

## CSC 521: Monte Carlo Algorithms

Syllabus for Spring Quarter, 2017

**Instructor:** Yiou Li

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**Class Hours:** Monday, 5:45 PM ~ 9:00 PM

**Room:** Lewis Center Room 1005

**Office Hours:** Monday, 4:00 PM ~ 5:30 PM, or by appointment

### Supplementary Textbook:

Simulation, Sheldon M. Ross, Academic Press.

Monte Carlo Methods in Financial Engineering, Paul Glasserman, Springer.

I will use my own slides, but the above book will help you as a supplementary study material.

**Course Description:** Monte Carlo methods are computational algorithms to obtain numerical results based on repeated random sampling. This course will introduce the students to basic concepts of Monte Carlo methods/simulations, with focus on applications in financial risk management. Monte Carlo and Quasi Monte Carlo techniques are computational sampling methods which track the behavior of the underlying securities in an option or portfolio and determine the derivative's value by taking the expected value of the discounted payoffs at maturity.

### Course Plan (tentative):

Introduction to Monte Carlo method, general asset sample path, option pricing, enhancing efficiency.

### Exams:

Tests: We will have two **in class one and a half hours tests** tentatively scheduled for **Monday, April 17, 2017** and **Monday, May 15, 2017**. Both of the tests will be taken in the computer lab. No make up exam will be given for unexcused absences. Only 90% of the make-up score will count for the final grade if you have an excused absence. The tests will be closed notes and books. You are allowed to bring **one** sheet of double-sided, letter-sized paper with anything written on them that you think might help.

Final: The final exam will be comprehensive and consist of in-class final and take-home final. The take-home final will be assigned one week before the in-class final, and will be collected on day of in-class final. The in-class final will be at classroom, scheduled for **6:00 PM- 8:15 PM, Monday, June 5, 2017**. The final will be closed books and notes. You are allowed to bring **one** sheet of double-sided, letter-sized paper with anything written on them that you think might help.

### Homework:

There will be homework each week (1-2 problems). The homework will be assigned one week before submission, and it will be collected in class the following week. **Late homework will NOT be accepted.** Solutions should be complete in order to get full credit. The submitted solutions should be **your solutions and must not be copied from anyone else.** Be sure to write your full name and class number on the first page. Submitted **assignments MUST be stapled.**

**Project:**

You are required to do a project. You can form a group with no more than 3 people or work individually. Specifically,

- I will assign a practical problem on **4/24/2017**.
- **In-Class Students:** Assume this is a project given by your client, and you should explain to the audiences the motivation of the project, the method, the tool you use and the conclusion you would like to show. Prepare a 15-minute (+5 minute question & answer) oral presentation with handout reports. The oral presentations will be scheduled on **5/22/2017**.

**Online Students:** Assume this is a project given by your client. Submit a complete written report explaining the motivation of the project, the method, the tool you use and the conclusion you would like to show. The written report will be due on **5/22/2017**.

**Gradings:**

Homework - 20%, Tests - 40%, Project - 10%, Final Exam - 30%.

A	90%-100%
A-	85%-89%
B+	80%-84%
B	75%-79%
B-	70%-74%
C+	65%-69%
C	60%-64%
C-	55%-59%
D	45%-54%
F	<44%

**ACADEMIC INTEGRITY:**

DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students' own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university's academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution.

Please refer to your Student Handbook or visit:

<http://studentaffairs.depaul.edu/homehandbook.html> for further details.

**CENTER FOR STUDENTS WITH DISABILITIES (CSD)**

Students who feel they may need an accommodation based on the impact of a disability should contact me privately to discuss their specific needs. All discussion will remain confidential. To ensure that you receive the most reasonable accommodation based on your needs, contact me as early as possible in the quarter (preferably within the first week or two of the course) and be sure to contact the following office for support and additional services:

Center for Students with Disabilities (CSD) in Lincoln Park Campus Student Center Suite 370  
773.325.1677

Or

Center for Students with Disabilities (CSD) in the Loop Campus Lewis Center 1420 773.362.8002

**Feedback:**

I will be more than happy to discuss with you any questions regarding the class. If you have any questions, recommendations, please feel free to visit my office hours or arrange an appointment.