

CS 203B: Mathematics for Computer Science III

- **Description:** [Probability theory](#) is the study of probability and random process. Probability theory aims to define a rigorous mathematical framework to study these questions. The applications cover almost all aspects of computer science. Most notably, in recent times, probability theory has attracted lot more interest because of its use in machine learning (through statistics and even directly) and quantum computing (through postulates of quantum mechanics).
- **Prerequisites:** None.
- **Course Contents:** We will start by covering the mathematical framework and basics of probability theory. This will include conditional probability and random variables. We will cover the idea of independence and concentration inequalities in the mid part of this course. They will be explained with examples from the world of computer science. The final part, if time permits, will be statistics, Markov chains and probabilistic methods.
- **Time and venue:** 8:00-9:00 AM MWF (RM 101)
- **Course webpage:** https://www.cse.iitk.ac.in/users/rmittal/course_s23.php
- **Course Policies:** No attendance, Honesty Practices and Withdrawal – in accordance with the Institute, Department and DOAA norms (please see course website).
- **Evaluation Components:** All of these need to be submitted on Hello/mooKIT.
 - **Assignments (2):** 20%
 - **Quizzes (2):** 40%
 - **Final:** 40%
- **Books & References:** No specific textbook. Relevant references and texts (if needed) will be posted on the course homepage from time to time. Some of the following books may be useful.
 - Elementary probability, David Stirzaker.
 - A first course in probability, Sheldon Ross.
 - An introduction to probability theory and its applications, William Feller.
 - Probability and computing, Mitzenmacher and Upfal