

* Please ensure that you use the official UGR nomenclature and terminology (ES-EN) available in [UGRTerm](#) for the names of programmes, courses, faculties/schools, departments, competences/skills, teaching methodology, etc.

TERM	CREDITS (ECTS)	TYPE	MODE OF DELIVERY	LANGUAGE(S) OF INSTRUCTION
2nd	4	Elective	Face-to-face	English
MODULE		Master in Economics		
SUBJECT		Game Theory		
CENTRE / FACULTY / SCHOOL RESPONSIBLE FOR THE PROGRAMME		International School for Postgraduate Studies (EIP)		
MASTER'S DEGREE		Master in Economics		
FACULTY / SCHOOL		Faculty of Economics and Business		
TEACHING STAFF ⁽¹⁾				
Elena Molis Bañales (coordinator)				
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OFFICE HOURS		Monday and Tuesday from 10.30 a.m. to 1.30 p.m.		
Jorge Alcalde Unzu				
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OFFICE HOURS		https://www.unavarra.es/pdi?uid=4338&dato=tutorias		
GENERAL AND SPECIFIC COMPETENCES				
BASIC AND GENERAL COMPETENCES				
<ul style="list-style-type: none"> CG1 – That the student attain the ability for analysis and synthesis, which includes being capable of 				

¹ Consulte posible actualización en Acceso Identificado > Aplicaciones > Ordenación Docente

(∞) Esta guía docente debe ser cumplimentada siguiendo la "Normativa de Evaluación y de Calificación de los estudiantes de la Universidad de Granada" ([http://secretariageneral.ugr.es/pages/normativa/fichasugr/ngc7121/!](http://secretariageneral.ugr.es/pages/normativa/fichasugr/ngc7121/))

defining, distinguishing and relating both the basic concepts and the premises upon which the exposition of any argument is built, as well as stating and basing its content in a concise and critical way, in the context – scientific, political, economic, organizational or whatever the type may be – in which it is presented.

- CB6 – To possess and understand knowledge that gives a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- CB7 – That the students know how to apply the knowledge acquired and their ability to solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to their area of study.
- CB8 – That the students are able to integrate knowledge and handle the complexity of formulating judgements from information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgements.
- CB9 – That the students know how to communicate their conclusions and the knowledge and underlying reasons that sustain them to specialist and non-specialist audiences in a clear and unambiguous way.
- CB10 – That the students possess the learning skills to enable them to continue studying in a way that will necessarily be largely self-managed and autonomous.

SPECIFIC COMPETENCES

- CE1 – Acquire bibliographical information on the current state of economics research
- CE2 – Acquire bibliographical information on the current state of business research
- CE3 – Understand the relevant existing theories, tendencies and debates
- CE4 – Apply and extend existing theories to solve real problems
- CE5 – Apply advanced techniques to real problems
- CE6 – Formulate and answer questions in a way applicable to business strategies
- CE7 – Formulate and answer questions in a way applicable to economic policy
- CE8 – Formulate and contrast hypotheses related to theoretical assumptions and predictions
- CE9 – Plan and organize empirical studies
- CE10 - Plan and organize experimental studies
- CE11 - Plan and organize field studies
- CE12 - Plan and organize business diagnostic studies
- CE13 – Programme in specific software for economic studies in the laboratory
- CE14 – Programme in specific software for data analysis
- CE15 – Solve technical and practical problems related to the design of experimental studies
- CE16 – Solve technical and practical problems related to the design of empirical studies
- CE17 – Solve technical and practical problems related to the organization, presentation and analysis of the data obtained from a study
- CE18 – Assist as support staff in research projects
- CE19 – Assist as support staff in consulting projects
- CE20 – Draw up scientific articles
- CE21 – Draw up consulting reports adapted to their possible users
- CE22 – Public presentation and defence of own work
- CE23 – Get to know the principal differences between countries (cultural effects) of economic values
- CE24 – Get to know the principal differences between countries (cultural effects) of economic results

OBJECTIVES OR LEARNING OUTCOMES (ACCORDING TO THE MASTER'S PROGRAMME VALIDATION REPORT)



Student will know/understand:

- CE1 – Acquire bibliographical information on the current state of economics research
- CE3 – Understand the relevant existing theories, tendencies and debates
- CE4 – Apply and extend existing theories to solve real problems
- CE5 – Apply advanced techniques to real problems
- CE6 – Formulate and answer questions in a way applicable to business strategies
- CE7 – Formulate and answer questions in a way applicable to economic policy
- CE20 – Draw up scientific articles
- CE22 – Public presentation and defense of own work

Student will be able to:

- Identify the basic concepts of Game Theory and its most prominent economic applications.
- Analyze a strategic situation and obtain good predictions about economic agents' behavior.
- Model any strategic situation as a formal problem of Game Theory by using the concepts learnt along the course.
- Apply the most suitable solution concepts of Game Theory to each particular situation.
- Determine which variables determine agents' behavior in a particular strategic situation.
- Understand and use the information of the behavior in a strategic environment

BRIEF DESCRIPTION OF THE COURSE CONTENT (ACCORDING TO THE MASTER'S PROGRAMME VALIDATION REPORT)

Normal-form games
Nash equilibrium
Extensive-form games
Subgame Perfect equilibrium
Repeated games
Bayesian games.
Matching theory

SYLLABUS

Introduction

PART A: Basics on (non-cooperative) game theory

Strategic games with complete information.

Chapter A.1: Solution Concepts

Chapter A.2: Mixed strategy equilibrium

Strategic games with incomplete information.

Chapter A.3: Bayesian games

Extensive games with complete information.

Chapter A.4: Extensive games with perfect information.

Chapter A.5: Extensive games with imperfect information.

Chapter A.6: Repeated games

PART B: Matching: Theory and Applications

Chapter B.1: House allocation



Chapter B.2: Assignments of doctors to hospitals
Chapter B.3: Assignment and exchange of kidneys for transplants.
Chapter B.4: School Choice

REQUIRED AND RECOMMENDED READING

REQUIRED READING:

- Osborne, M. J. (2004). An introduction to game theory (Vol. 3, No. 3). New York: Oxford University Press.

RECOMMENDED READING:

- Binmore, K. (2007). Game theory: a very short introduction. Oxford University Press.
- Fudenberg, D., & Tirole, J. (1991). Game theory. MIT Press Books, 1.
- Gibbons, R. (1992). A primer in game theory. FT Prentice Hall Publisher, London.
- Leyton-Brown, K., & Shoham, Y. (2008). Essentials of game theory: A concise multidisciplinary introduction. Synthesis Lectures on Artificial Intelligence and Machine Learning, 2(1), 1-88.
- Myerson, R. B. (2013). Game theory. Harvard university press.
- Osborne, M. J., & Rubinstein, A. (1994). A course in game theory. MIT press.
- Roth, A. E., & Sotomayor, M. A. O. (1990). Two-sided matching, volume 18 of Econometric Society Monographs.

USEFUL LINKS (OPTIONAL)

<https://www.youtube.com/user/gametheoryonline>

TEACHING METHODOLOGY

The teaching methodology is similar for each of the two parts of the course. First, we define a particular class of game. Second, we analyze possible solution concepts for such a game and a method for obtaining them. Finally, we discuss relevant economic applications of the concepts studied before. At the end of each part of the course each student will do a problem set in order to reinforce the knowledge acquired.

ASSESSMENT (EVALUATION INSTRUMENTS, EVALUATION CRITERIA, PERCENTAGE OF FINAL MARK, ETC)

ORDINARY ASSESSMENT SESSION

Article 17 of the UGR Assessment Policy and Regulations establishes that the ordinary assessment session (*convocatoria ordinaria*) will preferably be based on the continuous assessment of students, except for those who have been granted the right to a single final assessment (*evaluación única final*), which is an assessment method that only takes a final exam into account.

- Exam on Part A (50%). This exam will be a test questionnaire. Wrong answers will penalize.
- Individual project and its presentation on applications of some of the models analyzed during the course (25%)
- Problem set on PART B (25%)

EXTRAORDINARY ASSESSMENT SESSION

Article 19 of the UGR Assessment Policy and Regulations establishes that students who have not passed a course in the ordinary assessment session (*convocatoria ordinaria*) will have access to an extraordinary assessment session (*convocatoria extraordinaria*). All students may take part in this extraordinary assessment session, regardless of whether or not they have followed continuous assessment activities. In



this way, students who have not carried out continuous assessment activities will have the opportunity to obtain 100% of their mark by means of an exam and/or assignment.

- Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize.

DESCRIPTION OF THE EXAMS/TESTS THAT WILL FORM PART OF THE SINGLE FINAL ASSESSMENT "EVALUACIÓN ÚNICA FINAL" (AN ASSESSMENT METHOD THAT ONLY TAKES A FINAL EXAM INTO ACCOUNT) AS ESTABLISHED IN THE UGR ASSESSMENT POLICY AND REGULATIONS)

Article 8 of the UGR Assessment Policy and Regulations establishes that students who are unable to follow continuous assessment methods due to justifiable reasons shall have recourse to a single final assessment (*evaluación única final*), which is an assessment method that only takes a final exam into account.

In order to opt for a single final assessment (*evaluación única final*), students must send a request, using the corresponding online procedure, to the coordinator of the master's programme, in the first two weeks of the course or in the two weeks following their enrolment (if the enrolment has taken place after the classes have already begun). The coordinator will communicate this information to the relevant teaching staff members, citing and verifying the reasons why the student is unable to follow the continuous assessment system.

In this case, the assessment will comprise:

- Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize.

SCENARIO A (ON-CAMPUS AND REMOTE TEACHING AND LEARNING COMBINED)

TUTORIALS

TIMETABLE

(According to Official Academic Organization Plan)

TOOLS FOR TUTORIALS

(Indicate which digital tools will be used for tutorials)

The same as in the case of full presentiality

Email and Google Meet

MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY

On-campus and remote teaching will be combined. If necessary, the groups will be split in sub-groups to allow some of them go on-campus and other via streaming in a rotatory system. The structure and timing will depend on the measures adopted by the Faculty of Economics and Business and the Department.

MEASURES TAKEN TO ADAPT ASSESSMENT (Instruments, criteria and percentage of final overall mark)

Ordinary assessment session

- Test questionnaire on Part A (50%). Wrong answers will penalize. The test will be, preferably, on campus. If this is not possible, it will be online (Prado).
- Individual project and its presentation on applications of some of the models analyzed during the course (25%). The presentation will be, preferably, on campus. If this is not possible, it will be online (Google Meet).
- Problem set on PART B (25%).



Extraordinary assessment session	
<ul style="list-style-type: none"> Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize. The test will be, preferably, on campus. If this is not possible, it will be online (Prado). 	
Single final assessment	
<ul style="list-style-type: none"> Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize. The test will be, preferably, on campus. If this is not possible, it will be online (Prado). 	
SCENARIO B (ONCAMPUS ACTIVITY SUSPENDED)	
TIMETABLE (According to Official Academic Organization Plan)	TOOLS FOR TUTORIALS (Indicate which digital tools will be used for tutorials)
<ul style="list-style-type: none"> The same as in the case of full presentiality 	<ul style="list-style-type: none"> Email and Google Meet
MEASURES TAKEN TO ADAPT TEACHING METHODOLOGY	
<ul style="list-style-type: none"> Theoretical lessons by means of recorded videos. Problem sets and their corresponding solutions available at Prado. Presentations through Google Meet. 	
MEASURES TAKEN TO ADAPT ASSESSMENT (Instruments, criteria and percentage of final overall mark)	
Ordinary assessment session	
<ul style="list-style-type: none"> Test questionnaire on Part A (50%). Wrong answers will penalize. The test will be online (Prado). Individual project and its presentation on applications of some of the models analyzed during the course (25%). The presentation will be online (Google Meet). Problem set on PART B (25%) sent by email. 	
Extraordinary assessment session	
<ul style="list-style-type: none"> Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize. The test will be online (Prado). 	
Single final assessment	
<ul style="list-style-type: none"> Exam on Parts A and B. It will be a test questionnaire. Wrong answers will penalize. The test will be online (Prado). 	

