Advanced mathematics for economics

Academic Year: (2019 / 2020) **Review date: 04-09-2017**

Department assigned to the subject: Economics Department

Coordinating teacher: RINCON ZAPATERO, JUAN PABLO

Type: Electives ECTS Credits : 6.0

Year : Semester :

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 of:
- Understand basic concepts of matrices and algebra of matrices.
- Analyze dynamic economic models.
- Pose and solve differential and difference equations and systems, and styudy in detail the qualitative behavior of the solutions.
- Apply all the above concepts to economic problems.

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 has two parts: (I) Matrix algebra and matrix diagonalization and (II) Differential and difference equations and systems.

(I) Matrix algebra and matrix diagonalization: After a brief review of the elementary operations with matrices, some fundamental concepts for obtaining the canonical form of a matrix are given.

(II) Differential and difference equations and systems: definition and illustration of these concepts with examples coming mainly from economics. The main tools of resolution are given, and special emphasis on the analysis of the qualitative behavior of the solutions is done. The techniques are applied to some classical 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

- Alpha C. Chiang y Kevin Wainwright Fundamental methods of mathematical economics, Mc Graw Hill, 2006.

- Knut Sydsaeter y Peter J. Hammond Mathematics for economic analysis, Prentice Hall, 1995.