

ISYE 2027: PROBABILITY WITH APPLICATIONS

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Prerequisites: MATH 1552 and MATH 1553 or (MATH 15X2 and MATH 1522, minimum grade is C.

Prerequisite with concurrency: MATH 2551 or MATH 2500 *

* The students are advised to take 2500 before 2027 because it is likely that the multivariate calculus will appear in ISYE 2027 before MATH 2500.

Description: Topics include outcomes, events, and probability; conditional probability and independence; discrete and continuous random variables from engineering; expectation; joint, marginal, and conditional distributions; the law of large numbers and the central limit theorem.

Textbook: Dekking, F.M., C. Kraaikamp, H.P. Lopuhaa, and L.E. Meester, *A Modern Introduction to Probability and Statistics: Understanding Why and How*, Springer, London, 2005.

An electronic version of the textbook is available for free at library.gatech.edu.

Course Goals: The objective of this course is to learn the basic tools used in developing and analyzing probabilistic models.

Learning Outcomes: At the end of this course, students will be able to:

1. Understand how randomness affects system behavior and performance.
2. Grasp which distributions might be appropriate in modeling a particular situation.
3. Understand measures of a distribution's location and spread.
4. Compute probabilities and moments such as the expected value and variance of random variables and functions of random variables.
5. Understand independence and dependence.
6. Be able to use the central limit theorem to approximate probabilities.