

## SYLLABUS 26:960:575 INTRODUCTIONS TO PROBABILITY (Every fall)

**Douglas H. Jones, PhD**

This course serves to introduce the mathematics of probability theory and explores its diverse applications through numerous interesting and motivational examples. It provides a thorough introduction to the subject for professionals and advanced students taking their first course in probability. It is assumed students have had a one-year course in calculus. Some applications using R (a programming language) will be explored to support understanding of the concepts. The course lays the foundation for more advanced courses in applied statistics, operations management, and management information systems.

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**OFFICE:** 1 Washington Park-RM1058

**OFFICE HOURS:** Tuesday

**CLASS:** M 1:00-3:50 PM [1WP-412](#)

### Course textbook & support:

*Introduction to Probability* by George Roussas. Academic Press (Elsevier), 2006, ISBN 978-0-12-088595-4 **Required**

*R (Free Software: Available at <http://www.r-project.org/>)* **Required**

*R Reference Card* by Tom Short, <http://cran.r-project.org/doc/contrib/Short-refcard.pdf> **Required**

*An Introduction to R* by W. N. Venables, D. M. Smith and the R Core Development Team, <http://cran.r-project.org/doc/manuals/R-intro.pdf> **Required**

*Bare-Bones R* by T.P. Hogan. Sage, 2010, ISBN 978-1-4129-8041-8 Recommended

Handouts and Notes will be available on BlackBoard.

You must log into your Blackboard account at <https://blackboard.newark.rutgers.edu/> and become familiar with **Assignments Uploads**. You will submit your homework assignments using it. You will need to use your Rutgers NETID to log-in. If you do not see our course listed, then you must get it fixed by contacting either Dean Filipe or [help@newark.rutgers.edu](mailto:help@newark.rutgers.edu).

Grades based on Assignments (1/3), Mid-Term (1/3), Final (1/3). No partial credit for late assignments.

### Schedule and Topics

Class	Topic
1	Chapter 1. Some Motivating Examples
2	Chapter 2. Some Fundamental Concepts
3	Chapter 3. The Concept of Probability and Basic Results
4	Chapter 4. Conditional Probability and Independence
5	Chapter 5. Numerical Characteristics of a Random Variable
6	Chapter 6. Some Special Distributions
7	Mid-Term (Through Chapter 6)
8	Chapter 7. Joint Probability Density Function of Two Random Variables and Related Quantities
9	Chapter 8. Joint Moment Generating Function, Covariance and Correlation Coefficient of Two Random Variables
10	Chapter 9. Some Generalizations to $k$ Random Variables, and Three Multivariate Distributions
11	Chapter 10. Independence of Random Variables and Some Applications
12	Chapter 11. Transformation of Random Variables
13	Chapter 12. Two Modes of Convergence, the Weak Law of Large Numbers, the Central Limit Theorem, and Further Results
14	Final (Comprehensive)