

Princeton University – Department of Economics  
**ECO 317 – ECONOMICS OF UNCERTAINTY**  
Fall Term 2009

**SCHEDULE AND COURSE OUTLINE**

**Time and Place**

Lectures: Tu-Th 3.00-4.20 in Fisher Hall B-01  
Precept: Fri 10.00-10.50 in Fisher Hall B-01

**People**

Professor: Avinash Dixit  
Office location: Fisher Hall 212  
Office hours: Tu We 12.30-2.00.  
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Preceptor: Andrei Rachkov  
Office hour location: Fisher Hall B-10  
Office hours: Th 11.00-12.30  
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**Course Description**

This is an advanced course in microeconomic theory. Using the concepts and mathematical techniques developed in ECO 310, it studies the following topics: [1] Theories of choice under uncertainty. [2] Risk aversion and applications to insurance and portfolio choice. [3] Equilibrium under uncertainty with applications to financial markets. [4] Asymmetric information: moral hazard and adverse selection. [5] Applications to the design of incentives, contracts, contests, and auctions. Concepts in game theory are developed as needed.

**Textbook (required for purchase)**

Louis Eeckhoudt, Christian Gollier and Harris Schlesinger, *Economic and Financial Decisions Under Risk*, Princeton University Press, 2005. Available in paperback, ISBN0-691-12215-6. Firestone catalog number HB615 .E44 2005.  
Cited in readings below as EGS.

**Important precaution**

Information about problem sets, exams, and posting of supplementary notes for lectures and precepts will be sent by e-mail, under the subject heading ECO317. You must make sure to check this frequently, and keep your e-mail account under quota.

**Other books frequently cited (on reserve in Firestone library)**

These books are cited in the readings by the author(s) or editors

Kenneth J. Arrow, *Essays in the Theory of Risk-Bearing*, North-Holland, 1970.

Firestone catalog number HB615 .A75 1976

Peter Diamond and Michael Rothschild (eds) *Uncertainty in Economics: Readings and Exercises*, Academic Press, second edition 1989.

Firestone catalog number HB615 .U55 1989

Jack Hirshleifer and John G. Riley, *The Analytics of Uncertainty and Information*, Cambridge University Press, 1992. Available in paperback, ISBN 0 521 28369 8.

Firestone catalog number HB615 .H568 1992

**Prerequisites**

ECO 310 is a strictly enforced prerequisite. Moreover, if you did not get a B+ or better in that course, ECO 317 is probably not for you.

Knowledge of probability theory at least at the level of ECO 202. Having done ORF 245 instead will be a slight advantage. ORF 309 will be a huge advantage.

**Bottom-line issues***Problem Sets*

There will be seven problem sets. Each will be posted on the course web site about a week ahead of its due date. Each will be due on a Thursday by the end of class. We will not accept late problem sets for any reason. However, only the best five will count toward the grade, so you can miss two without cost. The due dates are:

No. 1 – Oct. 1. No. 2 – Oct. 15. No. 3 – Oct. 22.

No. 4 – Nov. 19. No. 5 – Nov. 26. No. 6 – Dec. 3. No. 7 – Dec. 10

*Exams*

There will be an 80-minute midterm exam in class on Thursday October 29, and a scheduled 3-hour final exam during the exam period in January. You must give higher priority to exams over other activities including travel home or to exotic locations.

*Grading*

The problem sets will count for 25% of the course grade.

The exam weights will be individualized: either (25% midterm, 50% final) or (20% midterm, 55% final), whichever gives you the higher score.

## Course outline

The weeks given below for coverage of the individual topics are approximate and subject to revision. But the order will mostly stay as stated below, so you can use the list to plan your advance reading. The “Optional additional readings” will give you a deeper and more detailed understanding of materials covered in the “Required” readings, and thereby consolidate and extend your knowledge for uses beyond this course. Some problems etc. based on the additional material may appear, but then you will be given enough leads and hints to be able to solve them having done only the required readings.

The readings will be supplemented by notes for lectures and precepts that will be posted on the course site on Blackboard. You will be notified of these postings by e-mail. All these posted materials will become required reading.

### *0. Brief review of probability theory (Week 1)*

Reading: Your textbook or notes from ECO 202, ORF 245, or ORF 309.

### *1. Expected utility theory of consumer choice under uncertainty (Weeks 1-2)*

Required readings:

EGS, chapters 1, 2.

Arrow, chapters 1-2, in chapter 2 merely quickly skim pp. 55-88.

Optional additional readings:

Hirschleifer and Riley, chapter 1 pp. 7-33.

I.N. Herstein and J. Milnor, “An Axiomatic Approach to Measurable Utility.” *Econometrica* 21, 1953, 291-297. At <http://links.jstor.org/sici?sici=0012-9682%28195304%2921%3A2%3C291%3AAAATMU%3E2.0.CO%3B2-S>

J.W. Pratt, “Risk Aversion in the Small and in the Large.” *Econometrica* 32, 1964, 122-36. Item 4 in Diamond-Rothschild, also at <http://links.jstor.org/sici?sici=0012-9682%28196401%2F04%2932%3A1%2F2%3C122%3ARAITSA%3E2.0.CO%3B2-W>

J. Dreze, “Axiomatic Theories of Choice, Cardinal Utility, and Subjective Probability: A Review.” Item 3 in Diamond-Rothschild.

David Kreps, *Notes on the Theory of Choice*, Westview Press, 1988. Chapters 1-8, 14.  
Firestone catalog number HB801 .K73 1988

### *2. Applications of expected utility theory: portfolio choice, insurance, saving (Weeks 3-4)*

Required readings:

EGS, chapters 3-6

Arrow, chapter 3

Optional additional readings:

Hirschleifer and Riley, chapters 2, 3

### *3. Critiques of expected utility theory; some alternatives (Week 5)*

Required readings:

EGS, chapter 13.

Mark J. Machina, "Choice Under Uncertainty: Problems Solved and Unsolved." *Journal of Economic Perspectives*, 1, 1987, 121-154. At <http://links.jstor.org/sici?sici=0895-3309%28198722%291%3A1%3C121%3ACUUPSA%3E2.0.CO%3B2-X>

Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica*, 47, 1979, 263-292. At <http://links.jstor.org/sici?sici=0012-9682%28197903%2947%3A2%3C263%3APTAAOD%3E2.0.CO%3B2-3>

Daniel Kahneman, "Maps of Bounded Rationality: Psychology for Behavioral Economics," (Nobel Prize lecture) *American Economic Review*, 93, 2003, 1449-1475. At <http://ariel.ingentaselect.com/vl=1141365/cl=46/nw=1/rpsv/cw/aea/00028282/v93n5/s1/p1449>

Menahem E. Yaari. "On the Role of 'Dutch Books' in the Theory of Choice Under Risk," in *Frontiers of Research in Economic Theory*, eds. Donald P. Jacobs, Ehud Kalai, and Morton I. Kamien, Cambridge University Press, 1998.

Optional additional readings:

Hirschleifer and Riley, chapter 1 pp. 33-41.

Colin J. Camerer, "Individual Decision Making." In *Handbook of Experimental Economics*, eds. John H. Kagel and Alvin E. Roth, Princeton University Press, 1995, pp. 587-703. Firestone catalog no. HB131 .H355 1995

Colin J. Camerer, *Behavioral Game Theory*, Princeton University Press, 2003. Firestone catalog no. HB144 .C364 2003. Discussions of the game experiment findings often discuss issues of individual decision making.

Green, Jerry, "Making Book Against Oneself, The Independence Axiom, and Nonlinear Utility Theory." *Quarterly Journal of Economics*, 102, 1987, 785-796. At <http://links.jstor.org/sici?sici=0033-5533%28198711%29102%3A4%3C785%3A%22BAOTI%3E2.0.CO%3B2-X>

### *4. General equilibrium under uncertainty, financial markets (Weeks 7-8)*

Required readings:

EGS, chapters 10, 11.

Arrow, chapter 4.

J. Mossin, "Security Pricing and Investment Criteria in Competitive Markets." *American Economic Review* 59, 1969, 749-756. At <http://links.jstor.org/sici?sici=0002-8282%28196912%2959%3A5%3C749%3ASPAICI%3E2.0.CO%3B2-K>

Optional additional readings:

G. Debreu, *Theory of Value*, Chapter 7. Reprinted as item 11 in Diamond-Rothschild.

- R. Radner, "Competitive Equilibrium Under Uncertainty." *Econometrica* 36, 1968, 31-58. Item 12 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0012-9682%28196801%2936%3A1%3C31%3ACEUU%3E2.0.CO%3B2-U>
- P. Diamond, "The Role of a Stock Market in a General Equilibrium Model with Technological Uncertainty." *American Economic Review* 57, 1967, 759-776. Item 13 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0002-8282%28196709%2957%3A4%3C759%3ATROASM%3E2.0.CO%3B2-I>
- Hirschleifer and Riley, chapter 4.

## 5. Markets with asymmetric information (Weeks 9-10)

Required readings:

EGS, chapter 12.

Arrow, chapters 8, 9. Chapter 8 is also Item 21 in Diamond-Rothschild.

Optional additional readings:

- S. Shavell, "On Moral Hazard and Insurance," *Quarterly Journal of Economics* 93, 1979, 541-562. At <http://links.jstor.org/sici?sici=0033-5533%28197911%2993%3A4%3C541%3AOMHAI%3E2.0.CO%3B2-7>
- G. Akerlof, "The Market for Lemons." *Quarterly Journal of Economics* 84, 1970, 488-500. Item 15 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0033-5533%28197008%2984%3A3%3C488%3ATMF%22QU%3E2.0.CO%3B2-6>
- M. Rothschild and J. Stiglitz, "Equilibrium in Competitive Insurance Markets." *Quarterly Journal of Economics* 90, 1976, 629-650. Item 17 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0033-5533%28197611%2990%3A4%3C629%3AEICIMA%3E2.0.CO%3B2-N>
- M. Spence, "Job Market Signaling." *Quarterly Journal of Economics* 87, 1973, 355-374. Item 18 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0033-5533%28197308%2987%3A3%3C355%3AJMS%3E2.0.CO%3B2-3>
- Hirschleifer and Riley, chapters 8, 11.

## 6. Incentives and mechanism design (Week 11)

Required readings:

- B. Holmstrom, "Moral Hazard and Observability." *Bell Journal of Economics* 19, 1979, 74-91. Item 20 in Diamond-Rothschild. Also at <http://links.jstor.org/sici?sici=0361-915X%28197921%2910%3A1%3C74%3AMHAO%3E2.0.CO%3B2-Q>
- D. Baron and R. Myerson, "Regulating a Monopolist with Unknown Costs." *Econometrica* 50, 1982, 911-930. At <http://links.jstor.org/sici?sici=0012-9682%28198207%2950%3A4%3C911%3ARAMWUC%3E2.0.CO%3B2-Y>
- R. Gibbons, "Incentives and Careers in Organizations." In *Advances in Economics and Econometrics*, Vol. III, eds. D. M. Kreps and K. F. Wallis, Cambridge University Press, 1997, 1-37. Working paper version available at <http://papers.nber.org/papers/w5705.pdf>
- C. Prendergast, "The Provision of Incentives in Firms." *Journal of Economic Literature* 37, 1999, 7-63. At <http://links.jstor.org/sici?sici=0022-0515%28199903%2937%3A1%3C7%3ATPOIIF%3E2.0.CO%3B2-%23>
- B. Holmstrom and P. Milgrom, "Multitask Principal-Agent Analysis: Incentive Contracts, Asset Ownership, and Job Design." *Journal of Law, Economics, and Organization* 7, Special Issue, 1991, 24-52. At <http://links.jstor.org/sici?sici=8756-6222%281991%297%3C24%3AMPAICA%3E2.0.CO%3B2-3>

Optional additional readings:

- A. Dixit, "Incentives and Organizations in the Public Sector." *Journal of Human Resources* 37, 2002, 696-727. At <http://links.jstor.org/sici?sici=0022-166X%28200223%2937%3A4%3C696%3AIAOITP%3E2.0.CO%3B2-N>

## *7. Auctions and contests (Week 12)*

Required readings:

Hirshleifer and Riley, chapter 10.

- P. Klemperer, "A Survey of Auction Theory." Chapter I-A of an online book, available at <http://www.paulklempere.org/index.htm>

Optional additional readings:

*Journal of Economic Perspectives*. Symposium on auctions. 3, 1989, 3-50. Links to individual articles at <http://www.jstor.org/browse/08953309/di960527?frame=noframe&userID=807028d2@princeton.edu/01cc99333c0050178cb13&dpi=3&config=jstor>