Teaching Plan

1. Course description

● **Name of course:** Mathematics II

● **Academic year:** 2014-15   **Study year:** 1st **Trimester:** 2nd

● **Degree:** IBE

● **Course code:** 21124

● **Number of ECTS credits:** 5

● **Hours of dedication by student:** 125

● **Language of instruction:** English

● **Professors:** Bernat Anton (theory lectures) – Alberto Fernández (seminars)

2. Presentation of the course

Mathematics II is the second in a sequence of three mathematics courses to be taken during the first year of studies in economics and business. Having been introduced to mathematical calculus as well as the basic concepts of optimization of a function of a single variable in Mathematics I, students will now extend these ideas to functions of two variables. The particular properties of two-variable functions will be treated, as well as the theory and practice of finding their optimum values, either maxima or minima as the case may be. Furthermore, optimization of such functions with equality or inequality constraints is treated. Thus, this course provides the basic mathematical tools for obtaining optimal values of economic functions, which is a fundamental objective in economics and business practice and research.

3. Competences to be acquired

General Competences	Specific Competences
Instrumental 1. Ability to analyze and synthesize 2. Ability to organize and plan 3. General basic 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 skills	1. Knowledge and applications of basic tools in mathematical analysis and linear algebra. 2. Problem formalization for different economics and business contexts through mathematical language. 3. Solutions of optimization problems for functions of two variables.

4. Content

- **Block 1:** Vectors, lines and planes in 3D-space.

- **Block 2**: Functions of two real variables

- **Block 2:** Implicit functions and gradients

- **Block 3:** Unconstrained optimization of two-variable functions

- **Block 5:** Optimization with inequality constraints

- **Block 6:** Optimization with inequality constraints: linear programming

5. Assessment

The grading of the subject is based on these four points:

1) Tests carried out during Seminars: two 30-minute long tests will be carried out during two of the Seminars [test 1: Seminar #4, week 9-13 February, 2015; test 2: Seminar #7, week   2-6 March 2015]. Each of these tests will consist of one or more problems, similar to the ones worked in the former sessions of the seminar. Each of the tests will account for 14% of the final grade.

2) Grading of Seminars: the attendance of the student to the sessions and the quality of the submitted homework will be graded. All in all, the different grades given will be for:

   a. Attendance and homework: 4% (it is obviously meant that the student hands in his/her personal homework to the best of his/her ability).

   b. Problem solving at the blackboard and participation in the Seminar: 8%.

3) Final Exam. A two-hour examination that includes all the contents of the course. It will provide a 60% of the final grade.

   - In order to pass the course a minimum of 4 out of 10 is required in the final exam. In case the grade of the final exam is less than 4, then the final grade of the course is by definition equal to the grade of the final exam (and, thus, the student automatically fails the course).
   - Class participation and the overall understanding of the material as reflected in the final exam, together as the presentation of an optional subject, will be taken into account in order to potentially improve the characterization of the final grade from "Excel.lent" to "MH".
   - In case of failing the course, there will be a retake exam, and the new course grade will be calculated with the same percentages and conditions as before. In order to be allowed in the retake exam, a student must have attended at least 6 out of the 8 Seminars, and must have taken the original final exam.

6. Teaching resources

Textbook: Sydsaeter & Hammond *Mathematics for Economic Analysis*. Prentice-Hall, 1995

Material at ``Aula Global'':

- Weekly Guides of theory.
- List of solved problems.
- Homework that has to be handed in at the following Seminar.

6. Methodology

Students are supposed to do the following weekly assignments:

- Individual reading of the scripts or textbook sections before the theory sessions

- Attending theory sessions

- Personal study, solving homework problems, careful reading of the text book

- Bringing completed homework to SRPs

- Attending SRPs and being prepared to present the solutions of the homework problems, or similar problems, to the class

7. Activities timetable

Except for the two first weeks when there will be no seminars, activities will be as follows:

Week	In class activities	Out of class activities
Week X	Session 1: Theory (whole group) Session 2: Theory (whole group)	- Individual reading of the scripts/book sections before the theoretical sessions - Personal study, solving homework problems, careful reading of the textbook.
	Session 3: Seminars for solving problems (subgroups) – in two of these seminars 30-minute tests will be conducted which count towards the final grade.	