

OPRE 6301

Quantitative Introduction to Risk and Uncertainty in Business

Fall 2005

Thursdays, 7:00–9:45 p.m.

Room: SOM 2.106

Instructor:

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Text: *Statistics for Management and Economics*, by Gerald Keller, 7th Edition. Duxbury (Thomson Brooks/Cole), 2005.

Prerequisites: MATH 5304; or consent of the instructor.

Grading Scheme:

Midterm Exam (September 29): 50%

Final Exam (December 1): 50%

Course TA:

Ruixia Shi

Office: SOM 3.409

Office Hours: Tuesdays, 4:00-6:00 p.m.

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Course Description: In the increasingly complex world of business, effective decision making is crucial. This course is an introduction to statistical and probabilistic methods that are applicable to generic decision problems faced by managers. The basic theme is to develop concepts and methods that will help managers convert complex data into information. Topics covered include: data presentation and summarization, basic probability theory and random variables, introductory decision analysis, estimation, confidence intervals, hypothesis testing, one-way analysis of variance, regression analysis, and goodness-of-fit tests. The aim of the course is for students to develop skills on problem formulation, identification of statistical techniques, computer implementation in Excel, and interpretation of results.

Course Software: Microsoft Excel with Analysis Toolpak add-in. The text CD contains additional softwares, but they are not required.

Online Communication: For discussion of the homework problems, you are strongly encouraged to take advantage of the *Discussion Bulletins* in WebCT (<https://webct.utdallas.edu/>; or <https://netid.utdallas.edu:4443/guam/newuser/login?login=Y> if you don't yet have an account setup). Everyone is welcome to contribute answers to posted questions. The instructor will also monitor the *Bulletins* on a regular basis.

Course Outline:

1. What is Statistics? (Chapter 1)
2. Descriptive Statistics
 - (a) Data Collection and Sampling (Chapters 5)
 - (b) Graphical and Tabular Summarization of Data (Chapters 2 and 3)
 - (c) Numerical Summarization of Data (Chapter 4)
3. Probability and Random Variables
 - (a) Basic Probability Theory (Chapter 6),
 - (b) Random Variables and Business Applications (Chapters 7.1–7.3 and 23)
 - (c) Important Probability Distributions (Chapters 7.4–7.5 and 8.1–8.3)
4. Statistical Inference
 - (a) Sampling Distributions and Simulation (Chapter 9)
 - (b) Introduction to Estimation and Hypothesis Testing (Chapters 10 and 11)
 - (c) Inferences about a Single Population (Chapter 12.1–12.3)
 - (d) Inferences about Comparing Two Populations (Chapter 13.1–13.3)
 - (e) Analysis of Variance (Chapter 15.1 and 15.6)
 - (f) Least-Squares Linear Regression (Chapters 17, 18.1–18.3, 19.1–19.3, and 19.5–19.6)
 - (g) Goodness-of-Fit Tests (Chapter 16.1–16.3)

Suggested Homework: Homework will not be collected for grades. It is however essential that you study the suggested problems at a pace consistent with that of the lectures.

Chapter 5: 5.11, 5.12, 5.14, 5.15

Chapters 2–3: 2.12, 2.14, 2.15, 2.20, 2.24(a), 2.28, 2.43, 2.44(a), 2.46, 2.49, 2.53, 2.54, 2.64, 2.66, 2.68, 2.70, 2.72, 2.106; 3.9

Chapter 4: 4.1, 4.2, 4.4, 4.6, 4.8, 4.10, 4.18, 4.32, 4.36, 4.60, 4.64, 4.68, 4.86

Chapter 6: 6.8, 6.28, 6.36, 6.40, 6.42, 6.44, 6.56, 6.58, 6.62, 6.66, 6.70, 6.80, 6.96, 6.100

Chapter 7: 7.20, 7.30, 7.32, 7.54, 7.68, 7.70, 7.72, 7.74, 7.76, 7.96, 7.98, 7.104, 7.108, 7.112, 7.116, 7.118, 7.120, 7.122, 7.126, 7.130, 7.132, 7.136

Chapter 23: 23.10, 23.12, 23.14(a), 23.16, 23.32(a,b), 23.44

Chapter 8: 8.34, 8.36, 8.38, 8.40, 8.42, 8.54, 8.56, 8.64, 8.86, 8.88, 8.90, 8.94

Chapter 9: 9.22, 9.28, 9.30, 9.32, 9.36, 9.38, 9.42

Chapters 10–11: 10.26, 10.32, 10.36, 10.38, 10.52, 10.56; 11.10, 11.16, 11.44

Chapter 12: 12.16, 12.22, 12.30, 12.34, 12.88, 12.92(a), 12.122, 12.124

Chapter 13: 13.4, 13.18, 13.26, 13.46, 13.70, 13.88, 13.100

Chapter 15: 15.8, 15.10, 15.12, 15.16, 15.60, 15.70, 15.72, 15.74, 15.76

Chapters 17–19: 17.6, 17.8, 17.16, 17.18, 17.98(a,b,c), 17.104; 18.8, 18.10, 18.12, 18.40; 19.4, 19.8, 19.16, 19.22, 19.40, 19.48

Chapter 16: 16.12, 16.14