

# EC220-15 Mathematical Economics 1A

**21/22**

**Department**

Economics

**Level**

Undergraduate Level 2

**Module leader**

Costas Cavounidis

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

Mathematical Economics 1A, "Game Theory," is an introduction to the rigorous mathematical study of strategic interactions. Students will learn how game theorists model such interactions, and how those models can be analyzed. By the end of the module, they will have developed a formidable toolbox of game-theoretic techniques, and will be familiar with a variety of applications of these techniques to real-world situations, both economic and otherwise.

[Module web page](#)

### Module aims

Mathematical Economics 1a, "Introduction to Game Theory", aims to provide a basic understanding of pure game theory and also introduce the student to a number of applications of game theory to economic problems of resource allocation.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module will typically cover the following topics: Games in strategic form: Nash equilibrium and

its applications to voting games, oligopoly, provision of public goods. Games in extensive form: sub game perfect equilibrium and its applications to voting games, repeated games. Static games with incomplete information: Bayesian equilibrium and its applications to auctions, contracts and mechanism design. Dynamic games of incomplete information: Perfect Bayesian equilibrium, Sequential equilibrium and its application to signalling games. Bargaining theory: Nash bargaining, non-cooperative bargaining with alternating offers and applications to economic markets. Evolutionary Game Theory

## **Learning outcomes**

By the end of the module, students should be able to:

- Subject Specific and Professional Skills:...demonstrate understanding of the tools of game theory, and the ability to apply them to wide classes of problems. The teaching and learning methods that enable students to achieve this learning outcome are: Lectures, seminars, guided reading and independent study. The summative assessment methods that measure the achievement of this learning outcome are: Tests and examination

## **Indicative reading list**

Please see Talis Aspire link for most up to date list.

[View reading list on Talis Aspire](#)

## **Subject specific skills**

Students will have the opportunity to develop skills in:

Analytical thinking and communication  
Analytical reasoning  
Critical thinking  
Strategic thinking  
Problem-solving  
Abstraction  
Policy evaluation  
Analysis of incentives  
Concepts of Simultaneity and Endogeneity  
Analysis of optimisation  
Understanding of Uncertainty and Incomplete Information

## **Transferable skills**

Students will have the opportunity to develop:

Numeracy and quantitative skills  
Written communication skills  
Oral communication skills  
Mathematical, statistical and data-based research skills

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# Study

## Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Seminars	5 sessions of 1 hour (3%)
Private study	125 hours (83%)
Total	150 hours

## Private study description

Private study will be required in order to prepare for seminars/classes, to review lecture notes, to prepare for forthcoming assessments, tests, and exams, and to undertake wider reading around the subject.

## Costs

No further costs have been identified for this module.

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## Assessment

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

## Assessment group DB

	Weighting	Study time
Test 1 50 minute in class test	20%	
Online Examination	80%	

A paper which examines the course content and ensures learning outcomes are achieved.

~Platforms - AEP

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- Answerbook provided by department
- Students may use a calculator

## Assessment group R

	<b>Weighting</b>	<b>Study time</b>
Online Examination - Resit	100%	
A paper which examines the course content and ensures learning outcomes are achieved.		
~Platforms - AEP		

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- Answerbook provided by department
- Students may use a calculator

## Feedback on assessment

The Department of Economics is committed to providing high quality and timely feedback to students on their assessed work, to enable them to review and continuously improve their work. We are dedicated to ensuring feedback is returned to students within 20 University working days of their assessment deadline. Feedback for assignments is returned either on a standardised assessment feedback cover sheet which gives information both by tick boxes and by free comments or via free text comments on tabula, together with the annotated assignment. For tests and problem sets, students receive solutions as an important form of feedback and their marked assignment, with a breakdown of marks and comments by question and sub-question. Students are informed how to access their feedback, either by collecting from the Undergraduate Office or via tabula. Module leaders often provide generic feedback for the cohort outlining what was done well, less well, and what was expected on the assignment and any other common themes. This feedback also includes a cumulative distribution function with summary statistics so students can review their performance in relation to the cohort. This feedback is in addition to the individual-specific feedback on assessment performance.

[Past exam papers for EC220](#)

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## Availability

### Pre-requisites

Any of:

EC106-24 Introduction to Economics OR  
EC107-30 Economics 1 OR  
EC109-30 Microeconomics 1 OR  
EC137-15 Economics 1: Micro

AND (FOR ECONOMICS STUDENTS ONLY)

EC121-12 Mathematical Techniques A AND  
EC122-12 Statistical Techniques A AND  
EC125-6 Computing and Data Analysis

OR

EC123-12 Mathematical Techniques B AND  
EC124-12 Statistical Techniques B AND  
EC125-6 Computing and Data Analysis

EC106 or EC107 for GL11 and other Maths students

To take this module, you must have passed:

- Any of
  - [EC106-24 Introduction to Economics](#)
  - [EC107-30 Economics 1](#)
  - [EC109-30 Microeconomics 1](#)
  - [EC137-15 Economics 1: Micro](#)
  - All of
    - [EC121-12 Mathematical Techniques A](#)
    - [EC122-12 Statistical Techniques A](#)
    - [EC125-6 Computing and Data Analysis](#)
  - All of
    - [EC123-12 Mathematical Techniques B](#)
    - [EC124-12 Statistical Techniques B](#)
    - [EC125-6 Computing and Data Analysis](#)

## Post-requisite modules

If you pass this module, you can take:

- EC334-15 Topics in Financial Economics: Corporate Finance and Markets
- EC314-15 Topics in Economic Theory
- EC341-15 Mathematical Economics 2: Mechanism Design and Alternative Games
- EC341-15 Mathematical Economics 2: Mechanism Design and Alternative Games
- EC341-15 Mathematical Economics 2: Mechanism Design and Alternative Games
- EC301-15 Mathematical Economics 2: Dynamics, Uncertainty & Asymmetrical Information
- EC301-15 Mathematical Economics 2: Dynamics, Uncertainty & Asymmetrical Information
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## Courses

This module is Core optional for:

- Year 2 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 2 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)

This module is Optional for:

- TECA-L1PA Postgraduate Taught Economics (Diploma plus MSc)
  - Year 1 of L1PA Economics (Diploma plus MSc)
  - Year 1 of L1PA Economics (Diploma plus MSc)
  - Year 2 of L1PA Economics (Diploma plus MSc)
  - Year 2 of L1PA Economics (Diploma plus MSc)
- UECA-3 Undergraduate Economics 3 Year Variants
  - Year 2 of L100 Economics
  - Year 2 of L100 Economics
  - Year 2 of L100 Economics
  - Year 2 of L116 Economics and Industrial Organization
  - Year 2 of L116 Economics and Industrial Organization
- UECA-4 Undergraduate Economics 4 Year Variants
  - Year 2 of LM1H Economics, Politics & International Studies with Study Abroad
  - Year 2 of LM1H Economics, Politics & International Studies with Study Abroad
- UECA-LM1D Undergraduate Economics, Politics and International Studies
  - Year 2 of LM1D Economics, Politics and International Studies
  - Year 2 of LM1D Economics, Politics and International Studies
- Year 3 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 4 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
  - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
- UPHA-V7MM Undergraduate Philosophy, Politics and Economics (with Intercalated year)
  - Year 4 of V7MQ Philosophy, Politics and Economics (Bipartite) with Intercalated Year
  - Year 4 of V7MH Philosophy, Politics and Economics - Economics/Philosophy Bipartite (Economics Major) (with Intercalated year)
  - Year 4 of V7MI Philosophy, Politics and Economics - Philosophy/Economics Bipartite (Philosophy Major) (with Intercalated year)
  - Year 4 of V7MJ Philosophy, Politics and Economics - Philosophy/Politics Bipartite (with Intercalated year)
  - Year 4 of V7MG Philosophy, Politics and Economics - Politics/Economics Bipartite (Politics Major) (with Intercalated year)

This module is Option list B for:

- UMAA-G105 Undergraduate Master of Mathematics (with Intercalated Year)
  - Year 2 of G105 Mathematics (MMath) with Intercalated Year
  - Year 3 of G105 Mathematics (MMath) with Intercalated Year
  - Year 5 of G105 Mathematics (MMath) with Intercalated Year
- UMAA-G100 Undergraduate Mathematics (BSc)
  - Year 2 of G100 Mathematics
  - Year 2 of G100 Mathematics
  - Year 2 of G100 Mathematics
  - Year 3 of G100 Mathematics
  - Year 3 of G100 Mathematics
  - Year 3 of G100 Mathematics

- UMAA-G103 Undergraduate Mathematics (MMath)
  - Year 2 of G100 Mathematics
  - Year 2 of G103 Mathematics (MMath)
  - Year 2 of G103 Mathematics (MMath)
  - Year 3 of G100 Mathematics
  - Year 3 of G103 Mathematics (MMath)
  - Year 3 of G103 Mathematics (MMath)
  - Year 4 of G103 Mathematics (MMath)
  - Year 4 of G103 Mathematics (MMath)
- UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
  - Year 2 of G106 Mathematics (MMath) with Study in Europe
  - Year 3 of G106 Mathematics (MMath) with Study in Europe
  - Year 4 of G106 Mathematics (MMath) with Study in Europe
- Year 2 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 2 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- UMAA-G101 Undergraduate Mathematics with Intercalated Year
  - Year 2 of G101 Mathematics with Intercalated Year
  - Year 4 of G101 Mathematics with Intercalated Year