

# Advanced Probability, MA 587/687

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## INTRODUCTORY STATEMENT

This course is relatively new, it was first offered in Spring 2012. It is a part of our departmental effort to build a structure of graduate courses in truly applied mathematics (possibly, we will even make a new formal track toward Master Degree). The idea is to offer career-oriented courses helping students to secure a good job outside mathematics. This course, in particular, aims at preparing students for Actuarial Exam P/1. Eventually our department intends to offer other courses of applied math character, such as Advanced Statistics, Financial Mathematics, Math Biology, computational courses, etc.

What is the relation of this course to its prerequisite, Probability MA 485/585? Probability is a fairly large subject. Most universities offer a sequence of (at least two) probability courses. It is not possible to learn this subject in one course on a serious level (in particular, on a level sufficient to pass actuarial exams).

The first course, Probability MA 485/585, only presents the *core* of the subject. It was mostly given in an intuitive way: the goal was to *understand* basics and learn how things work. After taking MA 485/585 the students are *familiar* with fundamentals of probability and know how to solve standard problems. This is not enough to be an expert, or to effectively collaborate with others who use probability, or to pass a formal actuarial exam.

The present course, Advanced Probability MA 587/687, covers all necessary formalities of probability theory (its specific language, terms, symbols and tools) in a more comprehensive manner. It also includes extras that were left out in Probability MA 485/585, such as conditional and marginal distributions, special families of random variables, etc. All this will complete your preparation for Actuarial Exam P/1. It will take approximately three months.

In the last month of the semester, we will cover two important topics that are *not* required by Actuarial Exam P/1 but are very important in many applications: Markov Chains and Multivariable Normal Distributions. (It is worth noting that Markov Chains *are* required by Actuarial Exam MLC.)

This is our plan. Students are encouraged to make their own suggestions to cover other interesting topics or skip some topics which seem unnecessary.