Monte Carlo Methods in Financial Mathematics
MAP 6437-4 Spring 2010

Room: 102 LOV
MWF: 1:25 – 2:15 PM

Instructor	Dr. Giray Ökten
Contact information	Office: 116 LOV Phone: 644-8713 email: okten@math.fsu.edu
Office hours	MW: 2:30 – 3:30 PM; or by appointment.
Course Rationale	Monte Carlo simulation is a popular numerical tool in financial engineering, especially in the areas of derivative pricing and risk management. Financial firms typically require their financial engineers to be well versed in Monte Carlo and quasi-Monte Carlo techniques.
Course Objectives	In this course we will learn about the general theory of Monte Carlo methods, covering topics like pseudorandom numbers, generation of random variables, variance reduction techniques, low-discrepancy sequences and quasi-Monte Carlo methods. As we learn the theory we will discuss applications in computational finance. We will learn how to analyze and develop Monte Carlo algorithms for problems in computational finance.
Eligibility & Prerequisites	MAP 5601, competence in a programming language for scientific computing
Suggested Reading - Resources	**"**Monte Carlo Methods in Financial Engineering**"** by Paul Glasserman, Springer, 2004. "Simulation and the Monte Carlo Method", by Reuven Y. Rubinstein, John Wiley & Sons, 1981.
Content	The following is somewhat tentative and subject to minor modifications as we go. Lecture notes will be posted on the Blackboard page. Chapter 1: Introduction and History of Monte Carlo Methods Chapter 2: Pseudorandom Number Generation Chapter 3: Statistical Tests for Randomness Chapter 4. Generation of Random Variables and Stochastic Processes Chapter 5: Quasi-Monte Carlo and hybrid-Monte Carlo Methods Chapter 6: Variance Reduction Techniques in Financial Applications Chapter 7: American options Chapter 8: Estimating Sensitivities
Homework	Homework will be assigned, collected, and graded. You will in general have one week to turn in your assignment. If you are late by one lecture, 10%, otherwise 20% is taken off. I will not accept homeworks late by a week. Homeworks will make 30% of your letter grade.
Tests	There will be two in class tests. Each test will make 20% of your letter grade. The dates of the tests are Feb 24, and April 9.

Term paper — You will write a term paper based on a topic you studied in class. Extensions of work done in class, researching a topic/paper related but not discussed in class, or investigation of an original idea, are all acceptable. The ideal term paper will involve a theoretical as well as a numerical component. The term paper will make 30% of your letter grade. You need to submit an abstract for your term paper on March 19. The due date for the complete term paper is April 23.

Grading scale and points — A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: 0 – 59
I typically use plus or minus grades for borderline cases.

Tests: 40 points
Homework: 30 points
Paper: 30 points

Makeup policy — If you miss a test for an excused absence (emergency, illness), and provide documentation, then the second test grade will be substituted for the missed test grade. Students must bring FSU ID cards to all tests.

Attendance — You should try your best not to even miss one class. If you have to miss a class, let me know, and get the lecture notes. A student absent from class bears the full responsibility for all subject matter and procedural information discussed in class.

Honor code — A copy of the University Academic Honor Code can be found in the current Student Handbook. You are bound by this in all of your academic work. It is based on the premise that each student has the responsibility 1) to uphold the highest standards of academic integrity in the student's own work, 2) to refuse to tolerate violations of academic integrity in the University community, and 3) to foster a high sense of integrity and social responsibility on the part of the University community. You have successfully completed many mathematics courses and know that on a "test" you may not give or receive any help from a person or written material except as specifically designed acceptable. Out of class you are encouraged to work together on assignments but plagiarizing of the work of others or study manuals is academically dishonest.

American disabilities act — Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); 2) bring a letter to the instructor from SDRC indicating you need academic accommodations. This should be done within the first week of class.