ECONOMICS 100A: MICROECONOMICS Fall 2010

Tuesday, Thursday 12:30-1:50pm in Pepper Canyon Hall 106

Instructor:

Dr. Melissa Famulari	mfamulari@ucsd.edu	Econ 221	Office Hrs: Wed, 8:30-noon

Graduate Teaching Assistants:

(1) Travis Brayak	tbrayak@ucsd.edu	Seq.Hall 232	Office Hrs: Thurs, 4:30-6:30pm
(2) Sarojini Hirshleifer	shirshle@ucsd.edu	Seq Hall 140	Office Hrs: Mon, 8:30-9:30am

Prerequisites: Econ 1 and either Math 10C or Math 20C or Math 21C.

Assessment: There two inclass midterm exams on **Tuesday, October 19th** and **Tuesday, November 16th** each of which is worth 25% of your grade. The final exam is cumulative and is worth 50% of your grade. The final is on **Friday, December 10th from 11:30-2:30 p.m.**

Course Objectives: As the first class in the micro sequence, Econ 100A is designed to teach you how to set up, solve and analyze optimization models and apply these mathematical models to the theory of the consumer (commodity demand, labor supply and consumption/savings decisions). Finally, we will examine the fundamentals of decision making under risk and uncertainty.

Course Materials:

Required Textbook and Reading:

(1) Perloff, Jeffrey M. (2007) *Microeconomics: Theory and Applications with Calculus*, Pearson/Addison-Wesley.
(2) Machina, Mark (2010) "Math Handout"

Additional Readings:

Other calculus-based intermediate textbooks that you could use to supplement Perloff include Walter Nicholson's, *Microeconomic Theory*, Hal R. Varian's, *Intermediate Microeconomics* and Binger and Hoffman's, *Microeconomics with Calculus*.

One free option is an online introductory textbook written by Preston McAfee of Caltech http://www.introecon.com/. The level of this book is between Econ 1 and Econ 100A. It is very interesting, free, and you may find it useful

Mathematics Tutorial for Economists: Written by Martin Osborne at the University of Toronto http://www.economics.utoronto.ca/osborne/MathTutorial/index.html, Chapters 1-6 of this will help you review the material that you learned in Math 10ABC or 20ABC that are the most important for this course.

Mandatory Discussion Sessions: These mandatory sessions will be held on Tuesday 7:00-7:50 p.m. and 8:00-8:50 p.m. in Pepper Canyon Hall room 122. The sessions are conducted by your TAs who will answer your questions regarding lectures, the textbook, practice problems and old exam problems.

WebCT: This is where you access the syllabus, class handouts, a discussion board, your grades, homework assignments, etc. I have posted previous quarter's 100A exams to give you some additional practice. NOTE: I will not post answers to the old exams.

Weekly Homework: I will post homework assignments on WebCT each week by Friday. I will post the homework answer key one week after the problem set is assigned.

Administrative Issues:

(1) If you have a documented disability, please bring your documentation to me as soon as possible so that I can make suitable accommodations for you. If you believe that you have a disability and desire accommodation, please register with the Office for Students with Disabilities

(2) Any student found guilty of academic dishonesty will earn a failing grade for the course. In addition to the academic sanction that I will impose, the Council of Deans of Student Affairs will also impose a disciplinary penalty. For a review of UCSD policy, please see http://senate.ucsd.edu/manual/appendices/app2.htm.

(3) You will only need a pen or pencil for exams. Since I make copies of your exams, feel free to use a pencil. Exams are closed book and you may not use notes. Exams are completely electronic-free so you may not use of calculators, headphones, cell phones, etc. during an exam.

(4) If you arrive late to an exam, I will allow you to take the exam in the time that remains *as long as no one has turned in his/ her exam and left the room*. Once a classmate has turned in his/her exam, you will earn a zero on the test if you arrive late.

(5) If there is a mistake adding the points on your exam, bring it to my attention within one week of the exam being returned and I will correct it. If you believe an exam has not been graded properly, you may request a regrade within one week of the exam being returned. I will regrade your entire exam. The regraded score will be your grade for the exam. You may not ask for another regrade or go back to your first grade.

DATE	TOPIC	TEXT / MATH HANDOUT
Sep. 23	Introduction & Mathematical Review #1	Chpt. 1/ Sect A, B
Sep. 28	Mathematical Review #1 (continued)	2 / C
Sep. 30	Consumer Preferences: Utility Functions and Indifference Curves	3.1
Oct. 5	Consumer Preferences: Utility Functions and Indifference Curves (continued)	3.2
Oct. 7	Mathematical Review #2	D, E
Oct. 12	Mathematical Review #2 (continued)	D, E
Oct. 14	Utility Maximization and Demand Functions	3.3, 3.4
Oct. 19	**(Tuesday) 1st Midterm Exam**	
Oct. 21	Utility Maximization and Demand Functions (continued)	4.1
Oct. 26	Utility Maximization and Demand Functions (continued)	5.1, 5.4
Oct. 28	Comparative Statics of Demand	4.2
Nov. 2	Comparative Statics of Demand (continued)	4.3
Nov. 4	Comparative Statics of Demand (continued)	4.5, 4.5
Nov. 9	Supply of Labor: Labor-Leisure Decision	5.5
Nov.16	**(Tuesday) 2nd Midterm Exam**	
Nov.18	Supply of Capital: The Consumption-Savings Decision	15.4
Nov.23	Decision Making under Risk and Uncertainty	16.1, 16.2
Nov.30	Decision Making under Risk and Uncertainty (continued)	16.3, 16.4
Dec. 2	Decision Making under Risk and Uncertainty (continued)	16.3, 16.4

Dec. 10 (Friday) FINAL EXAM 11:30am-2:30pm (location T.B.A)

ECON 100A COURSE OUTLINE – Fall 2010

I. INTRODUCTION

a. Domain of Microeconomic Analysis

b. Circular Flow Diagram

c. Stocks vs. Flows and the Dimensions of Economic Variables

II. MATHEMATICAL REVIEW #1

a. Calculus Review (Math Handout, Section A)

Derivatives, Partial Derivatives and the Chain Rule
Approximation Formulas for Small Changes in Functions (Total Differentials)

b. Elasticity (Math Handout, Section B)

Absolute, Proportionate and Percentage Changes in Variables
Definition of Elasticity and Examples
Constant Elasticity Functions

c. Level Curves of Functions (Math Handout, Section C)

Definition and Graphical Illustration
Algebraic Formula for a Level Curve
Formula for the Slope of a Level Curve

d. Scale Properties of Functions (Math Handout, Section D)

III. CONSUMER PREFERENCES: UTILITY FUNCTIONS & INDIFFERENCE CURVES

a. Commodities, Commodity Bundles and Preferences

Commodities are Typically *Flows*, not *Stocks*
Issue of Divisibility
Weak Preference, Strict Preference and Indifference Relations

b. Utility Functions

Preferences are Defined over Commodity Bundles, *not* Individual Commodities
Utility Functions and Total Utility Curves
- Important Examples: Linear, Cobb-Douglas, Leontief

Marginal Utility and Marginal Utility Curves
- Hypothesis of Diminishing Marginal Utility

Monotonic Transformations of Utility Functions

c. Indifference Curves and the Marginal Rate of Substitution

Deriving a Consumer's Indifference Curves from Their Utility Function
General Properties of Indifference Curves:
- One Through Every Commodity Bundle
- Downward Sloping and Can't Cross

Marginal Rate of Substitution (MRS)
- Graphical Interpretation: Slope of the Indifference Curve
- Algebraic Formula: Ratio of Marginal Utilities
- Hypothesis of Diminishing Marginal Rate of Substitution

IV. MATHEMATICAL REVIEW #2

a. Solving Optimization Problems (Math Handout, Section E)

General Structure of Optimization Problems
First and Second Order Conditions for Unconstrained Optimization Problems
First Order Conditions for Constrained Optimization Problems

V. UTILITY MAXIMIZATION AND DEMAND FUNCTIONS

a. Utility Maximization Subject to a Budget Constraint

- Graphical Illustration
- First Order Conditions for Utility Maximization
  - Two Interpretations of the First Order Conditions
- Second Order Conditions (Hypothesis of Diminishing MRS)
- Corner Solutions: Graphical Illustration and Algebraic Condition
- Indirect Utility Functions and Their Properties

b. Regular ("Marshallian") Demand Curves and Demand Functions

- Definition of Regular Demand Functions
  - Examples: Cobb-Douglas, Leontief, Linear
- General Properties of Demand Functions:
  - Walras' Law
  - Scale Invariant in Prices and Income
  - Relationship between Price Elasticities & Income Elasticity for a Good
- Market Demand Functions

VI. MATHEMATICAL REVIEW #3

a. Comparative Statics of Solution Functions **(Math Handout, Section F)**

b. Comparative Statics of Equilibria **(Math Handout, Section G)**

c. Comparative Statics of Optimal Value Functions **(Math Handout, Section H)**

VII. COMPARATIVE STATICS OF DEMAND

a. Income Changes

- Income-Consumption Locus
- Engel Curves: Definition and Graphical Derivation
- Income Elasticity
  - Superior, Normal and Inferior Goods
  - Income Elasticity and Budget Shares
  - Relationship Between Income Elasticities of All Goods
- Algebraic Derivation of the Effect of an Income Change

b. Price Changes

- Price-Consumption Locus
- Graphical Derivation of Marshallian Demand Curves
- Own Price Elasticity
  - Price Elasticity and Expenditures
- Cross Price Elasticity
  - Gross Substitutes and Gross Complements
- Algebraic Derivation of the Effect of a Price Change

c. Compensated Price Changes and Compensated Demand Functions

- Graphical Illustration of a Compensated Price Change
- Graphical Derivation of Compensated Demand Curves
- Algebraic Derivation of Compensated Demand Functions
- Algebraic Derivation of the Effect of a Compensated Price Change

d. Slutsky Equation

Expressing Each of the Three Basic Changes in Terms of the Other Two
Graphical Illustration
Algebraic Formulation and Informal Proof
Giffen Goods

VIII. SUPPLY OF FACTORS OF PRODUCTION

a. Supply of Labor: The Labor-Leisure Decision

Income-Leisure Space and the Labor-Leisure Decision
First Order Conditions for Optimal Supply of Labor
Comparative Statics: Income and Substitution Effects
Backward Bending Supply of Labor Curves
Kinked Budget Lines and the Overtime Decision

b. Supply of Capital: The Consumption-Savings Decision

Intertemporal Income and Consumption Streams
Interest Rates and Discounted Present Value of a Stream
Intertemporal Utility Maximization
First Order Conditions and Interpretation
Comparative Statics: Income and Substitution Effects

ECON 100A FAMOUS OPTIMIZATION PROBLEMS

Optimization Problem	Objective Function	Constraint	Control Variables	Parameters	Solution Functions	Optimal Value Function
Consumer's Problem	$U(x_1,...,x_n)$ utility function	$p_1 \cdot x_1 + ... + p_n \cdot x_n = I$ budget constraint	$x_1,...,x_n$ commodity levels	$p_1,...,p_n, I$ prices and income	$x_i(p_1,...,p_n,I)$ regular demand functions	$V(p_1,...,p_n,I)$ indirect utility function
Expenditure Minimization Problem	$p_1 \cdot x_1 + ... + p_n \cdot x_n$ expenditure level	$U(x_1,...,x_n) = u_0$ desired utility level	$x_1,...,x_n$ commodity levels	$p_1,...,p_n, u_0$ prices and utility level	$h_i(p_1,...,p_n,\overline{u})$ compensated demand functions	$e(p_1,...,p_n,u_0)$ expenditure function
Labor/Leisure Decision	$U(H,I)$ utility function	$I = I_0 + w \cdot (168 - H)$ budget constraint	H, I leisure time, disposable inc.	w, I_0 wage rate and nonwage income	$168 - H(w,I_0)$ labor supply function	$V(w,I_0)$ indirect utility function
Consumption/ Savings Decision	$U(c_1,c_2)$ utility function	$c_2 = I_2 + (1+i) \cdot (I_1 - c_1)$ budget constraint	c_1, c_2 consumption levels	I_1, I_2, i income stream and interest rate	$c_1(I_1, I_2, i), c_2(I_1, I_2, i)$ consumption functions	$V(I_1,I_2, i)$ indirect utility function
Long Run Cost Minimization	$w \cdot L + r \cdot K$ total cost	$F(L,K) = Q$ desired output	L, K factor levels	Q, w, r desired output and factor prices	$L(Q,w,r), K(Q,w,r)$ output-constrained factor demand functions	$LTC(Q,w,r)$ long run total cost function
Long Run Profit Maximization (in terms of Q)	$P \cdot Q - LTC(Q,w,r)$ total profit	none	Q output level	P, w, r output price and factor prices	$Q(P,w,r)$ long run supply function	$\pi(P,w,r)$ long run profit function
Long Run Profit Maximization (in terms of L and K)	$P \cdot F(L,K) - w \cdot L - r \cdot K$ total profit	none	L, K factor levels	P, w, r output price and factor prices	$L(P,w,r), K(P,w,r)$ factor demand functions	$\pi(P,w,r)$ long run profit function