Department of Economics
Barnard College
Fall 2009

Economics BC 1007: Mathematical Methods in Economics

Professor Sharon G. Harrison

Course description: This class will cover the mathematics you need to succeed in Intermediate Macroeconomics, Intermediate Microeconomics, and upper level electives in Economics. We start with the basics: algebra, solving equations, and graphing. Other topics include differentiation, functions and financial mathematics. We will make extensive use of examples in Economics to solidify the concepts. These include equilibrium and elasticities as well as constrained and unconstrained optimization. Class meetings will consist of lectures as well as working together on sample problems.

Course prerequisites: There are no prerequisites for this class.

Class meetings: This class will meet Mondays and Wednesdays from 10:35-11:50 am.

Contact Information: My office is in Room **7, Lehman Hall** and my phone number there is **854-3333**. You can also reach me by e-mail at **sh411@columbia.edu.**

Courseworks: Homework assignments, important announcements, and other information will be posted throughout the semester on the courseworks page for this class (go to https://courseworks.columbia.edu/).

Office Hours: TBA.

Textbook: The required text for this class is: *Essential Mathematics for Economics and Business*, third edition, by Teresa Bradley. It is available at the Columbia University Book Store.

Evaluation: Your grade in this class will depend on your performance on: 1 midterm exam (35%), a non-cumulative final exam (40%), bi-weekly quizzes (15%), and bi-weekly problem sets (10%). Late problem sets will not be accepted. The lowest quiz grade and the lowest problem set grade will each be dropped. The date of the midterm is Wednesday, October 28. The final exam will be on the date determined by the official schedule. There will be no make-up exams given. Please note that after I submit final grades, I will not respond to emails regarding them.

Teaching assistant: Your teaching assistant is Mariann Micsinai. Her email address is mmicsina@barnard.edu. She will hold weekly recitation sections and office hours. Times and places will be decided during the first week of class. She will also be responsible for grading your quizzes and problem sets; and she will discuss her policies with you during the first week of recitation sections. **Please email her, not me,** with any issues regarding handing in and grading of problem sets.

Honor code: I value Barnard's Honor Code for the integrity it fosters. All exams and assignments in this class are to be completed in accordance with the Barnard Honor Code. Columbia students commit themselves to the Honor Code upon registering for a Barnard course. The codes says, in part:

> "We consider it dishonest to ask for, give, or receive help in examinations or quizzes, to use any papers or books not authorized by the instructor in examinations, or to present oral work or written work that is not entirely our own, unless otherwise approved by the instructor. We consider it dishonest to remove without authorization, alter, or deface library and other academic materials."

(Rough) Schedule of Topics to be Covered

(Chapter numbers in (.))

(Check courseworks intro page regularly for updates)

WEEK 1: Sept 9:

- Preliminaries (1)
  - Arithmetic operations and fractions
  - Solving equations and inequalities
  - Working with percentages

WEEK 2: Sept 14, 16:

- Graphing Linear Equations (2)
  - The equation of the line
  - Graphs
  - Applications: supply and demand, elasticity
- Simultaneous equations (3)
  - Two equations in two unknowns
  - Three equations in three unknowns
  - Applications: equilibrium and its implications

WEEK 3: Sept 21, 23:

- Non-linear equations (4)
  - Polynomial, exponential and logarithmic functions
  - Applications: demand and supply, growth

WEEK 4: Sept 28, 30:

- **September 28: Yom Kippur, no class**
- Differentiation (6)
  - Definition and rules
  - Higher derivatives

WEEK 5: Oct 5, 7

- Applications of Derivatives (6)
  - Marginal and average functions
  - Optimization

WEEK 6: Oct 12, 14:

- Applications of Derivatives cont'd (6)
  - Maximums and minimums: profits
  - Curvature and second derivatives: costs

WEEK 7: Oct 19, 21:

- Applications of Derivatives cont'd (6)
  - Derivatives of functions
  - More rules

WEEK 8: Oct 26, 28:
October 28: Midterm Exam

- Applications of Derivatives cont'd (6)
  - Elasticity and functions

WEEK 9: Nov 2, 4:

- **November 2: Election Day Holiday**
- Functions of several variables (7)
  - Partial derivatives
  - Applications: marginal values, returns to scale, elasticities

WEEK 10: Nov 9, 11:

- Functions of several variables cont'd (7)
  - Unconstrained optimization
  - Applications: profit and revenue

WEEK 11: Nov 16, 18:

- Functions of several variables cont'd (7)
  - Constrained optimization
  - Applications: utility, cost, budget constraints

WEEK 12: Nov 23, 25:

- **November 25: Thanksgiving Holiday**
- Financial Mathematics (5)
  - Arithmetic and geometric series
  - Simple and compound interest
  - APR

WEEK 13: Nov 31, Dec 2:

- Linear Programming (9)
  - Algebraic and graphical methods
  - Applications: cost minimization and profit maximization

WEEK 14: Dec 7, 9

- Difference equations (10)
  - First order difference equations
  - Applications

WEEK 15: Dec 14:

- Catch-up and Review

Preliminary schedule of quizzes and problem sets. All dates are Wednesdays, unless otherwise noted.

	Quiz:	Problem Set due:
September	16	23
	30	
October	14	7
		21
November	4	11
	18	
December	9	2
		14 (Monday)