

EC961 Introductory Mathematics and Statistics

September 2024

THIS MODULE, *EC961 Introductory Mathematics and Statistics* is intended to provide a working background knowledge of the mathematical and statistical techniques necessary for MSc programmes in the Department of Economics at the University of Warwick.

What is this?

This is a fairly intensive pre-sessional module, running in the last two weeks of September, just before the start of the Autumn Term. The idea is to give everyone a basic working knowledge of a range of topics in mathematics and statistics that are necessary for fully engaging with subsequent modules in macroeconomics, microeconomics and econometrics.

The module is in four parts:

Calculus and Dynamics: This covers compound and exponential growth, differential calculus and its use in finding optimal solutions to problems in economics, elasticity, Taylor–Maclaurin series, some more detailed theoretical background in calculus (such as the Intermediate Value Theorem and the Fixed Point Theorem), solution of first order linear difference equations, and some basic concepts and facts about concave, convex, quasiconcave and quasiconvex functions.

Linear Algebra: This is concerned with the algebra of vectors and matrices, and the solution of problems involving linear functions. In particular, we will cover eigenvalues and eigenvectors, solution of simultaneous linear equations, matrix diagonalisation and its applications, and the classification of quadratic forms.

Multivariate Calculus: This section covers more advanced topics in calculus, including partial differentiation, finding optimal solutions to functions of more than one variable, using Lagrangian optimisation and the Karush–Kuhn–Tucker (KKT) conditions, solving systems of difference equations, and solving some classes of differential equations.

Statistics and Probability In this section, we will introduce the fundamental concepts of probability theory such as discrete and continuous random variables, conditional probability, Bayes’ Theorem, standard probability distributions, and their use in statistical inference and hypothesis testing.

This document contains the lecture notes for the first three of these.

When?

Table 1 shows the provisional timetable.

There will be nine lectures (mostly in the mornings), in which we will cover the course material, and eight classes (in the afternoons) in which you will work through practice questions in smaller groups, under the supervision of a class tutor. The lectures will take place in lecture theatre MS.01 in the Zeeman Building, and the classes will take place in smaller rooms in the Faculty of Arts Building.

Week 1	Mon 16 Sep	Tue 17 Sep	Wed 18 Sep	Thu 19 Sep	Fri 20 Sep
Morning (10am–1pm)		Lecture 2 Calc and Dynamics	Lecture 3 Linear Algebra	Lecture 4 Linear Algebra	Lecture 5 Statistics
Afternoon (2pm–5pm)	Lecture 1 Calc and Dynamics	Class 1 Calc and Dynamics	Class 2 Calc and Dynamics	Class 3 Linear Algebra	Class 4 Linear Algebra
Week 2	Mon 23 Sep	Tue 24 Sep	Wed 25 Sep	Thu 26 Sep	Fri 27 Sep
Morning (10am–1pm)	Test 1 (12pm–1pm)	Lecture 6 Statistics	Lecture 7 Statistics	Lecture 8 Multivariate Calc	Lecture 9 Multivariate Calc
Afternoon (2pm–5pm)		Class 5 Statistics	Class 6 Statistics	Class 7 Multivariate Calc	Class 8 Multivariate Calc
Week 3	Mon 30 Sep	Tue 1 Oct	Wed 2 Oct	Thu 3 Oct	Fri 4 Oct
Morning (10am–1pm)	Test 1 (retake) (12pm–1pm)		Test 2 (9am–12pm)		
Afternoon (2pm–5pm)	Revision Lecture (2pm–3pm)				

Table 1: Provisional timetable

There will also be two online tests. The first of these will take place 12pm-1pm on Monday 23 September, and will cover the Calculus and Dynamics material, and the first half of the Linear Algebra topics. If you're not happy with your performance on this test, there will be a second opportunity to take (a similar but different version of) it on Monday 30 September.

The second test will cover all of the material, and will take place from 9am–12pm on Wednesday 2 October. There will also be a revision lecture and Q&A session at 2pm on Monday 30 September.

Who are we?

The two module lecturers are:



Dr Nicholas Jackson
Zeeman B0.09 / Economics S.084
Calculus and Dynamics
Linear Algebra
Multivariable Calculus



Dr Juliana Cunha Carneiro Pinto
Economics S1.123
Probability and Statistics

There are twelve class tutors:



Dr Farzad Javidanrad
Class 1
Arts FAB3.31



Malavika Mani
Class 2
Arts FAB4.80



Andrew Brendon-Penn
Class 3
Zeeman A1.01



Kyle Boutilier
Class 4
Arts FAB4.79



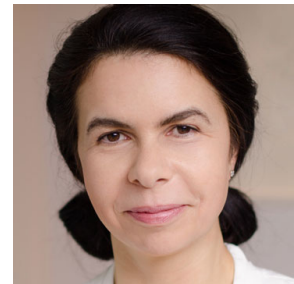
Alperen Tosun
Class 5
Arts FAB3.30



Hussain Abass
Class 6
Humanities H2.03



Shantanu Chadha
Class 7
Soc Sci S2.81



Dr Darina Dintcheva
Class 8
Arts FAB3.32



Dr Damiano Turchet
Class 9
Arts FAB6.01



Puru Gupta
Class 10
Soc Sci S0.50



Dr James Massey
Class 11
Arts FAB6.02



Dr Minh Tung Le
Class 12
Soc Sci S0.52