Course guide
220685 - 220685 - Game Theory: Cooperative Games

Last modified: 19/04/2023

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

Degree: MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2012). (Optional subject).

Academic year: 2023 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: ANTONI MAGAÑA

Others:

TEACHING METHODOLOGY

The teaching methodology consists of face-to-face sessions where the contents are exposed and exercises are solved and autonomous work are also carried out where students must apply the concepts explained to solving problems of varying difficulty. In the content presentation sessions, the teacher introduces the theoretical bases of the subject, the concepts, methods and results, illustrating them with suitably chosen examples. Exercises are proposed to the students to consolidate the matter. To facilitate the follow-up of the subject, both the notes and the exercises are published on the Virtual Campus (CV). Through this, the doubts raised by the students are also solved.

LEARNING OBJECTIVES OF THE SUBJECT

- Introduce the basic ideas of cooperative games and their applications.
- At the end of the course, the students should be able to apply the studied concepts to different problems, as the distribution of costs and/or benefits and the analysis of the distribution of power in situations where the agents may take decisions by voting (think, for example, in the stakeholder group of a company).

STUDY LOAD

Type	Hours	Percentage
Hours large group	13,0	17.33
Self study	48,0	64.00
Guided activities	14,0	18.67

Total learning time: 75 h

CONTENTS

title english

Description:
- Concept of cooperative TU game.
- Examples: sharing costs, purchase groups, the movings game.
- Properties of cooperative games. Different type of cooperative games.

Full-or-part-time: 21h
Theory classes: 3h
Guided activities: 4h
Self study : 14h

title english

Description:
- Desirable properties of a solution concept.
- Axiomatic characterization of the Shapley value.
- Examples

Full-or-part-time: 27h
Theory classes: 5h
Guided activities: 5h
Self study : 17h

title english

Description:
- Simple games. Concept and examples.
- Properties.
- The Shapley-Shubik index of power.
- Examples.

Full-or-part-time: 27h
Theory classes: 5h
Guided activities: 5h
Self study : 17h

GRADING SYSTEM

The final mark will be obtained from the following activities:
-Activity Units 1 and 2: 25%
-Activity Unit 3: 25%
-Final exam: 50%
If a student does not pass with the assetment system described above, he / she will be able to take another exam, which will be worth 100% of the final grade of the subject, on the dates proposed by the school management.

BIBLIOGRAPHY

Basic:
- Carreras, F.; Magaña, A.; Amer, R. Teoría de juegos [on line]. 2ª ed. Barcelona: Edicions UPC, 2005 [Consultation: 13/10/2020]. Available on: http://hdl.handle.net/2099.3/36540. ISBN 848301792X.