ECONOMICS 100A: MICROECONOMICS

Fall 2009 **Tues, Thur 11:00am-12:20pm** **Warren Lecture Hall 2001**

Professor Mark Machina **Office: Econ Bldg 217** **Office Hours: Wed 8-noon**

TA's:	Michael Futch	Sequoyah Hall 228	Tues 3-5pm
	Matthew Niedzwiecki	Econ Bldg 123	Thurs 1-3pm
	Ketki Sheth	Sequoyah Hall 237	Wed 2:30-4:30pm
	Section 1	Wednesday 5:00-5:50pm	Cog Sci Bldg 001
	Section 2	Wednesday 6:00-6:50pm	Cog Sci Bldg 001

DATE	TOPIC	TEXT / MATH HANDOUT
Sep. 24	Introduction & Mathematical Review #1	Ch. 1 / Sects. A, B
Sep. 29	Mathematical Review #1 (continued)	2 / C
Oct. 1	Consumer Preferences: Utility Functions and Indifference Curves	3.1
Oct. 6	Consumer Preferences: Utility Functions and Indifference Curves (cont.)	3.2
Oct. 8	Mathematical Review #2	D, E
Oct. 13	Utility Maximization and Demand Functions	3.3, 3.4
Oct. 15	Utility Maximization and Demand Functions (continued)	4.1
Oct. 20	(Tuesday) 1st Midterm Exam (*drop date is Oct 23*)	
Oct. 22	Consumer Surplus and Welfare Analysis	5.1-5.4
Oct. 27	Mathematical Review #3	F,G,H
Oct. 29	Mathematical Review #3 (continued)	F,G,H
Nov. 3	Comparative Statics of Demand	4.2
Nov. 5	Comparative Statics of Demand (continued)	4.3
Nov. 10	Comparative Statics of Demand (continued)	4.4, 4.5
Nov. 12	Supply of Labor: The Labor-Leisure Decision	5.5
Nov. 17	(Tuesday) 2nd Midterm Exam	
Nov. 19	Supply of Capital: The Consumption-Saving Decision	15.4
Nov. 24	Decision Making under Risk and Uncertainty	16.1, 16.2
Dec. 1	Decision Making under Risk and Uncertainty (continued)	16.3, 16.4
Dec. 3	Decision Making under Risk and Uncertainty (continued)	16.3, 16.4
Dec. 9	(Wednesday) FINAL EXAM 11:30am-2:30pm	(location TBA)

TEXT & READINGS: *Microeconomics: Theory and Applications with Calculus* (1st Ed.) by Jeffrey Perloff, Addison-Wesley, 2008. There is also a Soft Reserve Package which contains the Math Handout, practice problems, and old exam questions. You are responsible for all the material in the assigned portions of the text and the Math Handout.

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

COURSE WEB PAGE: The course web page is at:

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

ECON 100A COURSE OUTLINE – Fall 2009

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
  - 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

III. CONSUMER PREFERENCES: UTILITY FUNCTIONS & INDIFFERENCE CURVES

- **a. Commodities, Commodity Bundles and Preferences**
  - Commodities are Typically *Flows*, not *Stocks*
  - Issue of Divisibility
  - The Relevant Time Period
- **b. Preference Relations and Utility Functions**
  - Preferences are defined over Commodity Bundles, *not* Individual Commodities
  - Weak Preference, Strict Preference and Indifference
  - 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. 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. Inequality Constraints and Corner Solutions**

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

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

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

c. Consumer Surplus and Welfare Analysis

Indirect Utility Functions and their Properties
Consumer Surplus
Equivalent and Compensating Variation
Expenditure Functions

VI. MATHEMATICAL REVIEW #3

- **Comparative Statics of Solution Functions (Math Handout, Section F)**
- **Comparative Statics of Equilibria (Math Handout, Section G)**
- **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 ("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

VIII. 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

IX. 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

X. DECISION MAKING UNDER RISK AND UNCERTAINTY

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	$U(x_1,...,x_n)$ 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	$U(x_1,...,x_n) = u$ desired utility level	$x_1,...,x_n$ commodity levels	$p_1,...,p_n, u$ prices and utility level	$h_i(p_1,...,p_n, u)$ compensated demand functions	$e(p_1,...,p_n, u)$ 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