DEPARTMENT OF ECONOMICS
DELHI SCHOOL OF ECONOMICS
UNIVERSITY OF DELHI

Minutes of Meeting

Subject : B.A. (Hons) Economics – First Semester
Course : Mathematical Methods for Economics - I
Date of Meeting: Thursday 31st July, 2015
Venue: Department of Economics, Delhi School of Economics, University of Delhi, Delhi – 110 007
Chair: Dr. Abhijit Banerji

Attended by:

1. N. Shradha Varma, I.P College
2. Anu Satyal, C.V.S.
3. Nidhi Bagario, Satyawati College
4. Harish Dhawan, Aryabhatta College
5. Divya Gupta, D.R. College
6. Indranil Choudhury, PGDAV College
7. Isha Chawla, Lakshmibai College
8. Lokendra Kumawat, Ramjas College
9. Neelam J. Malhotra, LSR College
10. Nidhi Gupta, SRCC
11. Sandhya Varshney, Dyal Singh College
12. Ranjan Swarnkar, ARSD College
13. Niti Bhtani, Hindu College
14. Deepti Sethi, JDM
15. Deepika Jajoria, Shyamlal College (Evening)
16. Sonam, Hans Raj College
17. Bhumika Hingarani, Shivaji College
18. Sanjeev Kumar Dyal Singh College
19. Anurag Malhotra, St. Stephen's College

Textbook.

(1) The textbook for the course is

K. Sydsaeter and P. Hammond: *Mathematics for Economic Analysis*, Pearson Educational, Asia: Delhi (2002)

This semester covers Chapters 1-10 and Chapter 20 of the textbook, leaving out Sections 6.7, 10.4 and 20.2-20.5. Note the material on integration (Sections 10.1-10.3) and difference equations (Section 20.1).

(2) It was noted that a new edition of the textbook has recently been made available by Pearson. Since the title of the new book is "Essential Mathematics for Economic Analysis", and it has a third author as well (Strom), it could perhaps be somewhat different. This new book will not be referred to in the

course. However, teachers could explore this new book and note the similarities and differences in the content and pedagogic choices, vis-à-vis the required textbook.

(3) The rough weights attached to the five sections mentioned in the syllabus are: I (Preliminaries) has 10% weight, II (Functions of one real variable) has 55% weight, III (Single variable optimization) has 25% weight, IV (Integration of functions) has 5% weight and V (Difference equations) has 5% weight. These weights are only indicative and not ironclad guarantees of the weights attached to these sections in examinations. The examinations should broadly reflect these weights, but may vary from them by as much as 10% points.

I. Preliminaries

Logic and proof techniques; sets and set operations; relations; functions and their properties; number systems.

II. Functions of one real variable

Graphs; elementary types of functions: quadratic, polynomial, power, exponential, logarithmic; sequences and series: convergence, algebraic properties and applications; continuous functions: characterizations, properties with respect to various operations andapplications; differentiable functions: characterizations, properties with respect to various operations and applications; second and higher order derivatives: properties and applications.

III. Single-variable optimization

Geometric properties of functions: convex functions, their characterizations and applications; local and global optima: geometric characterizations, characterizations using calculus and applications.

IV. Integration of functions

Areas under curves; indefinite integrals; the definite integral.

V. Difference equations

First order difference equations

Philosophy of the Course

1. This is **not** a ``Mathematical **Economics** course'', but a ``**Mathematical Methods** for Economics course''. The intention is not to transmit any particular body of economic theory, but to transmit the body of basic mathematics that enables the creation of economic theory in general. In this course, particular economic models are not the ends, but the means for illustrating the method of applying mathematical techniques to economic theory in general. A pedagogical corollary of this attitude is that economic applications should be chosen as illustrations, not on the basis of their ``importance" or ``relevance" in economic doctrine, but on the basis of their appropriateness for illustrating particular aspects of mathematical techniques being taught in this course. (Of course, if pedagogical relevance and substantive doctrinal importance coincide in some application, then covering such a Pareto superior application is recommended.) Classroom instruction should stress the understanding and skill in the application of mathematical theorems and techniques, rather than the mastering of any particular set of economic applications.

2. Stress should be placed on learning mathematical theorems and techniques and **recognizing classes** of applications where particular theorems and techniques, or their combinations, are applicable and useful.

3. The prescribed textbook defines the level of sophistication of material to be transmitted to students and the problems contained therein indicate the level of difficulty of questions that may be asked in examinations.

4. There is no presumption that examination questions will/can be chosen only from the prescribed textbook. However, the examiner should ensure that the level of difficulty is at par with the difficulty of problems in the textbook; the evaluation of ``difficulty'' is best left to the prudence and academic judgement of the examiner within the institutional context of examination-setting.

5. Instructors should feel free to draw upon any appropriate supplementary sources for problems and material that they feel is handled inadequately or poorly in the prescribed textbook.

6. Proofs of propositions that are relatively straightforward may be asked in the examinations. However, questions should not be such as to allow mere regurgitation of theorems proved in the textbook and memorized by the students. Ideal questions should test the student's ability to **understand and correctly apply** theorems proved in the textbooks rather than merely reproduce their proofs.

7. Examiners should avoid questions whose solution involve mere memorization of formulae and computation.

8. Questions may require students to apply techniques learned in this course to applications drawn from economic theory. However, such questions should be framed with great care. Such questions should explicitly state the **mathematical structure** required to derive the answer, not leave it implicit, assuming that students will be aware of the economic model in question and the assumptions underlying it. The examiner may assume that students are **mathematically** sophisticated at a level indicated by this course, but there should be no presumption of economic sophistication or knowledge of economic doctrine beyond what is taught in the Principles course.

9. Economic applications available in the textbooks and covered in class should **not** be assumed to be an exhaustive list of potential applications that may be used for framing examination questions.

10. There should be no presumption that a particular pattern or style of the examination will be replicated from year to year. The examiner shall have latitude to make academically prudent changes subject to the above-mentioned weightage guidelines.