PREFACE

This book is based on courses MA381 and EC3080, taught at Trinity College Dublin since 1992.
Comments on content and presentation in the present draft are welcome for the benefit of future generations of students.
An electronic version of this book (in LaTeX) is available on the World Wide Web at `http://pwaldron.bess.tcd.ie/teaching/ma381/notes/` although it may not always be the current version.
The book is not intended as a substitute for students' own lecture notes. In particular, many examples and diagrams are omitted and some material may be presented in a different sequence from year to year.
In recent years, mathematics graduates have been increasingly expected to have additional skills in practical subjects such as economics and finance, while economics graduates have been expected to have an increasingly strong grounding in mathematics. The increasing need for those working in economics and finance to have a strong grounding in mathematics has been highlighted by such layman's guides as **?**, **?**, **?** (adapted from **?**) and **?**. In the light of these trends, the present book is aimed at advanced undergraduate students of either mathematics or economics who wish to branch out into the other subject.
The present version lacks supporting materials in *Mathematica* or *Maple*, such as are provided with competing works like **?**.
Before starting to work through this book, mathematics students should think about the nature, subject matter and scientific methodology of economics while economics students should think about the nature, subject matter and scientific methodology of mathematics. The following sections briefly address these questions from the perspective of the outsider.

What Is Economics?

This section will consist of a brief verbal introduction to economics for mathematicians and an outline of the course.

What is economics?

1. Basic microeconomics is about the allocation of wealth or expenditure among different physical goods. This gives us relative prices.

2. Basic finance is about the allocation of expenditure across two or more time periods. This gives us the term structure of interest rates.

3. The next step is the allocation of expenditure across (a finite number or a continuum of) states of nature. This gives us rates of return on risky assets, which are random variables.

Then we can try to combine 2 and 3.
Finally we can try to combine 1 and 2 and 3.
Thus finance is just a subset of micoreconomics.
What do consumers do?
They maximise 'utility' given a budget constraint, based on prices and income.
What do firms do?
They maximise profits, given technological constraints (and input and output prices).
Microeconomics is ultimately the theory of the determination of prices by the interaction of all these decisions: all agents simultaneously maximise their objective functions subject to market clearing conditions.

What is Mathematics?

This section will have all the stuff about logic and proof and so on moved into it.