

Applied Probability Theory: ACMS 60850
Haggar Hall 117: Tues & Thurs 11:00AM - 12:15PM
Andrew Sommesse (Instructor)

This course will give a solid introduction to Probability. The requirements are a three semesters of calculus (which includes power series, some linear algebra, complex numbers and fourier transforms), and a solid undergraduate probability class. Topics covered will include:

1. Basic setup of probability theory (including sample spaces, conditional probability, independence). Random variables (including the elements of measure and integration theory).
2. Discrete and continuous random variables.
3. Laws of Large Numbers.
4. Central Limit Theorems.
5. Random walks; stopping times; and recurrence theory.
6. Martingales and optional stopping theorems.
7. Markov chains (embedding, birth and death processes, Poisson processes)
8. Various stochastic processes, including Brownian motion, queues, and applications.
9. The rudiments of stochastic integration (including Ito's formula and the Black-Scholes differential equation).

Grimmett-Strizaker [2] will be used as the text. Williams [4] is an excellent text for the first part of the course. A good elementary book is [3]. Feller [1] is a classic.

References

- [1] W. Feller, An Introduction to Probability Theory and Its Applications, Volume 1, Wiley.
- [2] G. Grimmett and D. Strizaker, Probability and random processes, Oxford, 3rd edition, 2001.
- [3] S. Ross, A First Course on Probability, any edition, Prentice Hall (2002).
- [4] D. Williams, Probability and Martingales, Cambridge, 1991.