

Degree	Type	Year	Semester
4313805 Economic Analysis	OB	1	1

## Contact

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## Teachers

Jordi Caballé Vilella

Jordi Massó Carreras

## Use of languages

Principal working language: english (eng)

## External teachers

Rodríguez-Barraquer Tomás

## Prerequisites

There are no specific prerequisites.

## Objectives and Contextualisation

This module provides students advanced quantitative tools. These tools are necessary for economic analysis.

This module covers optimization, probability, statistics and game theory. The module is organized in three sections. The first section covers the foundations of optimization theory. The second section provides students with the theoretical foundations of probability and statistics necessary for econometric and financial analysis. The third section is devoted to game theory; it provides the student with the mathematical framework that is necessary to analyze multi-person decision theory problems.

## Skills

- Capacity to articulate basic economic theory, analytically deriving them from mathematical reasoning
- Capacity to identify basic statistical analysis and econometric techniques deriving them from the laws of probability and statistics
- Conceptually analyse a specific economic problem using advanced analytical tools
- Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Student should possess the learning skills that enable them to continue studying in a way that is largely student led or independent

## Learning outcomes

1. Describe statistical topics on which stochastic economic analysis and empirical analysis is based
2. Distinguish the element to be included and the necessary assumptions for proposing a decision-making problem with very simple strategic interactions
3. Framing an economic question of decision within a strategic context in simple math problem and derive its response through mathematical logic
4. Possess and understand knowledge that provides a basis or opportunity for originality in the development and/or application of ideas, often in a research context
5. Student should possess the learning skills that enable them to continue studying in a way that is largely student led or independent
6. Use of mathematics to analyse economic problems

## Content

### Optimization

1. Topology
2. Continuity
3. Differentiability
4. Convexity
5. Static Optimization
6. Dynamic Systems

### Probability and Statistics

1. Probability and Measure Theory
2. Random Variables and Distributions
3. Expectation
4. Special Distributions
5. Functions of Random Variables
6. Stochastic Processes and Limiting Distributions
7. Sampling
8. Estimation
9. Hypothesis Testing
10. Choice under Uncertainty

### Game Theory

1. Introduction and Some Examples
2. Games in Normal Form
3. Games in Extensive Form
4. Nash Equilibrium and Related Issues
5. Repeated Games
6. Games of Incomplete Information
7. Bargaining Theory
8. Cooperative Games

## Methodology

- Theory classes
- Practice classes
- Learning based on problem solving
- Tutorials
- Personal study
- Study groups
- Textbook reading

- Article reading

## Activities

Title	Hours	ECTS	Learning outcomes
<b>Type: Directed</b>			
Theory classes	112.5	4.5	1, 2, 3, 4, 5, 6
<b>Type: Supervised</b>			
Problems sets, tutorials	112.5	4.5	1, 2, 3, 4, 5, 6
<b>Type: Autonomous</b>			
Personal study, study groups, textbook readings, article readings	150	6	1, 2, 3, 4, 5, 6

## Evaluation

### Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Class Attendance and Problem sets and assignments	20%	0	0	1, 2, 3, 4, 5, 6
Final Exam	80%	0	0	1, 2, 3, 4, 5, 6

## Bibliography

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