Statistics 6540:
Applied Stochastic Processes
3 semester hour course

Prerequisite: 610 or 6301 or equivalent or permission of the instructor

Exclusions: Stat 632


Rationale for the change to a 3-hour semester course from a 3-hour quarter course (Stat 632):

The semester version of the course (Stat 6540) will be a required course for one track of the Ph.D. program in Biostatistics. The rationale for converting Stat 632 into a 3-hour semester course is that we will need to expand coverage of existing course material as well as add new material related to topics that are of important to the Biostatistics Ph.D. students. This will not be possible in a 2 credit hour semester course. Currently, items 1-4 below are covered in depth in the quarter version of the course, while items 5 and 6 are only briefly discussed. Converting to a 3-hour semester course will allow for expanded coverage of items 5 and 6 (discrete state space continuous time Markov chains), which could include applications to coalescent theory models. The additional time will also allow for coverage of computer simulation of stochastic processes, which is very useful for those working with modern applied probability models.

COURSE DESCRIPTION (max 250 characters)

An introduction to some of the most commonly encountered stochastic processes. Goals include understanding basic theory as well as applications. Students should be familiar with basic probability, including conditional probability and expectation.

TOPIC LIST (maximum of 15 topics)

1. Conditional probability and expectation
2. Discrete time Markov chains
3. Branching processes
4. Poisson processes
5. Finite state / continuous time Markov chains
6. Birth and death processes
7. Reversible Markov chains
8. Gaussian processes
9. Computer simulation of stochastic processes