Problems in Applied Probability

For many real-world processes, like financial market prices, molecular motion and weather patterns, seemingly random fluctuations are intrinsic to their observed behaviour. Understanding the uncertainty in such systems requires a knowledge of the probabilities by which they are ruled, and the statistics by which we can measure them. This plan for this course is to introduce the basic mathematical tools for quantifying the probabilities and statistics of random systems, and to apply these ideas to models with uncertainty. Computational approaches to random simulation and parameter estimation will play an prominent role in the lectures and assignments.

The first part of the term will be an introduction to the mathematics of probability, and the statistics of randomness. The second part of the term will focus on specific problems, and their analysis using probabilistic and statistical methodologies. Assignments will be problem-based, and also require some use of the Matlab computing environment. Possible special topics are: queueing theory, stochastic differential equations, and data assimilation.

Professor: David Muraki, office K10538, phone 604.291.4814

Lectures: monday 3:30-5:30pm in AQ4150 & wednesday 4:30-5:30pm in AQ4130

Office Hours: tuesday 3:45-6:00pm

Textbook: *Introduction to Probability Models*
Sheldon Ross, Academic Press (8^{th} edition, 2003)

Webpage: visit *www.math.sfu.ca/∼muraki* & follow class link
updated weekly: assignments, computing demos & announcements
link to online notes from main library

E-Mail: channel for class communications
webct-based e-mail: class e-mail & discussion group
muraki@fraser.sfu.ca: private class-related e-mail correspondence
muraki@math.sfu.ca: urgent correspondence only please

Computing: Maple & Matlab are the course computing environments
lecture demos & lab scripts will be posted on class webpage
Maple & Matlab are accessible from the Assignment Lab in AQ3144

Responsibilities: weekly written reports, due wednesday in math assignment box #16 ($\approx 45\%$)
midterm ($\approx 20\%$, late-october) & final exam ($\approx 35\%$, 06 december)