



Guía docente

220218 - 220218 - Teoría de Juegos

Última modificación: 19/04/2023

Unidad responsable: Escuela Superior de Ingenierías Industrial, Aeroespacial y Audiovisual de Terrassa

Unidad que imparte: 749 - MAT - Departamento de Matemáticas.

Titulación: MÁSTER UNIVERSITARIO EN INGENIERÍA INDUSTRIAL (Plan 2013). (Asignatura optativa).

MÁSTER UNIVERSITARIO EN INGENIERÍA AERONÁUTICA (Plan 2014). (Asignatura optativa).

MÁSTER UNIVERSITARIO EN INGENIERÍA ESPACIAL Y AERONÁUTICA (Plan 2016). (Asignatura optativa).

Curso: 2023

Créditos ECTS: 3.0

Idiomas: Inglés

PROFESORADO

Profesorado responsable: Molinero Albareda, Xavier

Otros: Magaña Nieto, Antonio

METODOLOGÍAS DOCENTES

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.

OBJETIVOS DE APRENDIZAJE DE LA ASIGNATURA

- 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.

HORAS TOTALES DE DEDICACIÓN DEL ESTUDIANTADO

Tipo	Horas	Porcentaje
Horas aprendizaje autónomo	48,0	64.00
Horas grupo grande	27,0	36.00

Dedicación total: 75 h



CONTENIDOS

Part 1: Introduction to Game Theory, and Cooperative Games

Descripción:

A brief history of Game Theory, and Cooperative Games.

Actividades vinculadas:

Exercises. Examination 1.

Dedicación: 8h

Grupo grande/Teoría: 4h

Aprendizaje autónomo: 4h

Part 2: The Shapley value (Banzhaf value)

Descripción:

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

Actividades vinculadas:

Exercises. Examination 1.

Dedicación: 24h

Grupo grande/Teoría: 4h

Grupo mediano/Prácticas: 4h

Aprendizaje autónomo: 16h

Part 3: Simple Games and Weighted Majority Games

Descripción:

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

Actividades vinculadas:

Exercises. Examination 2.

Dedicación: 16h

Grupo grande/Teoría: 4h

Grupo mediano/Prácticas: 2h

Aprendizaje autónomo: 10h

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

Descripción:

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

Actividades vinculadas:

Exercises. Examination 2.

Dedicación: 27h

Grupo grande/Teoría: 5h

Grupo mediano/Prácticas: 4h

Aprendizaje autónomo: 18h



SISTEMA DE CALIFICACIÓN

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.

BIBLIOGRAFÍA

Básica:

- Carreras, Francesc; Magaña, Antonio; Amer, Rafael. Teoría de juegos [en línea]. 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.

Complementaria:

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