

# Mathematics I (21123)

**Degree/study:** IBE

**Course:** first

**Term:** first

**Number of ECTS credits:** 5

**Hours of student's dedication:** 125

**Language or languages of instruction:** English

**Theory professor:** Gemma Colomé

## 1. Presentation of the subject

“Mathematics I” is conceived as an introductory course on basic concepts for the student, hence it is located in the first trimester of the first year.

It is the first of a sequence of three mathematics courses to be taken during the first year. The student begins to acquire competences to tackle situations that require a formal mathematical treatment.

During the course, the use of mathematical language and the acquisition of an adequate working method are enforced, which are especially useful for the modeling of economic situations. In particular, the fundamental aspects of mathematical calculus for functions of one real variable (with optimization) and of linear algebra commonly used in economics are developed. Thus, it is a course that provides the basic mathematical tools to be used in modeling problems in economics and business.

## 2. Competences to be attained

General competences	Specific competences
<b>Instrumental</b> <ol style="list-style-type: none"> <li>1. Ability to analyze and to synthesize.</li> <li>2. Ability to organize and plan.</li> <li>3. General basic knowledge.</li> <li>4. Problem solving.</li> <li>5. Written and spoken capabilities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use of mathematical language.</li> <li>2. Apply creatively the knowledge acquired and adapt them to new contexts and situations.</li> <li>3. Proactive attitude and willingness to learn.</li> <li>4. Basic algebraic manipulation for calculus in one variable.</li> <li>5. Knowledge of basic concepts about the real line and functions in one variable.</li> <li>6. Knowledge of basic properties of the usual families of real functions.</li> <li>7. Analyze and interpret mathematical models applied to economics.</li> </ol>
<b>Interpersonal</b> <ol style="list-style-type: none"> <li>6. Criticism</li> </ol>	
<b>Systemic</b> <ol style="list-style-type: none"> <li>7. Research abilities.</li> <li>8. Learning capacities.</li> <li>9. Autonomous work</li> <li>10. Ability to generate new ideas (creativity)</li> </ol>	
<b>Other</b> <ol style="list-style-type: none"> <li>11. Written and oral communication abilities using specialized language.</li> </ol>	

## 3. Contents

Block 1. Functions of one real variable

Block 2. Differentiation

Block 3. Optimization

Block 4. Integration

Block 5. Systems of equations and matrices

## 4. Evaluation

The evaluation of the course is based on the following three aspects:

- Midterm tests to be taken during the “problem solving seminars” (PSS). Two tests of 30 minutes will be done during the course. Each one will consist on three problems similar to the ones seen during the previous PSS or theory lectures. Each test will represent a 14% of the final grade.

- Evaluation of the problem solving seminars. Participation in the seminars and the quality of individual problem set delivered during the PSS will be evaluated. It represents a 12% of the final grade, according to the following distribution:

- Attendance and presentation of the individual problem set: 4%. In each session both attendance and the quality of the problem set are evaluated. Not attending or not handing in the set of problems on a certain seminar will be qualified with a 0 for that session. If some student that has more than two zeros in seminars fails, he/she will not be allowed to attend the make-up exam. In the case of a documented justified absence, the grade for that seminar will be "Not evaluated", and it will be only considered the average of the other seminars.

- Participation: 8%.

- Final Exam. It is a 2 hours exam on all the contents seen along the course. It represents a 60% of the final grade. In order to pass the course, a minimum of 4/10 in this exam is required.

If one has more than two zeros in seminar attendance, and the result of the weighted grade doesn't allow passing the course, the final grade will be "Not attended" and the student won't be allowed to attend the make-up exam.

If one obtains less than 4 points in the final exam, the grade of the course will be the grade of the final exam, or "Not attended " if the student has more that two zeros in seminar attendance.

The make-up exam will be an exam similar to the final one and the final grade will be obtained as 60% of the mark of this make-up exam (if it is greater than 4) and 40% will correspond to the evaluation obtained during the course, with the same weights for tests, attendance, problems sets and participation as in the ordinary evaluation.

The make-up exam is only for those students who have failed the course, that took the final exam and that do not have more than two zeros from seminar attendance. In the other case, the final grade will be "Not attended".

## 5. Bibliography and teaching resources

### 5.1. Basic bibliography

Textbook:

- SYDSAETER, K.; HAMMOND, P. J. **Mathematics for Economic Analysis**. Englewood Cliffs, N.J.: Prentice Hall, cop. 1995.

### 5.2. Additional bibliography

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.

### 5.3. Teaching resources

Other material published in Aula Global.

## 6. Methodology

Students are supposed to do the following weekly assignments:

- Individual reading of the theory guides before the theoretical sessions.
- Attending theoretical sessions.
- Personal study, solve problems, careful reading of the textbook.
- Before the seminar: Solve the set of problems to practice and to be handed in.
- Participation to the seminar. Problem solving seminar session (PSS).
- Review.

## 7. Activities Planning

PSS will take place the last 8 weeks of the course. Except for the weeks without PSS, activities will be as follows:

Week	In room activity	Out room activity (autonomous work)
Week X	Session 1: Theory (whole group)	- Individual reading of the theory guides before the theoretical sessions
	Session 2: Theory (whole group)	- Personal study, solving problems, careful reading of the textbook.
	Session 3: Problem Solving Seminar (PSS) (subgroups)	- Solve the set of problems.
		- Review

A more detailed description of the contents of each theory and seminar session can be found in Aula Global