CEE 460

Risk Analysis

Spring, 3:00-4:20pm MW

Instructor: Professor Ning Lin, E-Quad E328, nlin@princeton.edu

Texts:

Alfredo H-S. Ang & Wilson H. Tang, *Probability Concepts in Engineering Planning and Design: Volume I,* 2006 (second edition)

Stuart Coles, *An Introduction to Statistical Modeling of Extreme Values*, 2001

Alfredo H-S. Ang & Wilson H. Tang, *Probability Concepts in Engineering Planning and Design: Volume II,* 1984

Prerequisites: Basic probability and statistics course (ORF 245)

Grading:

Problem Sets 30%
Midterm Exam 30%
Project 30%
Attendance and participation 10%

Syllabus

Lectures:

- Roles of Probability and Statistics in Science and Engineering (Uncertainties)
- Fundamentals of Probability Models (Set Theory)
- Analytical Probability Models (Distributions)
- Functions of Random Variables (Transformation, Central Limit Theory, Extreme Value Theory)
- Numerical Methods (Monte Carlo Simulation)
- Review on Classic Statistics
- Introduction to Bayesian Statistics
- Hazard Cases: Hurricanes, Climate Change, Earthquakes
- Cost-Benefit Analysis
- Decision Theory and Risk Management
- Student Project Presentations

Labs:

- Distributions and MC Simulation
- Basic Statistics
- Generalized linear regression models
- Extreme Value Analysis
- Introduction to the U.S. HAZUS model