

## 14.121 Microeconomic Theory I

### Staff:

Instructor: Prof. Robert Townsend, E17-230, Office hours: after class.

Teaching Assistant: Germán Gieczewski, ggieczew@mit.edu

### Logistics:

Two lectures per week, Mon, Wed. 1-2:30, 14 lectures total

Recitations: Fri, 1-2:30 in E51-057

Course begins on 9/4/2013 and ends 10/25/2013

Exam: 10/25/2013

### Description:

This course provides an introduction to microeconomic theory designed to meet the needs of students in the economics PhD program. It provides an introduction to consumer Choice Theory and General Equilibrium models, with an overview of the main results and tools used in these subjects and both directly and indirectly in a variety of other fields.

Enrollment in this course is limited and permission of the instructor is required. Permission can be obtained by attending the first class meeting and providing information about previous coursework in mathematics and economics. The course assumes that students have taken undergraduate intermediate microeconomics classes. It also assumes that students are comfortable with multivariable calculus, linear algebra and have had some exposure to real analysis. Historically, many students from outside the economics department have had difficulty with the course. The enrollment limit may result in well-qualified students being turned away.

### Textbook:

- Mas-Collel, Whinston, and Green (1995): Microeconomic Theory [MWG]

Some students have also found the following books helpful:

- Debreu, G. Theory of Value: An Axiomatic Analysis of Economic Equilibrium. New York, NY: Wiley, 1959
- Jehle, Geoffrey, and Philip Reny. Advanced Microeconomic Theory. 2nd ed. Reading, MA: Addison-Wesley, 2000. [JR]

### Grading and Requirements:

The course will be graded on the basis of a series of problem sets and a final exam. Problem sets will be due in class on assigned lecture dates. They will be graded on a check-, check, check+ basis.

The grades are intended primarily to give you an idea of how you are doing in the course. You may work in groups, but please do the write-ups individually. We do not expect to see identical answers from different students. Class participation is strongly encouraged. The final exam will be held two days after the last lecture.

• **Topic 1 (9/4): The Big(gest) Picture**

Overview of the class. Modeling: primitives, notion of equilibrium. Data and its organization. Economic science. Experiments and research design. Identification and restrictions on data. Estimation (parametric and nonparametric). Quantification of parameters and answers to research questions. Policy implications, guidance on intervention, and optimal market design.

**References:**

- Chipman, John S. “The contributions of Ragnar Frisch to economics and econometrics.” *Econometric Society Monographs* 31 (1998): pp. 58-110.
- Koopmans (1947), “Measurement without theory,” *The Review of Economics and Statistics*, Vol. 29, No. 3 (1947), pp. 161-172.
- Matzkin, Rosa, ”Nonparametric Identification.” *Handbook of Econometrics* 6 (2007): 5307-5368.
- Angrist and Pischke (2010), “The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics” (No. w15794). National Bureau of Economic Research.
- Angrist and Imbens (1994), “Identification and Estimation of Local Average Treatment Effects,” *Econometrica*, Vol. 62, No. 2 (1994), pp. 467-475.
- Chiappori, Ekeland, Kübler and Polemarchakis (2004), “Testable Implications of General Equilibrium Theory: a Differentiable Approach,” *Journal of Mathematical Economics* Vol. 40, No. 1 (2004), pp. 105-119.
- Lucas Jr, Robert E. “Understanding business cycles,” *Carnegie-Rochester Conference Series on Public Policy* Vol. 5, North-Holland, 1977.

• **Topic 2 (9/9): Introduction to General Equilibrium and Fundamental Welfare Theorems in  $\mathbb{R}^n$**

Preferences and utility theory. Technology and Production Theory. Solution of decentralized problem. Walras’ Law. Pareto Optimality.

**References:**

- Preferences: MWG 2.B, 3.A, 3.B, 3.C
- Technology and Production: MWG 5.A, 5.B

• **Topic 3 (9/11): First Welfare Theorem**

First Welfare Theorem and its failures.

**References:**

- First Welfare Theorem: MWG 15.C, 16.A - 16.C

• **Topic 4 (9/16): Second Welfare Theorem and Optimization**

Second Welfare Theorem and its failures. Kuhn-Tucker conditions. Envelope Theorem. Supermodularity. Pareto Optimality and Welfare functions.

**References:**

- Kuhn-Tucker conditions and Envelope Theorem: MWG M.J - M.L
- Second Welfare Theorem: MWG 16.D
- Pareto Optimality and Welfare functions: MWG 16.E - 16.G

• **Topic 5 (9/18): General Implementation and Bargaining Foundations of General Equilibrium**

Core. Replication Economies and Core Convergence. Continuum of consumers and Aumann equivalence. Nash bargaining. Price makers and intermediation. Economies with endogenous commodity spaces.

**References:**

- Core, core convergence and Aumann equivalence: MWG 18.B
- Nash bargaining: MWG 22.E
- Price makers and intermediation: Townsend (1978), "Intermediation with Costly Bilateral Exchange", *The Review of Economic Studies*, Vol. 45, No. 3 (Oct., 1978), pp. 417-425
- Economies with endogenous commodity spaces:
  - \* Makowski (1980), "Perfect Competition, the Profit Criterion, and the Organization of Economic Activity", *Journal of Economic Theory*, Vol. 22, pp. 222-242
  - \* Pesendorfer (1995), "Financial Innovation in a General Equilibrium Model", *Journal of Economic Theory*, Vol. 65, pp. 79-116

• **Topic 6 (9/23 and 9/25): General Equilibrium with Uncertainty**

- Expected Utility Theory and Risk-Sharing. Contingent Commodities. Arrow-Debreu Economies and Sequence of Markets. Radner Economies.

References:

- Expected Utility Theory and Risk-Sharing: MWG Chapter 6
- Applications:
  - \* Townsend (1993), "The Medieval Village Economy", *Princeton University Press*, Section 2.2
  - \* Townsend (1994), "Risk and Insurance in Village India", *Econometrica*, Vol. 62, No.3 (May, 1994), pp. 539-591
- Arrow-Debreu and Radner Economies: MWG 19.A - 19.G

• **Topic 7 (9/30): Existence and Computation of Walrasian Equilibria**

Classical Demand Theory. Fixed Point Theorems. Sufficient conditions for Existence of Walrasian Equilibria. Uniqueness and Regularity. Computation of equilibrium prices: Scarf's Algorithm. Calibration and Estimation. Negishi's Algorithm.

**References:**

- Classical Demand Theory: MWG 3.D
- Fixed Point Theorems: MWG M.H and M.I
- Nash Equilibrium and Fixed Point Theorems: MWG 8.D and 8.A

- Existence of Walrasian Equilibrium: MWG 17.A - 17.D
- Scarf's Algorithm: Scarf (1982), "The Computation of Equilibrium Prices: An Exposition" on *Handbook of Mathematical Economics*, vol. II, Chapter 21
- Strategic Market Games: Giraud (2003), "Strategic Market Games: an Introduction," *Journal of Mathematical Economics*, Vol. 39, No. 5 (2003), pp. 355-375.
- Negichi's Algorithm: Judd (2005), "Solving Dynamic Stochastic Competitive General Equilibrium Models", in "*Frontiers in applied general equilibrium modeling: in honor of Herbert Scarf*".

• **Topic 8 (10/2): Aggregate Demand and Representative Consumer. Gorman Aggregation**

Indirect utility functions, aggregate demand and wealth expansion paths. Gorman Aggregation and existence of representative consumer. Theory of Syndicates.

**References:**

- Indirect utility functions: MWG, 3.D
- Aggregate demand: MWG, 4.B, 4.D
- Gorman Aggregation: Townsend (1993), "The Medieval Village Economy", *Princeton University Press*, pp. 51-54
- Syndicates: Wilson (1968), "The Theory of Syndicates", *Econometrica*, Vol. 36, No.1 (Jan., 1968), pp. 119-132

• **Topic 9 (10/7): Calibration and Basic Macroeconomics**

Organization of data. Accounts. Calibration. Leontief production functions and input-output matrices. Linear Programming theorems. Computation of General Equilibrium.

**References:**

- Calibration:
  - \* Dawkins, Srinivasan and Whalley (2001), "Calibration", on *Handbook of Econometrics*, vol 5, Chapter 58
  - \* Hansen and Heckman (1996), "The Empirical Foundations of Calibration", *The Journal of Economic Perspectives*, Vol.10 No.1, pp. 87-104
  - \* Shoven and Walley (1973), "General Equilibrium with Taxes: A Computational Procedure and an Existence Proof", *The Review of Economic Studies*, Vol. 40, No. 4 (Oct., 1973), pp. 475-489.
- Leontief production function and input-output matrices: MWG 5.A
- Linear Programming: MWG M.M

• **Topic 10 (10/9 and 10/16): Identification in General Equilibrium**

Expenditure minimization and duality. Weak Axiom of Revealed Preferences and Law of Demand. Hicksian Demands and Slutsky Matrices. Integrability. The Sonnenschein-Mantel-Debreu Theorem. Testable restrictions on equilibrium allocations: Brown and Matzkin, Browning and Chiappori.

**References:**

- Revealed preferences and law of demand: 2.E - 2.F
- Expenditure minimization and duality: MWG 3.E-3.G

- Integrability:
  - \* MWG 3.H
  - \* Jehle and Reny, "Advanced Microeconomic Theory". 2nd ed. Reading, MA: Addison-Wesley, 2000., pp.80-86
- Sonnenschein-Mantel-Debreu Theorem: MWG 17.E
- Testable restrictions on equilibrium allocations:
  - \* Brown and Matzkin (1996), "Testable Restrictions on the Equilibrium Manifold", *Econometrica*, Vol. 64, No.6 (Nov., 1996), pp. 1249-1262

• **Topic 11 (10/21 and 10/23): Generalizations of GE: what can go "right" and "wrong"**

Infinite Horizon economies. Lotteries. Overlapping generation models. Private information economies. Product diversity and location.

**References:**

- Infinite Horizon economies, overlapping generation models:
  - \* Debreu (1954), "Valuation Equilibrium and Pareto Optimum", *Proceedings of the National Academy of Sciences of the United States of America* (PNAS). 1954 July; 40(7): 588–592.
  - \* Acemoglu (2009), "Introduction to Modern Economic Growth" Princeton Press, Sections 5.2-5.7
  - \* Stokey, Lucas and Prescott (1989), "Recursive Methods in Economic Dynamics." Harvard University Press, Cambridge, MA.
- Product Diversity:
  - \* Jones (1983), "Existence of Equilibria with Infinitely Many Consumers and Infinitely Many Commodities: A Theorem Based on Models of Commodity Differentiation", *Journal of Mathematical Economics*, Vol. 12, pp.119-138
  - \* Stokey (1988), "Learning by Doing and the Introduction of New Goods," *The Journal of Political Economy*, pp. 701-717.
  - \* Mas-Colell (1975), "A Model of Equilibrium with Differentiated Commodities," *Journal of Mathematical Economics*, Vol. 2, No. 2 (1975), pp. 263-295.
- Lotteries: Rogerson (1988), "Indivisible labor, lotteries and equilibrium", *Journal of Monetary Economics*, Vol. 21, pp. 3-16.
- Private Information Economies:
  - \* Prescott and Townsend (1984), "General Competitive Analysis in an Economy with Private Information", *International Economic Review*, Vol. 25, No.1, pp.1-20
  - \* Prescott and Townsend (1984), "Pareto Optima and Competitive Equilibria with Adverse Selection and Moral Hazard", *Econometrica*, Vol. 52, No.1, pp. 21-46
- Monetary Economics:
  - \* Townsend and Wallace (1987), "Circulating private debt: an example with a coordination problem," *Contractual Arrangements for Intertemporal Trade*.
  - \* Townsend (1987), "Asset-return anomalies in a monetary economy," *Journal of Economic Theory*, Vol. 41, No. 2 (1987), pp. 219-247.