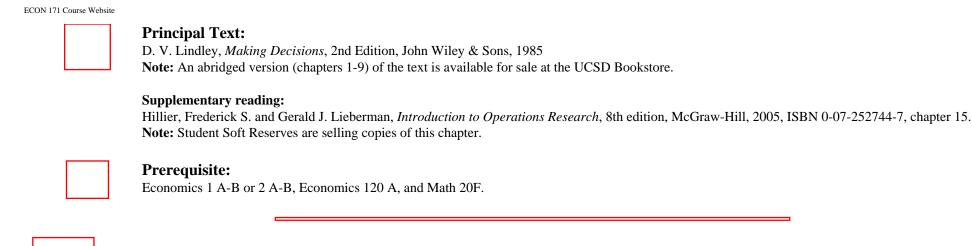# Economics 171: Decisions Under Uncertainty

Spring 2006

Course Web Site

The objective of this course is to provide you with training in making careful and informed decisions under uncertainty. While the techniques covered are in common use in corporate decision-making, they can also be helpful in household decision-making. Particular topics covered in the class include payoff tables, alternative decision criteria, expected utility theory, risk aversion, value of information, and decision trees.

Instructor:
Peter Katuscak: pkatuscak@ucsd.edu (please write ECON 171 in the email subject); Office: Economics 222

Office Hours:
Thu 1:45-3:15pm in Economics 222 or 210, or by appointment

Teaching Assistants:
David Eil: deil@ucsd.edu; Office hours: Mon 11:00am-1:00pm, or by appointment; Office: Sequoyah 238
Adam Sanjurjo: asanjurj@ucsd.edu; Office hours: Tue 12:30-2:00pm, or by appointment; Office: Economics 128

Lectures:
Tue and Thu, 3:30-4:50pm in Solis Hall 107

Discussion Sessions:
Purpose: to discuss homework problems and answer questions about lectures and readings
Mon 7:00-7:50pm, Peterson Hall 110, Tue 7:00-7:50pm, Pepper Canyon Hall 106 (there will be no discussion sections in weeks 1 and 6)

Special review sessions for the midterm:
TBA

Special review sessions for the final:
TBA

Principal Text:

D. V. Lindley, *Making Decisions*, 2nd Edition, John Wiley & Sons, 1985
Note: An abridged version (chapters 1-9) of the text is available for sale at the UCSD Bookstore.

Supplementary reading:

Hillier, Frederick S. and Gerald J. Lieberman, *Introduction to Operations Research*, 8th edition, McGraw-Hill, 2005, ISBN 0-07-252744-7, chapter 15.
Note: Student Soft Reserves are selling copies of this chapter.

Prerequisite:

Economics 1 A-B or 2 A-B, Economics 120 A, and Math 20F.

Homework Assignments, Final Exam, and Grades:

An in-class midterm will be given on May 9. It will contribute 30% of your grade. The final will take place on June 15. The final will contribute 50% of your grade.

In addition, 8 weekly homework problem sets will be assigned, and they will contribute 20% of your grade. The homework assignments will be posted on the website and due as announced. There will be no homework due during the first week and the week of the midterm. From each homework assignment, two randomly selected problems will be graded and the score for that homework assignment will be determined based on the grade for the selected problems. Answers will be provided on the course website. Since the course builds up methods from the simplest problems to more complex settings, it is important to keep up with the material week by week. Apart from directly contributing to your grade, doing the problems will be a great practice for the midterm and the final. Not doing the problems will be risky and will significantly increase your chances of doing poorly in the course.

Homework Assignments and Solutions:

- Homework 1 (due Apr 13); Solutions to Homework 1
- Homework 2 (due Apr 20): Solutions to Homework 2
- Homework 3 (due Apr 27): Solutions to Homework 3
- Homework 4 (due May 4): Solutions to Homework 4
- Homework 5 (due May 18): Solutions to Homework 5
- Homework 6 (due May 25): Solutions to Homework 6
- Homework 7 (due Jun 1): Solutions to Homework 7
- Homework 8 (due Jun 8): Solutions to Homework 8

Additional Practice Problems and Solutions:

- Practice for midterm: exam (solutions)
- Practice for final: exam A (solutions to exam A), exam B (solutions to exam B)

Exams:

- Midterm and solutions
- Midterm results:

- Final and solutions
- Final results:

Lectures, Topics, and Reading Assignments:

Course Overview
- Lecture 1 : course overview and introduction (Apr 4)

Probability Theory (Lindley, Chapters 2-3)
- Lecture 2 : assigning probabilities (Apr 6)
- Lecture 3 : laws of probabilities (Apr 11)
- Lecture 4 : laws of probabilities cont'd (Apr 13)
- Lecture 5 : probability distributions and applications (Apr 18)

Expected Utility Theory and Applications (Lindley, Chapters 4 and 5)
- Lecture 6 : expected utility theorem (Apr 20)
- Lecture 7 : utility of money (Apr 25)
- Lecture 8 : utility of money and applications (Apr 27)
- Lecture 9 : utility of money and applications cont'd (May 2)
- Lecture 10 : applications and midterm Q&A (May 4)

May 9: In-class MIDTERM (closed-book exam, no calculators, bring a bluebook)

Bayes Rule and Updating of Beliefs (Lindley, Chapter 6)
- Lecture 12 : Bayes rule and updating of beliefs (May 11)

Value of Information (Lindley, Chapter 7)
- Lecture 13 : value of perfect information (May 16)
- Lecture 14 : value of imperfect information (May 18)
- Lecture 15 : value of imperfect information cont'd (May 23)

Decision Trees (Lindley, Chapter 8)
- Lecture 16 : introduction and examples (May 25)
- Lecture 17 : decision tree applications (May 30)
- Lecture 18 : optimal search (June 1)
- Lecture 19 : infinite horizon problems and dynamic programming (June 6)
- Lecture 20 : applications, Q&A about the final (June 8)

June 15 (Thu): Final Exam, 3-6pm, in Solis Hall 107 (closed-book exam, no calculators, bring a bluebook)