

Statistics 407

Applied Probability

Markov chains. Limit distributions for ergodic and absorbing chains. Classification of states, irreducibility. The Poisson process and its generalizations. Continuous-time Markov chains. Brownian motion and stationary processes. Renewal theory. Introduction to basic simulation methods.

Course Hours: H(3-0)

Prerequisite(s): [Mathematics 321](#).

Suggested Text: "Introduction to Probability Models", eighth edition, by S. Ross, Academic Press.

The topics below correspond to Sections 2.8, 4.1-4.6, 5.3-5.4, 6.1-6.5, 6.8, 7.1-7.3, 10.1-10.4, 11.2-11.5 in the text by Ross. Additional sections may be covered if time permits (e.g., 4.7-4.7).

Syllabus

Topics

Number of hours

Markov Chains. Classification of states, irreducibility, limit theorems.

5

Absorbing chains. The number of steps to absorption, its mean and variance. The probability of absorption in various states. Generating function techniques on vectors and matrices.

9

Renewal theory. Ordinary and alternating renewal processes. Laplace transform techniques.

4

Poisson processes and generalizations, Continuous-time Markov chains.

10

Brownian motion and stationary processes. Simulation methods.

8

TOTAL HOURS

36

07:07:01

DS:jml

Calendar change H(3-1T) to H(3-0) Fall 2009