

MATH 6397
Stochastic Processes
Spring 2008

- Class:** TuTh 10:00am-11:30am, PGH 345
- Instructor:** Bernhard Bodmann, bgb@math.uh.edu
- Office:** Tu 2:30-3:20pm, We 2-3pm, PGH 636
- Objectives:** This course covers a wide range of topics in stochastic processes and applied probability. The emphasis will be on understanding the main ideas with a view to applications. Some group projects involving simulations will be given, but no computer programming experience will be assumed.
- (1) Continuous time Markov chains: birth-death processes; Poisson processes; birth and death with absorbing states. Applications.
 - (2) Martingales and martingale convergence theorems. Stopping times. Brownian motion, properties of Brownian paths and applications.
 - (3) Renewal processes and the renewal equation. Applications.
 - (3) Stochastic differential equations and applications.
 - (4) Diffusion processes, backward and forward equations, diffusion models with killing, semigroup formulation of continuous time Markov processes.
 - (5) Stationary processes, ergodic theorems, prediction of mean square error and covariance, applications of ergodic theory.
 - (6) Gibbs Fields and Monte Carlo simulations.
- Recommended Texts:**
- Textbook: A First Course in Stochastic Processes, Karlin and Taylor, Second Edition, Academic Press.
 - Reference Book: A Second Course in Stochastic Processes, Karlin and Taylor, 1981, Academic Press.
- Assessment:** There will be one midterm (worth 30 points), a final exam (50 points) as well as 2 take-home problem sheets (20 points in total). A random subset of the problems on the take-home problem sheets will be marked.
- Exam Dates:** Midterm on Tu, March 11, 5:30-7pm, PGH 646; Final exam on Th, April 24, 5:30-8pm; PGH 646