Course content for MT3470/MT4470, Mathematics of Financial Markets

Prerequisites:
MT1720; and one of MT1300 or MT2320

Aims:
This course aims to show how mathematics and statistics are used (and sometimes misused) by those who work in securities markets. Since many of our graduates find employment in this area, the topics in the course are chosen to demonstrate the most important applications. They are portfolio theory, two simple asset pricing models, the general behaviour of markets (how random, how chaotic are they?) and the theory of derivative securities.

Learning outcomes:
On completion of the course the student should be able to:
- understand the ideas of risk and return and how they can be measured;
- formulate Markowitz portfolio theory as an optimisation problem and use simple algorithms to solve it;
- understand the assumptions behind asset pricing models and the mathematical arguments leading to them;
- appreciate the consequences of a random walk model of price change and the arguments for and against such a model;
- understand the Black and Scholes formulation of option pricing and find simple solutions of the equation.
- MT4470: appreciate the mathematical tools used in financial applications, be able to understand their limits and to reproduce proofs of selected mathematical results.

Course content: