Syllabus for Stat515 (Spring 2015)
Stochastic Processes and Monte Carlo Methods

Instructor: Murali Haran
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Office Hours: Monday: 3:30-4:30, Tuesday: 2:30-3:30

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Office Hours: Tuesdays 9:30-10:30am, Thursdays: 10:00am-11:00am.

Class Times: MWF 2:30-3:20 in 009 Life Sciences

Textbook: *Introduction to Probability Models*, Sheldon Ross, **8th/9th/10th/11th** Edition, Academic Press. Plus notes for the simulation part of the course. Suggested reference for Monte Carlo: *Introducing Monte Carlo Methods with R*, Robert, Christian P. and Casella, George (2010), Springer.

Targeted Coverage:

- Review of conditional probability and expectations (Chapter 3)
- Markov chains (Chapter 4)
- Poisson processes (Chapter 5)
- Continuous time Markov chains (Chapter 6)
- Brownian motion, martingale basics (Chapter 10/other)
- Classical Monte Carlo: rejection, importance sampling
- Markov chain Monte Carlo: Gibbs, Metropolis-Hastings algorithms

Course Requirements:

- Weekly homework (30%). You may discuss them but they must be written up independently.
- Midterm exam in early March (25%).

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- Final exam: in class (30%) + take home (15%) (total: 45%)

Course Website: `http://www.stat.psu.edu/~mharan/515/515.html`

Academic Integrity: All Penn State and Eberly College of Science policies regarding academic integrity apply to this course. Please see `http://www.science.psu.edu/academic/Integrity/index.html`.

Policy on Late Homework:
Unless you inform me ahead of time (*at least 1 day in advance*), you will lose 50% of the grade for late homework turned in within 24 hours of the due date. You will receive no credit for homework turned in after that.

Important: Check the website for all announcements regularly.

Computing:
All *graduate students in statistics* are required to use the statistical computing language `R` through most of the latter half of the course. If you are not a statistics graduate student, you are still encouraged to write programs in `R` since it is widely used. You are free to use any other language you like but please note that I may not be able to help you with your computing if the language is unfamiliar to me.

LaTeX:
All *graduate students in statistics* are required to use `LaTeX` to write up their computing assignments in the latter half of the course. All other students are expected to hand in typed computing assignments even if they choose not to use `LaTeX`.