THE GEORGE WASHINGTON UNIVERSITY
Department of Statistics

Reliability & Risk Analysis
Stat 8289 - Fall 2011

SYLLABUS

Instructor: Dr. Nozer Singpurwalla
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Office Hours: By appointment only.
Lecture: Tuesdays 6:00-8:00pm, Seminar Room 2140 Penn. Ave.

Course Description: This being a seminar style course on a specialized topic, the course syllabus will be dynamic and evolving, depending on the interests and the background of the students. However, the material covered will be abstracted from several chapters and sections of “Reliability and Risk: A Bayesian Perspective” by N.D. Singpurwalla.

From Chapter 2, the material covered will be on the axioms of probability, utility and decision making, Bayes law, the notion of a probability model and the likelihood, Bayes factors and the interpretation of subjective probability.

From Chapter 4, the material covered will include the notion of failure rate, mixtures of failure rates, the retrospective failure rate, failure models for multiple components, causal and cascading failures, and failure models indexed by multiple scales.

From Chapter 5, the material covered will be inference under failure models using data, expert testimonies, and subject matter knowledge. Life testing and failure data analysis.
From Chapter 10, the material covered will be on system reliability and survivability and Monte Carlo Methods in reliability analysis.

**Prerequisites:** None: Mathematical Maturity.

**Learning Outcomes:**
- Upon completion of this course the student should have a deeper appreciation of probability and statistics as applied to a class of problems in biostatistical and engineering issues and this in turn will enhance his/her maturity in probabilistic thinking. Students in biostatistics should get a deeper understanding of the basic theory that drives their techniques.
- On an applied front, the student should also be able to function on addressing practical problems faced in the assurance sciences, risk analysis, and the actuarial sciences as done in industry, defense, regulatory agencies in power generation, food and drugs, national security, and transportation.

**Textbook:** *Reliability and Risk – A Bayesian Perspective* by Nozer D. Singpurwalla, Wiley 2006.

**Grading Policy:** Your final grade will be determined by the following weighted average:
- Class Discussion 25%
- Homework 15%
- Midterm 25% (October 19, 2011)
- Final 35% (December 7, 2011)