



Guia docent

220218 - 220218 - Teoria de Jocs

Última modificació: 19/04/2023

Unitat responsable: Escola Superior d'Enginyeries Industrial, Aeroespacial i Audiovisual de Terrassa

Unitat que imparteix: 749 - MAT - Departament de Matemàtiques.

Titulació: MÀSTER UNIVERSITARI EN ENGINYERIA INDUSTRIAL (Pla 2013). (Assignatura optativa).

MÀSTER UNIVERSITARI EN ENGINYERIA AERONÀUTICA (Pla 2014). (Assignatura optativa).

MÀSTER UNIVERSITARI EN ENGINYERIA ESPACIAL I AERONÀUTICA (Pla 2016). (Assignatura optativa).

Curs: 2023

Crèdits ECTS: 3.0

Idiomes: Anglès

PROFESSORAT

Professorat responsable: Molinero Albareda, Xavier

Altres: Magaña Nieto, Antonio

METODOLOGIES DOCENTS

The teaching methodology will consist of the following three parts:

(1) Classroom sessions devoted to presenting the contents. 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.

(2) Classroom sessions devoted to practical work. 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 (see part (3)).

(3) Self-study including complimentary exercises and activities. Students, independently, need to work on the materials provided by the teacher and the outcomes of the classroom sessions, in order to fix and assimilate the concepts.

OBJECTIUS D'APRENENTATGE DE L'ASSIGNATURA

- To discover the subject and methodology of Game Theory, a branch of Operations Research devoted to the analysis of conflicts of interest.
- To make special emphasis on Cooperative Games, games where coalitions (groups of players) are allowed.
- To realize the convenience of applying Game Theory to solve problems of cooperative games, simple games, and weighted majority games, illustrated by means of examples of this field.

In particular, Shapley value (Banzhaf value) and Shapley-Shubik index (Banzhaf-Coleman index) will be introduced, among other main concepts on Game Theory.

HORES TOTALS DE DEDICACIÓ DE L'ESTUDIANTAT

Tipus	Hores	Percentatge
Hores grup gran	27,0	36.00
Hores aprenentatge autònom	48,0	64.00

Dedicació total: 75 h



CONTINGUTS

Part 1: Introduction to Game Theory, and Cooperative Games

Descripció:

A brief history of Game Theory, and Cooperative Games.

Activitats vinculades:

Exercises. Examination 1.

Dedicació: 8h

Grup gran/Teoria: 4h

Aprenentatge autònom: 4h

Part 2: The Shapley value (Banzhaf value)

Descripció:

Definitions, concepts, calculus, and examples related to the Shapley value (Banzhaf value) on Cooperative Games.

Activitats vinculades:

Exercises. Examination 1.

Dedicació: 24h

Grup gran/Teoria: 4h

Grup mitjà/Pràctiques: 4h

Aprenentatge autònom: 16h

Part 3: Simple Games and Weighted Majority Games

Descripció:

Definitions, concepts, calculus, and examples related to Simple Games and Weighted Majority Games.

Activitats vinculades:

Exercises. Examination 2.

Dedicació: 16h

Grup gran/Teoria: 4h

Grup mitjà/Pràctiques: 2h

Aprenentatge autònom: 10h

Part 4: The Shapley-Shubik index (Banzhaf-Coleman index)

Descripció:

Definitions, concepts, calculus, and examples related to the Shapley-Shubik index (Banzhaf-Coleman index) on Simple and Weighted Majority Games.

Activitats vinculades:

Exercises. Examination 2.

Dedicació: 27h

Grup gran/Teoria: 5h

Grup mitjà/Pràctiques: 4h

Aprenentatge autònom: 18h



SISTEMA DE QUALIFICACIÓ

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

ADDENDUM.

Given the exceptional situation of the pandemic, the grading system may be modified.

BIBLIOGRAFIA

Bàsica:

- Carreras, Francesc; Magaña, Antonio; Amer, Rafael. Teoría de juegos [en línia]. 2001. [Barcelona]: Edicions UPC, 2001 [Consulta: 22/06/2020]. Disponible a: <http://hdl.handle.net/2099.3/36427>. ISBN 8483014777.
- Taylor, Alan D; Zwicker, William S. Simple games : desirability relations, trading, pseudoweightings. Princeton, N. J: Princeton University Press, 1999. ISBN 0691001200.

Complementària:

- Maschler, Michael; Solan, Eilon; Zamir, Shmuel. Game theory. Cambridge: Cambridge University Press, 2013. ISBN 9781107005488.