This course aims at giving a rigorous introduction to the basic ideas and techniques of Probability theory, based on measure theory. We begin with a discussion of basic properties of probability spaces, and the mathematical description of a stochastic experiment. We will consider various examples of distributions on the positive integers, as well as distributions on the real numbers. We then study moments, mean and standard deviation of a random variable, with emphasis on computations for specific examples. We also consider multi-dimensional observations, joint and marginal distributions. A particularly important topic that we will study in detail is the characteristic function of a random variable, and applications to the notion of weak convergence of probability measures. Along the way we encounter two theorems that are fundamental to the subject: the Law of Large Numbers and the Central Limit Theorem.


**Webpage:** The webpage for the course can be found at the following address: www.imada.sdu.dk/~musat/MM506.

Lecture notes, as well as weekly notes containing homework assignments will be posted there.

**Lectures** meet on Tuesdays 8-10, Room U48 and Thursdays 12-14, Room U2, with Magdalena Musat (musat@imada.sdu.dk).

**Exercise Sessions** meet on Mondays 10-12, Room U49d and Fridays 8-10, Room U17, with Søren S. Thorsen (sthorsen@imada.sdu.dk)

**Assignments:** Homework assignments to be discussed during Exercise Sessions of the following week, will be posted on the webpage. Also, there will be a mandatory project, to be announced in due time.

**Final exam:** The final exam is scheduled for March 28, 2007. There will be an external examiner, as well.