

## MATH 3313 (Introduction to Probability)

<b>Semester</b>	Fall 2012
<b>Taught by</b>	Professor Andrzej Korzeniowski, Math Department, UTA
<b>Textbook</b>	Probability & Statistical Inference, Hogg & Tanis, 8/E/2010, Prentice Hall
<b>Class Time</b>	Tue & Thu 2:00 - 3:20 PM, 107 PKH
<b>Office hours</b>	Tue & Thu 1:15 - 2:00 PM, 418 PKH
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### • COURSE OBJECTIVE

Introduce a graduate student to fundamental concepts of Probability – a basis for further studies in Random Processes or Statistics. It covers phenomena whose outcome is left to chance. Applications play a crucial role in solving real world problems in many areas of science, engineering and business, where predictions of random outcomes are desired.

**Follow-up class:** Stochastic Models and Simulation, MATH 4311, Spring 2013.  
This class is a part of MATH 3313-4311 sequence for Statistics, Industrial Math Options.

### • COURSE OUTLINE

1. Sample Spaces
  - Multiplication Principle, Permutations, Combinations
2. Probability
  - Axioms, Properties, Conditional Probability
  - Events: Mutually Exclusive, Independent
  - Total Probability Rule & Bayes' Formula
3. Random Variables
  - Discrete and Continuous Type
4. Expected Value
  - Mean, Variance, Standard Deviation
  - Chebyshev's Inequality
  - Moment Generating Functions
5. Discrete Distributions
  - Uniform, Bernoulli, Binomial, Multinomial
  - Hypergeometric, Negative Binomial, Poisson
6. Continuous Distributions
  - Uniform, Exponential, Normal, Gamma, Beta, Chi-Square
7. Bivariate Distributions
  - Joint, Marginal and Conditional Distributions
  - Covariance & Correlation Coefficient
  - Conditional Mean and Variance
  - Bivariate Normal Distribution
8. Functions of Random Variables
  - Distribution and Transformation Method
  - Generating Function Techniques
  - Law of Large Numbers and Central Limit Theorem

### • GRADING

Course grade will be based on 3 tests (70%) and the final exam (30%).