COURSE OUTLINE AND SYLLABUS

COURSE DATA

Name of course:	Mathematics I
Academic year:	2011-12
Year in the Program:	1st
Trimester:	1st
Degree:	IBE
Course code:	21123
Number of ECTS credits:	5
Hours of dedication:	125
Language of instruction:	English
Professor:	Kalyan Talluri

PRESENTATION

Mathematics I is the first course in a sequence of three mathematics courses that are being taught during the first year. It is an introductory course on basic concepts and therefore it is being taught in the first trimester of the first year.

In this course, the students begin acquiring the skills that will enable them to tackle problems and situations that require a formal mathematical treatment. In modern economics and business mathematical models are used to describe (and therefore to understand) the working of economies and businesses. Math I is the first course that teaches the tools necessary to understand these models and hence to understand these theories of business and economics.

During the course, we teach and insist on the use of mathematical language and the acquisition of an adequate working method, which are especially useful in modeling economic situations. In particular, the course develops the fundamental aspects of mathematical calculus for functions of one real variable (with optimization) and of linear algebra which commonly used in economics and business to describe the way firms, individuals, and the economy as a whole operate.

COURSE ORGANIZATION

The course duration is 10 weeks. The course is divided into theory lectures (or classes) and seminars. There are two (theory) classes per week, each lasts for 80 minutes. In addition, there are 8 seminars, each lasts for 80 minutes.

Please note that the seminars and the theory classes start 10 minutes after the announced time.

The seminars are dedicated to practice of the theoretical issues discussed in the class. Hence, the group is divided into 3 seminar subgroups, in each about a third of the students participate. During the seminars the students will have the chance to demonstrate their knowledge (acquired during the lectures and (mainly) through solving homework problems) and to gain further practice.

COURSE SKILLS

GENERAL SKILLS

Instrumentals

1. Ability to analyze and synthesize
2. Ability to organize and plan
3. General basic mathematical knowledge
4. Problem solving
5. Written and spoken capabilities

Interpersonal

6. Criticism

Systemic

7. Research abilities
8. Learning capacities
9. Autonomous work
10. Ability to generate new ideas (creativity)

Other

11. Written and oral communication abilities using a specialized language (mathematics).

SPECIFIC SKILLS

1. Model formalization of different settings through mathematical language.
2. Solutions of mathematical models.
3. Knowledge of basic tools in mathematical analysis and linear algebra and their applications to economics and business.

EVALUATION

The grading is based on the following components.

Final Exam: 60%
The final exam will take place at the end of the quarter and will last for two hours. The exam will cover all the material discussed and taught in class and in the seminars, as well as the recommended reading and the problem sets. It will cover both theoretical and practical aspects of the material. It counts 60% of the final grade.

In order to pass the course, students must have a score on the final exam of at least 4 out of the total 10.

Continuous Evaluation: 40%
This part of the grade will be based on the evaluation of all the activities that will take place during the quarter: problem sets, participation in the seminars (including solving and discussing practice problems), and the two short exams.

The grading of the specific components is:

1. In-class exams: Two in-class short exams will be administered during the course, each will last 30 minutes. Each quiz will consist of two to three problems similar to the ones discussed in the seminars. Each quiz will count as 12% of the final grade. Thus over all the quizzes count as **24%**.
2. Actively attending the seminars and handing in (well executed) problem sets: **8%**.
3. Active participation in the seminars and the class: **8%**. Active participation means for example solving and discussing the solution of problems (similar to the problems in the

problem sets) during the seminars and class. Students will be randomly called to solve a problem on the blackboard.

The September Exam:

In the September exam the grade will be calculated in the following manner. The September exam final grade will count for 80%. The other 20% include the last two parts of the continuous evaluations each counting as 10% (i.e., the grades on the quizzes will not be counted as part of the grade on the September exam, but seminar attendance and handing in (well executed) problem sets, and active participation will each count as 10%)

HOW TO SUCEED IN THIS CLASS

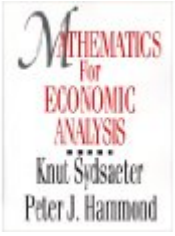
1. Memorize all definitions.
2. Recreate proofs and solutions without looking at the notes or text.
3. Do all problems and reading individually without consulting anyone or any material outside the book. If you cannot solve a problem that is OK, it is important you think about it.
4. Attend all classes.
5. Review and practice problems before the seminars and the final exam.

REFERENCES

TEXT BOOK

SYDSAETER, K.; HAMMOND, P. J. **Mathematics for Economic Analysis.** Englewood Cliffs, N.J.: Prentice Hall, cop. 1995. [S&H]

Recommendation --- BUY THE BOOK (www.amazon.fr or www.amazon.co.uk). It will be used for Math II and III also. If you buy, make sure it looks like this.



Do not buy the newer versions with the same authors and similar titles.

SYDSAETER, K.; HAMMOND, P. J., Essential Mathematics for Economic Analysis, Prentice Hall, 2006. [**S&H 06**]

OTHER REFERENCES

TAN, S. T. Matemáticas para Administración y Economía. International Thomson, 1998.

LARSON, R. E.; HOSTETLER, R. P.; EDWARDS, B. H. Cálculo y geometría analítica. Vol. 1. Madrid: McGraw-Hill, 1999. 6a. ed.

COURSE OUTLINE

Block 1: Functions		
0. Some Algebra†	S&H A	**S&H06 1**
1. Introduction: Functions	S&H 2	**S&H06 2,5**
2. Specific Functions: Linear, polynomial, and power functions	S&H 2, 3	**S&H06 4**
3. Exponential and logarithm functions	S&H 8	**S&H06 4**
Block 2: Differentiation		
1. Derivatives	S&H 4,5	**S&H06 6**

2. The chain rule and implicit derivatives	S&H 5	**S&H06 6,7**
3. Applications of derivatives	S&H 7,5	**S&H06 7**
Block 3: Optimization	S&H 9	**S&H06 8**
Block 4: Integration	S&H 10	**S&H06 9**
Block 5: System of equations and matrices		
1. System of equations and matrices	S&H 12	**S&H06 15**
2. Determinants and inverse matrices	S&H 13	**S&H06 16**

† Please make sure that you are familiar with these rules. We'll have time only to go over Inequalities (S&H A.7 **S&H06 1.6**) in class (and that will be quite fast).

METHODOLOGY

Students are supposed to do the following weekly assignments:

- Reading the relevant parts of the text book before the class.
- Attending the (theoretical) classes
- Individual study: solving and reviewing problems, reviewing the material taught in the class and the text book.
- Before attending the seminars: answering the problem sets questions.
- Attending the seminars and handing in the assigned problem sets.

ACTIVITIES

Except for the first weeks in which there will be no seminar, activities will be as follows:

Classroom Activity	Out of the Classroom Activity
Session 1: Theory Class (the whole group)	▪ Reading the relevant parts of the text book before the class
Session 2 : Theory class (whole group)	▪ Attending the class ▪ Individual study: solving problems, reviewing the material taught in the class and the text book.
Session 3: Seminars (subgroups)	• Before attending the seminars: answering the questions on the problem sets ▪ Attending the seminars and handing in the assigned problem sets

CLASS RULES

1. No mobile phones, tablets or computers can be turned on in the classroom.
2. No cheating or copying will be tolerated. If detected the grades of **all** involved parties will be reduced to Fail and reported to the Dean's office.
3. You are expected to be punctual and quiet.

OFFICE HOURS

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Office hours: Tuesday 11:00-12:30