Course Syllabus
Math 181: THE MATHEMATICS OF FINANCE
Fall 2001

1 Background in Finance and Probability
   1. Introduction and Course Description
   2. Review of probability
   3. Discrete Random Walks
   4. Random walks with Gaussian increments
   5. Equity models using random walks; the price of risk

2 Financial Derivatives
   6. Financial derivatives (puts, calls)
   7. No-arbitrage assumption; self-financing portfolios
   8. Derivation of discrete Black-Scholes
   9. Derivation of continuous Black-Scholes
  10. Black-Scholes (cont.)
  11. European put and call
  12. American put and call
  13. Hedging - the greeks
  14. Hedging (cont.)
3 Monte Carlo Methods

17. Introduction
18. Error analysis
19. Sampling methods
20. Variance reduction
21. Variance reduction (cont.)
22. Applications
23. Applications
24. Applications

4 Other Financial Securities

25. Exotic options (barriers)
26. Exotic options (path-dependent securities)
27. Interest rate models
28. Interest rate derivatives
29. Mortgage-backed securities