Course plan

1. Description of the subject

- **Subject name: Mathematics**
- **Academic year: 2011-2012** **Year in the programme: first**
  Term: first and second
- **Degree / Study: EMPR** **Subject code: 20639**
- **Number of ECTS credits: 5 + 5**
- **Hours of student's dedication: 125 + 125**
- **Language of instruction: Catalan**
- **Lecturers: Joan Miralles and Ramon Villanova**

2. Presentation of the subject

The subject Mathematics is designed as an introductory basic training subject for students, as shown by its scheduling in the first terms of the first year.

The subject is organized into two autonomous and consecutive terms. Student start work to acquire the competences associated with the working methods used in situations that allow formal treatment.

The cause also covers the use of mathematical language and the acquisition of working methods that are particularly appropriate and useful for formalizing economic situations. In particular, the subject covers basic aspects of mathematical calculation in one or several variables (with optimization) and the linear algebra most frequently used in economics; it is therefore an instrumental subject which provides mathematical tools that are mainly used in economics contexts.

3. Competences to be attained

General competences	Specific competences
Instrumental 1. The ability to analyze and synthesize. 2. Organizational and planning skills. 3. Basic general knowledge. 4. Problem solving. 5. Oral and written communication in the student's own language. **Interpersonal** 6. The ability to criticise. **Systemic** 7. Research skills. 8. The ability to learn. 9.The ability to work independently. 10. The ability to generate new ideas (creativity). **Other** 11. Oral and written communication using a specialized language.	1. Formalization of models and situations using mathematical language. 2. Solving mathematical models. 3. Knowledge and application basic tools of mathematical analysis and linear algebra.

4. Contents

First term:

Contents section 1. Real functions of a real variable

Contents section 2. Derivation

Contents section 3. Optimization

Contents section 4. Integration

Contents section 5. Equation and matrix systems

Second term:

Contents section 1. Real functions of two or more real variables

Contents section 2. Partial derivation, differentiability, applications

Contents section 3. Concavity, convexity, polynomial approximations

Contents section 4. Local optimization

Contents section 5. Optimization with restrictions

Contents section 6. Global optimization

5. Assessment

The assessment of the subject each term is based on three points:

- Tests during problem-solving sessions (PSS). Two tests of 30 minutes' duration will take place during the course. Each one will consist of problems similar to those covered during the problem-solving sessions. Each test will account for 12% of the final mark.

- Assessment of the problem-solving sessions. The student's participation in the sessions and the quality of the list of individual problems handed in in class will be assessed. This will account for a total of 16% of the final mark broken down as follows:

  - Attendance and hand-in of the individual list of problems: 8%.
  - Participation: 8%.

- Final examination. This includes all the contents of the course and lasts two hours. It will account for 60% of the final mark. A minimum mark of four points from their final examination is required to pass the subject. Those failing to sit the final examination in a term will receive a mark of absent for the term and the course.

After the marks for the two terms have been obtained, the final mark for the subject will be the average of both if they are four or higher. If the grade for the term is less than four, the course will be failed.

The final examination(s) for failed terms can be reset at the September sitting. In this case, the mark for the term will be recalculated with 80% of the mark for the September examination and 20% of the assessment of problem-solving sessions during the course. When combining the marks for the two terms, the same rule as for the ordinary sitting will apply.

6. Bibliography and teaching resources

Basic bibliography

SYDSAETER, K.; HAMMOND, P. J. *Matemáticas para el análisis económico*. Madrid: Prentice Hall, 1996.

Complementary bibliography

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. 6th ed. 1999

Teaching resources

Theory summaries, list of problems solved, presentations of self-access learning (SIREMA) and Moodle questionnaires, available in the Aula Global.

7. Methodology

Students are expected to do the following work each week:
- Before the theory class: read the theory summaries (autonomous).
- Attendance at theory classes (face-to-face).
- Personal study, study of problems solved, review of notes, consultation of the book.
- Before the problem-solving session (PSS): complete Moodle questionnaires via the Internet (autonomous).
- Before the PSS: production of the problems list (autonomous).
- Participation in the PSS (face-to-face).

8. Activities planning

Except for the first two weeks, when there is no problem-solving session (PSS), the schedule will be as follows:

Week	*Work in the classroom*	*Work outside the classroom group / type of activity*
Week x	Session 1. Theory (the whole group). Session 2. Theory (the whole group). Session 3. Problem-solving (PSS) (subgroups).	- Reading of the theory summaries (autonomous). - Reading of the theory summaries (autonomous). - Personal study, study of problems solved, review of notes, consultation of the book. - Completion of Moodle questionnaires via the Internet (autonomous). - Production of the problems list (autonomous).

Students will find a detailed description of the contents covered in each theory session and each problem solving session in the Aula Global.