

Fall 2024

## **MATH 448-101: Stochastic Simulation**

D. Horntrop

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## MATH 448: Stochastic Simulation Fall 2024 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:** An introduction in the use of computer simulation to study stochastic models. Topics include the generation of samples of continuous and discrete random variables and processes with applications to stochastic models, statistical analysis of the results, and variance reduction techniques.

**Number of Credits:** 3

**Prerequisites:** Introductory probability (**MATH 244** or **MATH 333**), numerical methods (**MATH 340**), and the ability to program a computer in a language such as C.

**Course-Section and Instructors:**

Course-Section	Instructor
Math 448-001	Professor D. Horntrop

**Office Hours for All Math Instructors:** [Fall 2024 Office Hours and Emails](#)

**Required Textbook:**

Title	<i>Simulation</i>
Author	Ross
Edition	6th
Publisher	Academic Press
ISBN #	9780323857930

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is **Monday, November 11, 2024**. It will be strictly enforced.

## 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/Projects**	30%
Midterm Exam	35%
Final Exam	35%

**\*\*I will drop your one lowest homework or quiz score from throughout the semester.**

**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 to the classroom environment and should be avoided.

**Homework:** Homework assignments/projects will be given frequently; many will involve writing computer programs in a computer language such as C. 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 pre planned absences from class. Even though every problem in an assignment may not be graded, you are expected to attempt all of them. As a standing assignment, you should read the relevant sections of the textbook prior to lecture.

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

**Exams:** 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	December 15 - December 21, 2024

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:** There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

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

## COURSE TOPICS

Major topics for this course include:

- Review of basic probability, generation of pseudorandom numbers, Monte Carlo integration
- Simulation of random samples from discrete distributions and continuous distributions
- Discrete event simulation for stochastic models of queueing systems and financial problems
- Analysis, verification, and validation of simulation results, variance reduction techniques

## ADDITIONAL RESOURCES

**Math Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G11 (See: [Fall 2024 Hours](#))

**Further Assistance:** For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for [Instructor Office Hours and Emails](#).

**Accommodation of Disabilities:** The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at [oars@njit.edu](mailto:oars@njit.edu), or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

<https://www.njit.edu/accessibility/>

**Important Dates** (See: [Fall 2024 Academic Calendar, Registrar](#))

Date	Day	Event
September 2, 2024	Monday	Labor Day
September 3, 2024	Tuesday	First Day of Classes
September 9, 2024	Monday	Last Day to Add/Drop Classes
November 11, 2024	Monday	Last Day to Withdraw
November 26, 2024	Tuesday	Thursday Classes Meet
November 27, 2024	Wednesday	Friday Classes Meet
November 28 to December 1, 2024	Thursday and Sunday	Thanksgiving Recess - Closed
December 11, 2024	Wednesday	Last Day of Classes
December 12, 2024	Thursday	Reading Day 1

December 13, 2024	Friday	Reading Day 2
December 15 to December 21, 2024	Sunday to Saturday	Final Exam Period

*Updated by Professor D. Horntrop - 8/2024  
Department of Mathematical Sciences Course Syllabus, Fall 2024*