SS 4521G/FM 9521B - Advanced Financial Modelling
Outline of Lectures: 27-31 January 2014

For this week, we aim to cover the following theories/concepts:

1. Recap of risk-neutral pricing of European options: The Black-Scholes option pricing formula will be derived using the risk-neutral approach. The put-call parity will be revisited.

2. Girsanov theorem on change of probability measures: We shall examine the conditions that permit the change from physical/objective to risk-neutral/martingale measure.

3. The stock price dynamics under the risk-neutral measure will be determined.

4. We shall look at how the Black-Scholes-Merton European call price gets modified to take into account when (i) the underlying asset pays a known dividend, (ii) the underlying is a stock index, (iii) the underlying is a currency, (iv) the underlying is a commodity price and (v) the underlying is a futures contract.

5. Properties of Black-Scholes-Merton formula

6. Simulation of random walk and its convergence to Brownian motion

7. Basics of Monte-Carlo simulation. Application to valuation of options and implementation in the Excel software will be considered.

8. Brief review of pricing American options