

## **MATH 666: Simulation for Finance** *Spring 2019 Graduate Course Syllabus*

**NJIT Academic Integrity Code:** All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

### **COURSE INFORMATION**

**Course Description:** Covers the use of Monte Carlo stochastic simulation for finance applications. Topics include generation of various random variables and stochastic processes (e.g., point processes, Brownian motion, diffusions), simulation methods for estimating quantities of interest (e.g., option prices, probabilities, expected values, quantiles), input modeling, and variance-reduction techniques. Students will write computer programs in C++. Students cannot receive credit for both **CS 661** and **CS/MATH 666**.

**Number of Credits:** 3

**Prerequisites:** Prior coursework in probability/stochastic processes, linear algebra, and differential equations; ability to write computer programs.

#### Course-Section and Instructors

Course-Section	Instructor
Math 666-102	Professor D. Horntrop

**Office Hours for All Math Instructors:** [Spring 2019 Office Hours and Emails](#)

#### Required Textbooks:

<b>Title</b>	<i>Stochastic Calculus for Finance II: Continuous Time Models</i>
<b>Author</b>	Steven Shreve
<b>Edition</b>	2004 Ed.
<b>Publisher</b>	Springer
<b>ISBN #</b>	ISBN
<b>References</b>	P. Jackel, <i>Monte Carlo Methods in Finance</i> , Wiley, 2002. D. McLeish, <i>Monte Carlo Simulation and Finance</i> , Wiley, 2005.

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is **Monday, April 8, 2019**. It will be strictly enforced.

## COURSE TOPICS

Major topics for this course include:

- Simulation of random variables
- Simulation of stochastic processes
- Discretization of stochastic differential equations
- Variance reduction techniques
- Introduction to Quasi Monte Carlo

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## POLICIES

**DMS Course Policies:** All DMS students must familiarize themselves with, and adhere to, the **Department of Mathematical Sciences Course Policies**, in addition to official **university-wide policies**. DMS takes these policies very seriously and enforces them strictly.

**Grading Policy:** The final grade in this course will be determined as follows:

Homework, Quizzes, and Projects	30%
Midterm Exam	35%
Final Exam	35%

**Attendance Policy:** Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the **Math Department's Attendance Policy**. This policy will be strictly enforced. Attendance at and participation in all lectures is expected. If you know in advance that you will be absent from class for a legitimate reason, please tell me prior to your absence so that appropriate arrangements (if any) can be made. Tardiness to class is very disruptive of the classroom environment and should be avoided.

**Homework Policy:** Homework assignments/projects will be given frequently. Each assignment must be turned in at the *beginning* of class. Late assignments are *NOT* accepted. Early assignments are always welcomed and are appropriate for preplanned absences from class. As a standing assignment, you should read the relevant sections of the textbook prior to lecture.

**Quiz Policy:** From time to time, quizzes may be given. Make up quizzes are *NOT* given.

**Exam Policy:** There will be a midterm examination and a final examination. The midterm examination will occur before the "drop" deadline. The final examination date, time, and location will be determined by the university.

Midterm Exam	TBA
Final Exam Period	May 10 - 16, 2019

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the **Math Department's Examination Policy**. This policy will be strictly enforced.

**Makeup Exam Policy:** To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- [http://math.njit.edu/students/policies\\_exam.php](http://math.njit.edu/students/policies_exam.php)

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times.

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## ADDITIONAL RESOURCES

**Accommodation of Disabilities:** Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at [973-596-5417](tel:973-596-5417) or via email at [lyles@njit.edu](mailto:lyles@njit.edu). The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

- <http://www5.njit.edu/studentsuccess/disability-support-services/>

**Important Dates** (See: [Spring 2019 Academic Calendar](#), Registrar)

Date	Day	Event
January 22, 2019	T	First Day of Classes
February 1, 2019	F	Last Day to Add/Drop Classes
March 17 - 24, 2019	Su - Su	Spring Recess - No Classes, NJIT Open
April 8, 2019	M	Last Day to Withdraw
April 19, 2019	F	Good Friday - No Classes, NJIT Closed
May 7, 2019	T	Friday Classes Meet/ Last Day of Classes
May 8 & 9, 2019	W & R	Reading Days
May 10 - 16, 2019	F - R	Final Exam Period

*Updated by Professor D. Horntrop - 1/21/2019  
Department of Mathematical Sciences Course Syllabus, Spring 2019*

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