



Course guides

220218 - 220218 - Game Theory

Last modified: 29/05/2020

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 749 - MAT - Department of Mathematics.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2020 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Francesc Carreras

Others: Antoni Magaña

TEACHING METHODOLOGY

The teaching methodology will consist of three parts:

- (1) Classroom sessions devoted to presenting the contents.
- (2) Classroom sessions devoted to practical work.
- (3) Self study including complementary exercises and activities.

In (1) the teacher will introduce the theoretical basis of the matter, that is, concepts, methods and results, and will illustrate them by means of suitable examples for ensuring a good comprehension of them.

In (2) applications of the theory to solve a variety of practical examples will be proposed by the teacher.

Reasoning, analytical thinking and criticism will be promoted. Exercises to be solved individually or in small groups will also be proposed, as well as activities for self study.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.

LEARNING OBJECTIVES OF THE SUBJECT

- To discover the subject and methodology of Game Theory, a branch of Operations Research devoted to the analysis of conflicts of interest.
- To realize the convenience of applying Game Theory to solve problems of management decision making, illustrated by means of examples of this field.

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	64.00
Hours large group	27,0	36.00

Total learning time: 75 h



CONTENTS

Module1: Non-cooperative games: strategies

Description:

Representation of conflicts: essential elements
Finite and infinite games, with or without constant sum
Optimal strategies and Nash equilibriums
Cournot and Bertrand duopoly models and product differentiation

Related activities:

Exercises
Examination 1

Full-or-part-time: 45h

Theory classes: 14h
Self study : 31h

Module2: Cooperative games: sharing rules

Description:

Communication, cooperation and negotiation
Sharing rules for costs, profits, and transferable utilities in general
Economic games: the Shapley value
Political games: the Shapley-Shubik power index

Related activities:

Exercises
Examination 2

Full-or-part-time: 30h

Theory classes: 13h
Self study : 17h

GRADING SYSTEM

The final mark will be obtained by weighting activities as follows:

- Exercises, weight: 20%
- Examinations, weight: 40% each

Examinations will be at individual level. Exercises might be occasionally allowed to be solved by small groups

BIBLIOGRAPHY

Basic:

- Carreras, F.; Magaña, A.; Amer, R. Teoría de juegos [on line]. 2001. [Barcelona]: Edicions UPC, 2001 [Consultation: 22/06/2020]. Available on: <http://hdl.handle.net/2099.3/36427>. ISBN 8483014777.