ECONOMICS 100A: MICROECONOMICS

Fall 2007	**Tuesday, Thursday 8:00-9:20am**	**WLH 2005**
Professor Mark Machina	**Office: Econ. Bldg. 217**	**Office Hours: Wed 8-noon**
TA's: Shalini Nageswaran	Sequoyah Hall 226	Fri 9:30-11:30am
Cynthia Wu	Sequoyah Hall 234	Tue 3:30-5:30pm
Section 1:	Monday 7:00-7:50pm	Center 119
Section 2	Tuesday 6:00-6:50pm	Center 115

DATE	TOPIC	TEXT / MATH HANDOUT
Sep. 27	Introduction & Mathematical Review #1	Ch. 1 / Sects. A, B
Oct. 2	Mathematical Review #1 (continued)	2 / C
Oct. 4	Consumer Preferences: Utility Functions and Indifference Curves	3.1
Oct. 9	Consumer Preferences: Utility Functions and Indifference Curves (cont.)	3.2
Oct. 11	Mathematical Review #2	D, E
Oct. 16	Utility Maximization and Demand Functions	3.3, 3.4
Oct. 18	Utility Maximization and Demand Functions (continued)	4.1
Oct. 23	(Tuesday) 1st Midterm Exam (*drop date is Oct 26*)	
Oct. 25	Consumer Surplus and Welfare Analysis	5.1-5.4
Oct. 30	Mathematical Review #3	F,G,H
Nov. 1	Mathematical Review #3 (continued)	F,G,H
Nov. 6	Comparative Statics of Demand	4.2
Nov. 8	Comparative Statics of Demand (continued)	4.3
Nov. 13	Comparative Statics of Demand (continued)	4.4, 4.5
Nov. 15	Supply of Labor: The Labor-Leisure Decision	5.5
Nov. 20	(Tuesday) 2nd Midterm Exam	
Nov. 27	Supply of Capital: The Consumption-Saving Decision	15.4
Nov. 29	Supply of Capital: The Consumption-Saving Decision (continued)	15.4
Dec. 4	Decision Making under Risk and Uncertainty	16.1, 16.2
Dec. 6	Decision Making under Risk and Uncertainty (continued)	16.3, 16.4
Dec. 11	(Tuesday) FINAL EXAM 8:00-11:00am (location T.B.A)	

TEXT & READINGS: *Microeconomics: Theory and Applications with Calculus* (1st Ed.) by Jeffrey Perloff, Addison-Wesley, 2008. You are responsible for all the material in the assigned chapters. There is also a Soft Reserve package, with a Mathematical Handout that contains required material for the course.

EXAMS: Grades are determined on the basis of two Midterm Exams and a Final Exam.

PRACTICE PROBLEMS: A large set of old exam problems is included in the Soft Reserve package. You are urged to practice on them, in preparation for the actual exams.

www.econ.ucsd.edu/~mmachina/courses/ECON_100A/ECON_100A.html

ECON 100A COURSE OUTLINE – Fall 2007

I. INTRODUCTION AND MATHEMATICAL REVIEW #1

a. Domain of Microeconomic Analysis

b. Circular Flow Diagram

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

d. Calculus Review (Math Handout, Section A)
- Derivatives, Partial Derivatives and the Chain Rule
- Approximation Formulas for Small Changes in Functions (Total Differentials)

e. Elasticity (Math Handout, Section B)
- Absolute, Proportionate and Percentage Changes in Variables
- Definition of Elasticity and Examples
- Constant Elasticity Functions

f. 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

II. 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

III. MATHEMATICAL REVIEW #2

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

b. 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

c. Corner Solutions and Inequality Constraints

IV. 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

c. Consumer Surplus and Welfare Analysis

- Consumer Surplus
- Equivalent and Compensating Variation
- Expenditure Functions

V. 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)

VI. 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 ("Hicksian") 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. The Slutsky Equation

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

VII. 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

VIII. 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

IX. DECISION MAKING UNDER RISK ANDUNCERTAINTY

a. Outcomes, Lotteries and Expected Value

Choice over Lotteries
Expected Value
The St. Petersburg Paradox

b. Expected Utility

Two-Stage Lotteries and the Independence Axiom
von Neumann-Morgenstern Utility Functions and Expected Utility

c. Risk Aversion

Properties of Risk Averse Preferences
Arrow-Pratt Measure of Risk Aversion
Risk Aversion and Wealth

d. Measures of Risk Aversion

e. Demand for Insurance

f. Investment in a Risky Asset

FAMOUS OPTIMIZATION PROBLEMS IN ECONOMICS

Optimization Problem	Objective Function	Constraint	Control Variables	Parameters	Solution Functions	Optimal Value Function
Consumer's Problem	$U(x_1,\ldots,x_n)$ utility function	$p_1 \cdot x_1+\ldots+p_n \cdot x_n = I$ budget constraint	$x_1,\ldots,x_n$ commodity levels	$p_1,\ldots,p_n, I$ prices and income	$x_i(p_1,\ldots,p_n,I)$ regular demand functions	$V(p_1,\ldots,p_n,I)$ indirect utility function
Expenditure Minimization Problem	$p_1 \cdot x_1+\ldots+p_n \cdot x_n$ expenditure level	$U(x_1,\ldots,x_n) = \overline{u}$ desired utility level	$x_1,\ldots,x_n$ commodity levels	$p_1,\ldots,p_n, \overline{u}$ prices and utility level	$h_i(p_1,\ldots,p_n, \overline{u})$ compensated demand functions	$e(p_1,\ldots,p_n, \overline{u})$ 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