Georgia Tech Fall 2013 Heinrich Matzinger

SYLLABUS FOR MATH 6235: Stochastic Processes for Finance II.

- TEACHER: Heinrich Matzinger. E-mail: matzi@math.gatech.edu
- WHERE and WHEN: 16:35 - 17:55 am, MW, Skiles 169
- OFFICE HOURS: Monday 13:30-14:55 or by appointment, OFFICE Skiles 264.
- TEXT BOOK: Stochastic Calculus for Finance II, Steven E. Shreve, Springer Finance and LECTURE NOTES of H. Matzinger, which will be sent out over E-mail.
- FINAL GRADE: consists of 60% of the work during semester and 40% final. Every homework which gets graded and every midterm count the same.
- MIDTERMS: There will be at least four mid-terms. The midterms contain problems like in the homeworks and preparation tests and you need to learn some proofs as indicated by Matzinger. The temptative dates for the tests are: September 2, September 23, October 14, November 11.
- HOMEWORKS: For some homeworks, solution sets will be send over the internet.
- FINAL EXAM: consists mainly of problems like in the midterms, homeworks and proofs which Matzinger will indicate.
- Matzinger will communicate with you by E-mail and send you all the information through E-mail.
- We work according to the Georgia Tech Honor code: http://www.honor.gatech.edu

COURSE DESCRIPTION:

- Background on integration and on simulation
- Brownian Motion, and Continuous-Time Martingales, Gaussian Processes and their Variation
- The Ito Stochastic Integral and its Properties, and Ito's Change-of-Variable Formula
- Stock Prices as Geometric Brownian Motions
- Black-Scholes Option Pricing

- Ito Processes and Stochastic Differential Equations
- Continuous-Time Markov Processes and the Kolmogorov Equations
- Additional Results on Black-Scholes Option Pricing
- Girsanov's Theorem for Change of Measure, and Martingale Representation Theorems
- Asset Pricing theory, Risk Neutral Measures (Equivalent Martingale Measures), and Hedging
- Pricing Specific Exotic Options
- Continuous-Time Optimal Stopping and Pricing American Style Options