Fall Semester 2007
Professor Ioannis Karatzas

G7260: TOPICS IN STOCHASTIC ANALYSIS

Tue-Thu 2:40-3:55 Room 1025 SSW Bldg

Course Description

Prerequisites: A course on Real Analysis and Probability, at the level of G4151-4153 or G6105-6106.


Integration with respect to continuous semi-martingales, Ito’s change-of-variable formula, Girsanov’s theorem and its applications. The martingale representation property for Simple Random Walk and for the Brownian filtration, the Clark-Ocone formula.

Local Time: Definition, properties, the Ray-Knight theorems. Bessel processes: general properties, Pitman’s 2M-X property, the D. Williams decomposition.


**Mathematical Finance:** Notions and problems of Hedging, Portfolio Optimization, Diversity, Arbitrage, Completeness.

**Special Topics** (as time permits): Least-squares approximation of random variables by stochastic integrals; Levy processes; Hypercontractivity; Skorohod embedding; Stochastic Differential Geometry; Excursions.

**RECOMMENDED TEXTS:**


**REMARKS:**

My intention is to run this course as a seminar, with occasional student presentations on Thursdays. Most PhD students should want to take this course Pass-Fail. Students who wish to register and need a letter grade, should contact me ahead of time; for those students a *Take-Home Final* will be available at the end of the semester.