Mathematics for Economics II

Academic Year: (2023 / 2024)   **Review date: 03-05-2023**

Department assigned to the subject: Economics Department

Coordinating teacher: MARHUENDA HURTADO, FRANCISCO

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Engineering and Architecture

OBJECTIVES

This subject provides the quantitative instruments that are needed to pose and analyze economic problems with the aid of a formal model.

In working toward the above goal the student will acquire the following competences and skills.

Regarding the contents of the course, the student will be able to:
- Extend the concepts of one variable functions to several variables.
- Understand the basic tools of calculus with several variables.
- Pose and solve static optimization problems.
- Apply all the above concepts to economic problems.

We classify the competences in two groups: specific competences and generic competences or skills.

Regarding the specific competences, the student will be able to:
- Solve linear systems of equations and determine the number of parameters in the solution.
- Understand the fundamental concepts involved in the calculus of functions of several variables: differentiability, chain rule, implicit differentiation.
- Describe the qualitative properties of the functions of several variables, such as growth, concavity and convexity.
- Approximate a function of several variables using the Taylor polynomial.
- Pose and solve static optimization problems, with and without restrictions using the first and second order conditions.

Pertaining the general competences or skills, in the class the student will develop:
- The ability to address economic problems by means of abstract models.
- The ability to solve the above formal models.
- The ability to interpret and classify the different solutions and apply the appropriate conclusions to social contexts.
- The ability to use the basic tools that are need in the modern analysis of economic problems.

Through out the course, the student should maintain:
- An inquisitive attitude when developing logical reasoning, being able to tell apart a proof from an example.
- An entrepreneurial and imaginative attitude towards the cases studied.
- A critical attitude towards the formal results and their applicability in social contexts.

DESCRIPTION OF CONTENTS: PROGRAMME

The course consist of two parts: Linear algebra and optimization of several variable functions.

Linear algebra: Properties of matrices and determinants. Systems of linear equations.

Functions of several variables: Continuity. Calculus of several variables: partial derivatives. Differentiable functions. Convexity. Implicit differentiation. Optimization. Extreme points. Constrained optimization. First and second order conditions. Comparative statics. Application to economic models.

LEARNING ACTIVITIES AND METHODOLOGY

The course lectures will be based on combining theoretical explanations with several practical exercises. The students should attempt to solve the exercises by themselves, before they are addressed in class.

Student participation is considered very important in order to acquire the skills needed to pose and solve economic models.

ASSESSMENT SYSTEM

The final grade is the weighted average of the final exam and the class grade. The final exam is the same for all the Mathematics for Economics II groups and consists of practical exercises and theoretical questions. The class grade is determined by each professor and is based on quizzes done in the classes.

Ordinary exam: The final grade is the weighted average of 60% the grade in the final exam and 40% the class grade.

Extraordinary exam: The final grade is the maximum of the following grades:
a) A weighted average consisting of 60% the grade in the final exam and 40% the class grade.
b) The grade in the final exam.

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- R. E. Larson, R. P. Hostetler y B. H. Edwards Calculus (Volumen II). English edition, McGraw Hill.