INTRODUCTION TO PROBABILITY & STATISTICS I
MATH 4740/8746

Course Description:
A mathematical introduction to probability theory including the properties of probability, probability distributions, expected values and moments, specific discrete and continuous distributions, and transformations of random variables. 3 credits

Prerequisites:
MATH 1970 and either MATH 2230 or MATH 2030

Overview of Content and Purpose of the Course:
The student should gain a solid foundation in elementary probability theory and should be ready to apply it to a statistical inference in MATH 4750/8756.

Major Topics:

1. Probability Theorem
   a) Properties of probability
   b) Conditional probability
   c) Independence
   d) Bayes theorem

2. Discrete Distributions
   a) Probability distribution functions and cumulative distribution functions
   b) Mean and variance; moment-generating functions
   c) Marginal and conditional probability distributions
   d) Some specific discrete distributions

3. Continuous Distributions
   a) Probability density functions and cumulative distribution functions
   b) Mean and variance; moment generating functions
   c) Marginal and conditional probability distributions
   d) Some specific continuous distributions

4. Functions of Random Variables
   a) Distribution function technique
   b) Transformation technique
   c) Moment-generating function technique
**Methods:**

The class will be presented by lecture; class discussion and questions; and problem assignments, possibly including the use of statistical software packages.

**Textbook:**


January 2016