CLASS ANNOUNCEMENT FOR FALL SEMESTER 2025: PROBABILITY THEORY I, MATH 710/STAT 810

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Advertisement: In Fall 2025 I will offer the class Probability Theory I (MATH/STAT 710). This class may be useful because of the following reasons:

- The theory of probability is very useful in Mathematics! It plays an important role in both pure and applied mathematics. More precisely, Probability theory is useful in Combinatorics, Stochastic Analysis, Functional Analysis, Mathematical Modeling, Theory of Machine Learning, Classical and Quantum Information Theory. Outside of Mathematics, Probability theory is important in Statistics, Physics (such as in Statistical Physics), Data Science, Computer Science (for example in probabilistic algorithms), Game Theory, and Economics/Finance.
- Measure theory will not be a prerequisite for the class, so first year graduate students are encouraged to take the class. The class will be helpful to them since we will develop the main results of measure theory which is the topic of MATH 704.
- I will offer a continuation of the class in Spring 2026 as MATH 711/STAT 811. Thus, PhD students may choose to use this sequence as one of the three sequences of their comprehensive exam.

Textbook: Achim Klenke, Probability Theory, A comprehensive course, Third Edition. Springer, Universitext, 2020.

Instructional Objectives:
In MATH 710/STAT 810 we will study the following topics:

- Basic Measure Theory.
- Independence.
- Laws of Large Numbers.
- Conditional Expectations.
- Martingales.

In MATH 711/STAT 811 we will study the following topics:

- Convergence of measures.
- Central Limit Theorem.
- Markov Chains.
- Brownian Motion.
- Itô Integral.

Prerequisites: The class will be appropriate for all graduate students.

Grading: The grade will be based on homework.