COURSE 002. INTRODUCTORY MATHEMATICAL ECONOMICS

Instructors: Abhijit Banerji and Sugata Bag

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  Contact Hrs: 13.00 - 14.00 hrs on lecture days.

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  Contact Hrs: 14.00 - 15.00 hrs on lecture days.

There will be 3 lectures per week, plus tutorials. The latter will be taken by faculty members who will be assigned shortly. The tutorials begin in a week or two. Meanwhile, those of you who feel the need to brush up math at a very basic level could quickly work through Sydsaeter and Hammond over the weekend.

Time and Location: Room # Lecture Theatre.

Lecture Hours:	Tuesday	10.25-11.35
	Wednesday	10.25-11.35
	Friday	10.25-11.35

Objectives.
(1) To learn some of the mathematical tools that frequently feed into Micro, Macro and Econometrics.
(2) (Ambitious) To acquire some mathematical sophistication.

Prerequisites. Mathematical content at the level of Sydsaeter and Hammond, the undergraduate Mathematics for Economics textbook in the University of Delhi.

Description. There are 3 parts to the course.
1. Preliminaries, and Optimization (AB)
2. Linear Algebra (SB)
3. Differential Equations (a brief introduction) (SB)

Part I will use about half of the lectures.

There are usually two midterm exams, with the first one held as early as September. The final exam is in November. Internal evaluation includes the midterm exam marks, and is worth 30 percent of overall marks.

Part 1. The main text we'll use for this part is

Rangarajan Sundaram. 1996. A First Course in Optimization Theory. Cambridge University Press. (RS)

For Parametric Continuity, the last topic in Part 1, we will use

N. Stokey, R. Lucas with R. Prescott. 1989. Recursive Methods in Economic Dynamics. Harvard University Press. (SLP, pages 55-66).

An alternative textbook that covers a lot of the same material as does RS is

Carl Simon and L. Blume. 1994. Mathematics for Economists. Norton and Co.

We will not use this book, by and large, but this is a good book to read (on your own) if your Math is shaky.

You may find RS hard even if your Math is *not* shaky, but I strongly advise you to stay (and grow) with it, rather than run from book to book. If it helps, you can quickly go through a chunk of Simon and Blume, on your own, at the same time. On the other hand, if you find RS quite doable (or a breeze), you may be under-challenged: you should then consider building up your real analysis foundations. Alternative texts include the ones by Abbott, baby Rudin, Apostol; or at a more advanced level, Efe Ok.

I will put out lecture notes on the course web page. Please work through the textbook and the notes with pencil and paper, and solve as many problems from the textbook as you can, without referring to suggested solutions. I will give out a problem set containing a subset of these problems.

Course Content for Part 1

(i) Preliminaries: Logical Implications, Sets, Relations, Functions etc. (RS - Appendix A).
(ii) Optimization: Existence of Optima; Unconstrained Optimization; Optimization with (a) Equality Constraints (b) Inequality Constraints; Envelope Theorem; Convexity and Optimization; and hopefully, Parametric Continuity. (RS- Chapters 1-6, some of chapter 7; SLP- pages 55-66). We will begin the section on Optimization with some Real Analysis, and intersperse some more with the different subsections on optimization.