Queens College, CUNY, Department of Computer Science

Computational Finance

CSCI 365 / 765

Spring 2018

Instructor: Dr. Sateesh Mane

Course Website: `http://venus.cs.qc.cuny.edu/~smane/cs365/`

Classes: Mon & Wed; 3 hr., 3 cr.
3:10 – 4:25 pm, SB A101
5:00 – 6:15 pm, SB B141

Office & Hours: SB A201; Mon & Wed 2:00 – 3:00 pm (approx)

Prerequisites: CSCI 313 and MATH 241; or CSCI 314 and ECON 249 for Finance students.

Textbook: no required text.

Reference texts (optional):

- John Hull, *Options, Futures and Other Derivatives*, 10^{th} ed.
- Daniel. J. Duffy, *Financial Instrument Pricing Using C++*.

Learning Goals:

- The emphasis of the course will be on computation, not abstract mathematics.
- **Prior knowledge of finance is not a prerequisite.**
- **Advanced mathematics such as stochastic calculus is not required.**

Course Description: Valuation of derivatives as a family of algorithmic computations, with analysis of the underlying financial model and hands-on implementation practice. Topics to be covered will include:

- time value of money (interest rates, yield curves)
- arbitrage based pricing and hedging
- risk neutral pricing and risk free portfolio
- options and Black-Scholes-Merton model
- path-dependent and 'exotic' derivatives
- volatility smiles
- **Students will be required to write working programs to implement the above algorithms.**
- **Students will be required to carry out basic mathematical computations in class.**
- **Examples are to compute the value of $x + \frac{1}{2}x^2$ for $x = 0.1$, or $\frac{\ln(y)}{z}$ for $y = 0.9$ and $z = 0.3$.**
- **Students who are unable to employ a calculator or program a spreadsheet to perform the above tasks may be unqualified for this course.**

Grade Policy: The grading policy will consist of:

- Midterm 1, Midterm 2, Final.
- Some exam questions will be mandatory for graduate students and optional for undergraduates.
- Homework is not officially graded. However, there is a strong connection between the homework assignments and the exam questions. Good quality work on homework assignments may be counted for a grade boost.

Exam Dates: There will be two midterms and a final. Dates to be decided.

Academic Policy: Academic dishonesty such as plagiarism or cheating will be dealt with seriously in accord with the University's policy on academic integrity.