Place/Time
 MWF 9:40 - 10:30 AM in BEH S 114

Instructor:
 A. Treibergs, JWB 224, 581-8350.
 E-mail: `treiberg@math.utah.edu`
 Web page: `http://www.math.utah.edu/~treiberg/M3076.html`
 Office Hours: 11:45-12:35 MWF (tent.) & by appt.

Prerequisites:
 "C" or better in MATH 1220 OR MATH 1250 OR MATH 1270 OR AP Calculus BC score of at least 4

Texts:
 • Jay L. Devore, *Probability and Statistics for Engineering and the Sciences 8th ed.*, Brooks/Cole, 2012.
 ISBN-13: 978-0-538-73352-6 ISBN-10: 0-538-73352-7
 • John Verzani, *Using R for Introductory Statistics*, Chapman & Hall/CRC, 2005.
 ISBN-13: 978-1-584-88450-7 ISBN-10: 1-584-88450-9

Grading
 Lab:
  Students will meet in the computer lab once a week for two hours. Students must pass the lab to pass the course.
  Most students manage to easily complete the lab assignments during the lab. Or students may access the computer
  at other times from the Mathematics Center.
 Homework:
  You will be asked to write up and hand in homework problems weekly.
 Midterms:
  There will be three full hour midterm exams on Sept. 18, Oct. 23 and Nov. 20. Questions will be modifications of
  homework problems.
 Quizzes:
  There will be four 15 minute quizzes on Sept. 4, Oct. 2, Nov. 6 and Dec. 4.. For the quizzes you will be
  responsible for the material covered from the day of the previous exam through the class meeting preceding the
  quiz. No makeup quizzes will be given for any reason.
 Final Exam:
  Wed., Dec. 18, 8:00 – 10:00 AM in BEH S 114. Half of the final will be devoted to material covered after
  the third midterm exam. The other half will be comprehensive. Students must pass the final to pass the course.
 Course Grade:
  Based on the best two of three midterm scores 30%, best three of four quizzes 15%, final 25%, homework 20%
  plus lab 10%.

Tutoring Center:
 Free tutoring is available in the T. Benny Rushing Mathematics Center, located between LCB and JWB. Normal
 hours M-Th 8:00 am - 8:00 pm, Fri 8:00 am-6:00 pm.

Withdrawals:
 Last day to drop a class is Sept. 4. Until Oct. 25 you can withdraw from the class with no approval at all. After
 that date you must petition your dean's office to be allowed to withdraw.

ADA:
 The Americans with Disability Act requires that reasonable accommodations be provided for students with
 cognitive, systemic, learning and psychiatric disabilities. Please contact me at the beginning of the quarter to
 discuss any such accommodations you may require for this course.

Course Content:

This is the first course in a sequence of two that offers a comprehensive introduction to the concepts of probability and statistics. We begin by quickly presenting some ways to organize and present data used in descriptive statistics (Ch. 1.) How well the population can be described from estimates made from samples drawn from that population depends on notions from probability. We consider laws of probability, random variables (one- and two-dimensional), common distributions, sample statistics and the Central limit Theorem (Ch. 2-5.) Finally we develop the basic techniques of inferential statistics, point estimates, confidence intervals and hypothesis testing (Ch. 6-9.) Both the theory behind statistical decision making and its practical application to many different areas will be examined in this course, so that students may appreciate the use of statistics in their professional and personal lives. The course material will be based on Chapters 1-9 of the text and corresponding material from the lab manual.

Expected Learning Outcomes

After completing this course the student should be able to:

- Understand basic statistical concepts; construct numerical and graphical data summaries.
- Calculate probabilities of events using counting rules; calculate conditional probabilities; determine independence of events; apply the Law of Total Probability and Bayes' Rule.
- Calculate probabilities, expectation, variance for discrete random variables; recognize the following standard discrete distributions: binomial, geometric, hypergeometric, Poisson.
- Calculate probabilities, expectations, variances for continuous random variables; recognize the following standard continuous distributions: uniform, normal, gamma, beta.
- Calculate probabilities and moments for multivariate distributions; obtain marginal and conditional distributions; calculate covariance and correlation and determine independence of random variables; obtain expectations and variances for linear combinations of random variables.
- Calculate probabilities and quantiles for sampling distributions related to the normal distribution (t, chi-square, F); apply the central limit theorem to calculate probabilities and quantiles for the sample mean.
- Construct point and interval estimators; evaluate their variance, mean squared error and bias.
- Understand and perform hypothesis tests for: the mean, comparing two means, the proportion, comparing two proportions, the variance, comparing two variances; compute p-values, type I, and type II errors; determine the power of a test.
- Perform probabilistic computations, do statistical tests and produce graphics in R@ or another statistical package.

Course learning outcomes will be assessed through the following: homework, quizzes, tests, lab scores and class discussion.