Advanced Stochastic Modeling and Simulation (SE/ME714)
Spring 2011

INSTRUCTOR

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TOPICS

1. **Stochastic Processes**
   (a) Review of probability theory
   (b) Poisson process
   (c) Renewal theory
   (d) Discrete & Continuous-time Markov chains
   (e) Martingales
2. **Simulation**
   (a) Simulating stochastic models
   (b) Statistical analysis of simulated data
   (c) Variance reduction techniques

TEXTBOOKS

- *Stochastic Processes, 2nd Edition*, Sheldon Ross, Wiley, 1996.
- *Simulation, 3rd Edition*, Sheldon Ross, Academic Press, 2002.

GRADING

Homework: 30%, Exams (and/or projects) 60%, class participation 10%.

OFFICE HOURS

Thursdays 2-3 pm.

REFERENCES

- **Stochastic Processes**

  1. *Stochastic Modeling and the Theory of Queues*, Ronald W. Wolff, Prentice Hall, 1989.
  2. *Discrete Stochastic Processes*, Robert G. Gallager, Kluwer Academic Publishers, 1996.
  3. *Markov Chains: Gibbs Fields, Monte Carlo Simulation, and Queues*, Pierre Bremaud, Springer-Verlag, 1999.
  4. *A First Course in Stochastic Processes*, Samuel Karlin and Howard M. Taylor, Academic Press, 1975.
  5. *A Second Course in Stochastic Processes*, Samuel Karlin and Howard M. Taylor, Academic Press, 1981.

- **Simulation**

  1. *Stochastic Simulation: Algorithms and Analysis*, Soren Asmussen, Peter W. Glynn, Springer, 2007.
  2. *Monte Carlo methods in Financial Engineering*, Paul Glasserman, Springer, 2004.
  3. *A Guide to Simulation*, Paul Bratley, Bennett L. Fox, Linus E. Schrage, 2nd Edition, Springer-Verlag, 1987.
  4. *Stochastic simulation*, Brian D. Ripley, Wiley, 1987.