. M. Goldsman and C.M. Borror, *Probability and Statistics in Engineering*, 4th ed., Wiley, Hoboken, New Jersey, 2003.
- R.V. Hogg, J.W. McKean and A.T. Craig, *Introduction to Mathematical Statistics*, 6th ed., Pearson Prentice Hall, Upper Saddle River, New Jersey, 2005.
- S. M. Ross, *First Course in Probability*, 6th ed., Prentice Hall, Upper Saddle River, New Jersey, 2001.

Homework: The homework will be assigned on Thursdays and due on the following Thursday, *before the end of the class*. NO late submission is allowed unless it is requested and approved by the instructor in advance (e-mail or phone-call received *before* the day the assignment is due). Distance-learning students may submit pdf copies of their homeworks to a dropbox on D2L.

Examinations:

Exam I: October 14, Tuesday
Exam II: December 09, Tuesday

Makeup examinations **MUST** be requested at least one week prior to the date the exam is held. In case of medical or other personal/family emergencies, a formal excuse (doctor's note, etc.) is required.

Grading:	Homework	25%
	Exam I	35%
	Exam II	40%

Academic Integrity Policy: Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, homework, and exams must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity: <http://dos.web.arizona.edu/uapolicies/>. Any violation of the academic integrity code will be dealt with using the procedures detailed in the code.

Course Outline:

- Review of Probability Theory
 - Probability Set Function
 - Conditional Probability and Independence
 - Random variables, common distributions
 - Expectation (including Moment Generating Functions)
- Properties of a Random Sample
 - Order Statistics
 - Asymptotic Properties of the Sample Mean
 - Sampling from a Normal Distribution
- Point Estimation
 - Method of Moments
 - Maximum Likelihood Estimation
 - Bias, Efficiency and Consistency of Point Estimators
 - Best Minimum Variance Unbiased Estimator
- Hypothesis Testing I
 - Elements of a Statistical Test
 - Some Common Tests (concerning means, variances, etc.)
 - Goodness-of-Fit
- Hypothesis Testing II
 - Likelihood Ratio Tests
 - Asymptotic Tests
 - Optimal Tests and the Neyman-Pearson Lemma
- Confidence Interval Estimation
 - Inverting a Test Statistic
 - Asymptotic Confidence Intervals
 - Size and Coverage Probability