

# Mathematical Economics: EC3080

## Instructor

Paul Scanlon,

Department of Economics.

OFFICE: Arts Building, Rm 3006.

OFFICE HOURS: W, 12pm-1.30pm.

TIME: W, 10am-12am (College Green, RM 3) and W, 3pm-4pm (TUT, Rm 3126)

## Introduction

This is the first part of the Junior Sophister course in mathematical economics. We will cover differential/difference equations, optimization theory, together with applications from microeconomic theory and finance.

## Assessment

There will be a test sometime between 9-13th November, which will contribute 15 percent towards your course grade for EC 3080. My component of the final exam contributes 35 percent towards your mark for EC 3080.

## Outline

### 1. Differential and Difference Equations

First and second order difference and differential equations. The analysis of systems of differential equations via matrix algebra.

### 2. Constrained Optimisation

Review of the Envelope Theorem. Kuhn-Tucker Analysis with Applications.

### 3. Functions

Convex Sets; Quasiconcavity and Quasiconvexity; Euler's Theorem; Multivariable Taylor Expansions with Economic Applications; The Leibniz Rule.

### 4. Applications to Finance and Microeconomic Theory.

Introduction to asset pricing and portfolio theory through matrix algebra; Applications to consumption/production theory and general equilibrium.

## Textbooks

There is no required text for the course. At various stages, I will suggest readings and give you handouts, which I recommend you read. However, there are a number of useful books, which present good treatments of much of the subject matter of the course. I recommend you read at least one of the following texts (any edition is fine):

1. *Mathematics for Economics*, by Michael Hoy, John Livernois, Chris McKenna, and Ray Rees.
2. *Mathematics For Economists: An Introductory Textbook*, by Malcolm Pemberton and Nicholas Rau.
3. *Fundamental Methods of Mathematical Economics*, by Alpha C. Chiang and Kevin Wainwright.
4. *Mathematics for Economists*, by Carl P. Simon, Lawrence E. Blume.