

# Probability Theory PRO

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*Text:* *A First Course in Probability*, Seventh Edition by Sheldon Ross

*Prerequisite:* a calculus sequence

*Course Description:* This is a first course on the mathematical tools and models of uncertainty. Not only being interesting and challenging in itself, this field is of increasing importance in many areas of engineering, physics, biology, economics, and social sciences as well. In this course we cover the basic notions and methods of probability theory, with special emphasis on examples and problem solving.

*Topics:*

Probability in discrete sample spaces  
Methods of enumeration (combinatorics)  
Conditional probability and independence  
Discrete and continuous random variables  
Jointly distributed random variables  
Properties of expectation  
The Laws of Large Numbers  
The Central Limit Theorem

*Study Habits:* This course requires considerable work. You should be devoting time for reading the book, thinking about the ideas, concepts and techniques, talking with some of your classmates about them, doing all the assigned exercises, etc. There will be challenging weekly homework assignments. Probability is a conceptually difficult field, where one may have to use a big variety of mathematical tools, and find their connection to real-life situations within the same problem. Therefore it is extremely important to clearly understand all the material we talk about in class. I will try to explain, make easier to understand, and sometimes extend the ideas of the book. The class and the book will reinforce each other, and neither is a replacement for the other. Questions and comments from students are encouraged. You are strongly encouraged to take part in the office hours and ask questions.

*Grading and assignments:* There will be a midterm exam, weekly homework to be handed in during the semester, and a final exam. Their weights are 30%, 30%, and 40%, respectively.

Grades will be approximating the following standards (with a plus/minus at the upper/lower end of the interval):

<i>Grade</i>	<i>Percentages</i>
A	$\geq 87\%$
B	[73%, 87%)
C	[55%, 73%)
D	[45%, 55%)
F	$< 45\%$

Because of this standard, you are not in competition with your classmates nor does their performance influence positively or negatively your performance. You are encouraged to form study/problem groups with your classmates; things not clear to you may become obvious when you try to explain them to others or when you hear other points of view. Sometimes just verbalizing your mathematical thoughts can deepen your understanding. However, if you discuss with others the exercises, each person should write up her/his own version of the solution. Please note that much less can be learned by just understanding and writing up someone else's solution than by coming up (or even just trying to come up) with original ideas and solving the problem.

*Calculator Policy:* It is recommended to use calculators on exams. Also, you may use one sheet of paper in the exams with any formulae/theorems written on it.

*Please feel free to contact me* any time outside class via e-mail, phone, or in person if you have questions or suggestions about this course.