

EC133-15 Linear Algebra

23/24

Department

Economics

Level

Undergraduate Level 1

Module leader

Nicholas Jackson

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module allows students to develop a fluency with the algebra of matrices and vectors, and an understanding of topics related to linear transformations, in particular eigenvalues and eigenvectors, coordinate transformations, and matrix diagonalisation and its applications. This provides students with a deeper understanding of techniques used in mathematical economics and econometrics.

[Module web page](#)

Module aims

To give the students a clear understanding of some important topics in linear algebra. Students will acquire an understanding of systems of simultaneous linear equations, vectors and linear maps in two- and three-dimensional space, theory and applications of matrix diagonalisation, general vector spaces, and quadratic forms.

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: Vector and matrix algebra; Vector spaces and coordinate systems; Linear transformations; Eigenvalues and eigenvectors; Simultaneous equations; Matrix diagonalisation; Inner products; Symmetric matrices; Quadratic forms.

Learning outcomes

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

- Subject knowledge and understanding: ... demonstrate an understanding of symbolic logic, basic properties of number systems, vectors and matrices in \mathbb{R}^2 , \mathbb{R}^3 and \mathbb{R}^n , vector spaces, linear maps, quadratic forms and their applications to certain sorts of problems (solving systems of simultaneous equations, long-term behaviour of coupled recurrence relations, etc). The teaching and learning methods that enable students to achieve this learning outcome are: Lectures, tutorials, problem sheets and independent study. The assessment methods that measure the achievement of this learning outcome are: Problem sheets, online quizzes and unseen examination.
- Key skills: ...understand formal mathematical definitions and theorems, and apply them to solve problems in linear algebra. The teaching and learning methods that enable students to achieve this learning outcome are: Lectures, tutorials, problem sheets, online quizzes and independent study. The assessment methods that measure the achievement of this learning outcome are: Problem sheets, online quizzes and unseen 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

Problem-solving

Abstraction

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

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Seminars	9 sessions of 1 hour (6%)
Private study	121 hours (81%)
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.

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 D4

	Weighting	Study time
Problem Set 1	5%	
Take home problem set		
Problem Set 2	5%	
Take home problem set		
Problem Set 3	5%	
Take home problem set		
Problem Set 4	5%	
Take home problem set		
Test 1	4%	
Online quiz worth 4% or 0 depending on whether student achieves 80%		
Test 2	4%	

	Weighting	Study time
Online quiz worth 4% or 0 depending on whether student achieves 80%		
Test 3	4%	
Online quiz worth 4% or 0 depending on whether student achieves 80%		
Test 4	4%	
Online quiz worth 4% or 0 depending on whether student achieves 80%		
Test 5	4%	
Online quiz worth 4% or 0 depending on whether student achieves 80%		
Online Examination	60%	
A paper which examines the course content and ensures learning outcomes are achieved.		
~Platforms - AEP		

- Online examination: No Answerbook required
- Students may use a calculator

Assessment group R

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

- Online examination: No Answerbook required

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 EC133](#)

Availability

Pre-requisites

A-level in Mathematics

Courses

This module is Core optional for:

- Year 1 of UIPA-L1L8 Undergraduate Economic Studies and Global Sustainable Development

This module is Optional for:

- UECA-3 Undergraduate Economics 3 Year Variants
 - Year 1 of L100 Economics
 - Year 1 of L100 Economics
 - Year 1 of L100 Economics
 - Year 1 of L116 Economics and Industrial Organization
 - Year 1 of L116 Economics and Industrial Organization
- UECA-LM1D Undergraduate Economics, Politics and International Studies
 - Year 1 of LM1D Economics, Politics and International Studies
 - Year 1 of LM1D Economics, Politics and International Studies
- Year 1 of UPHA-L1CA Undergraduate Economics, Psychology and Philosophy
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)

This module is Unusual option for:

- Year 1 of UPHA-L1CA Undergraduate Economics, Psychology and Philosophy
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)

This module is Option list A for:

- Year 1 of UIPA-L1L8 Undergraduate Economic Studies and Global Sustainable Development
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)
 - Year 1 of V7ML Philosophy, Politics and Economics (Tripartite)