

Econ 11A  
Tu Th 9-12:30pm  
Jack Baskin 372

Instructor: Raj Sengupta  
Summer 2009  
UC Santa Cruz

## **Econ 11A: Mathematical Methods for Economists, 1**

### **Course Overview**

Econ 11A- Mathematical Methods for Economics, I is designed to provide an introduction to differential calculus in one variable and its applications to economics. The course will cover topics from pre-calculus and calculus. We will focus on functions and graphs, limits, derivatives of univariate functions (algebraic as well as exponential and logarithmic functions).

Differential calculus itself begins with the mathematical concept of a limit. We use limits to define the important concepts of continuity and differentiability, and we learn to compute the derivatives of the functions that we commonly use to model economic variables, i.e., polynomials, power functions, exponential functions, logarithm functions, and combinations of these functions. Other technical topics include implicit differentiation, Taylor polynomials and Taylor approximation.

We will also study the applications of derivatives to important concepts in economics, such as rate of change, elasticity and optimization in one variable. This course is followed by ECON 11B, which covers integral calculus in one variable and differential calculus in several variables.

Please find updates and other course material on the web:

<http://sites.google.com/site/summersessionecon11a/>

**Instructor:** Raj Sengupta  
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**Location:** Room 403C E2  
**Office Hours:** Th 1:00–3:00pm  
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**Location:** Room 403G,E2  
**Office Hours:** Mon 10:00am – 12:00pm

### **Textbook**

The required textbook for this course is *Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences*, custom edition for UCSC or 12<sup>th</sup> edition, by Haussler, Paul, and Wood. Available at Bay Tree Books.

## **Grading**

Homeworks: 5% *4 =	20%
Class Tests: 10%* 4 =	40%
<u>Final:</u>	<u>40%</u>
Total:	100%

Problems sets are due at the beginning of the lecture on due date (typically every Thursday). There will be a total of 4 assignments, each worth 5% of final grade.

There will be 4 class tests (10% each) on every Thursday, for a duration of 30 to 45 mins at the beginning of lecture.

Final comprehensive exam will be held on Tuesday, July 2<sup>3rd</sup>, and will account for the remaining 40% of overall grade.

**Late homeworks will not be accepted, and there will be no make-up exams.**

## **Sections**

Sections are mandatory-exceptions will be made only if the timings overlap with another class.

Tuesday and Thursday 4:00pm –5:10pm Social Sciences II, 363

Sections begin from June 23.

**In addition to these, review questions and solutions have been uploaded on the course website for practice purposes. Supplementary notes have also been added, to study before coming to lectures.**

## **Academic Integrity**

- CHEATING IN ANY FORM WILL NOT BE TOLERATED.
- STUDENTS CAUGHT CHEATING WILL BE DROPPED FROM THE COURSE AND RECEIVE A FAILING GRADE.
- STUDENTS CAUGHT HELPING OTHERS CHEAT WILL ALSO BE CONSIDERED CHEATERS.
- SUCH STUDENTS WILL ALSO BE REPORTED TO THE ECONOMICS DEPARTMENT AND TO THEIR RESPECTIVE COLLEGE PROVOST.

**PLEASE BRING YOUR STUDENT ID TO EVERY EXAM.**

## Tentative Lecture Schedule

6/23, Tuesday	Introduction and review; Limits. Chapters 3 and 4. Section 10.1, Supplementary Notes 1 - 3.
6/25, Thursday (HW1 Due + Test1)	Limits (cont.) and continuity. Sections 10.2 - 10.3.
6/30, Tuesday	The derivative and first rules of differentiation. Sections 11.1 - 11.2. Supplementary Notes 4 and 5.
7/2, Thursday (HW2 Due+ Test2)	Product and quotient rules; The derivative as rate of change and the approximation principle.
7/7, Tuesday	Chain rule; Derivatives of exponential and log functions; Elasticity. Sections 11.5, 12.1 - 12.3. Supplementary Note 6.
7/9, Thursday (HW3 Due+ Test3)	Elasticity (cont.); Implicit differentiation. Sections 12.4.
7/14, Tuesday	Higher order derivatives and Taylor polynomials. Section 12.7 and Supplementary Note 7.
7/16, Thursday (HW4 Due+ Test4)	Extreme values, critical points and the first derivative test. Sections 13.1 - 13.2.
7/21, Tuesday	Concavity and the second derivative test and Applied optimization. Sections 13.3 - 13.4, 13.6.
7/23, Thursday	<b><i>Final Exam (comprehensive)</i></b>