

# ISyE/Math/MGT 6785 Syllabus

## Practice of Quantitative & Computational Finance

**Instructor:** Dr. Shi-Jie Deng

**Time and Classroom:** M W 1:35 – 2:55pm, IC 217.

**Office:** ISyE Rm 319

**Office Phone:** (404) 894-6519

**Email:** deng@gatech.edu

**Office Hour:** 11am – 12noon Mondays or by appointment.

**Prerequisites:** Core QCF curriculum in stochastic process and optimization or consent of instructor.

**Course Materials:** There is no required textbook for this course. The course will be mainly based on journal papers, research reports, and recommended texts. **Important:** all papers and other course materials will be posted at **T-Square** (<http://t2.gatech.edu>) for you to download.

**Recommended** textbooks: *MONTE CARLO METHODS IN FINANCIAL ENGINEERING* (by P. Glasserman), *Value at Risk: The New Benchmark for Managing Financial Risk* (by Philippe Jorion), and *Numerical Methods in Finance: A MATLAB-Based Introduction* (by Paolo Brandimarte).

Background readings include: *Options, Futures and Other Derivative Securities* by Hull, 3<sup>rd</sup> edition, Prentice Hall, 1997.

### Course Topics:

Part I will describe the applications and theory of discrete-time lattice approach in options pricing. Topics include: implied binomial/trinomial lattice, multinomial-lattice construction, and applications of stochastic volatility modeling and exotic options pricing. Part II will introduce the simulation methodology, techniques, and their applications in asset pricing. Topics include: variance reduction, importance sampling, and applications of pricing American-style options and path-dependent securities. Part III will cover specific risk management applications in energy commodity markets.

Students are asked to form groups of **no more than 4** people for class presentation. Each group chooses a subject of interest and a paper by **9/16/2013** and presents the paper on the subject in class starting 9/23/2013.

### Grading:

No exams. There will be **two interim**-projects related to class lectures and problems arising from the financial industry. Students are required to do a final project on a financial problem in the quantitative portfolio trading, algo trading, and energy market domain or of their own choice, and approved by the instructor. **A proposal for the final project is due on October 7, 2013.** A write-up in Word or Latex and the corresponding workable computer code(s) need to be submitted as both hardcopies and e-mail attachments for the mini-projects and the final project. **Final project report write-up is due on December 11, 2013 and project presentations will be scheduled on 12/11 and 12/12.** Grade will be based on a class presentation (**15%**) interim-projects (**15%+25%**) and the final project (**45%**). **Interim-projects may involve a team of no more than 2 people and the final project team may consist of up to 3 members.**