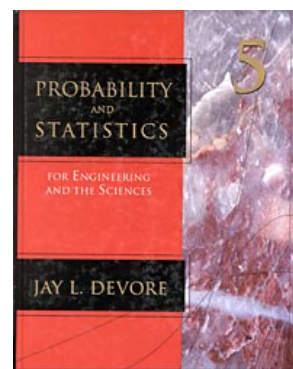


**Course description:** Probability is the mathematical foundation of statistics, so it is one of the most appealing applications of calculus. This course is for anyone who knows a little calculus and wishes to better understand probability distributions. This understanding changes the way we think: about what we read in the paper, about uncertainty in every day life, and about how to interpret data from observational studies and designed experiments. If you plan to do research in the social or natural sciences, this course will prepare you for discipline-specific statistics courses, like Econ 203 and Psych 200.

This course starts with a discussion of sample spaces and events, the axioms of probability theory, conditional probability and independence of events. It provides a careful treatment of discrete random variables, the expected value and the variance of a discrete distribution. Examples include the binomial and Poisson distributions. Using calculus, the concepts of expected value and variance can be generalized to continuous random variables, such as those with normal and exponential distributions. Independence is revisited in the context of jointly distributed random variables, for which covariance and correlation are defined. The half-semester course ends with the Central Limit Theorem's role in understanding the distribution of the mean of a random sample.

**Resources:** The required text is Jay Devore's *Probability and Statistics*; we will cover the first five chapters of the fifth edition. Some data sets discussed in class are from Chatterjee, Handcock and Simonoff's *A Casebook for a First Course in Statistics and Data Analysis*. Experiments conducted in class may be downloaded from [www.haverford.edu/math/lbutler/116home/116home.html](http://www.haverford.edu/math/lbutler/116home/116home.html). The Math Question Center, Sunday through Thursday 7–9 pm in INSC H011, is a good place to collaborate on homework with classmates and to experiment with *Mathematica*.



**Weekly assignments:** Weekly problem sets will be posted on the Math 116g Home Page ([www.haverford.edu/math/lbutler/116home/116home.html](http://www.haverford.edu/math/lbutler/116home/116home.html)) each Wednesday, and are due the following Wednesday by 12:30 pm under the door of INSC H212. No late papers are accepted. *You are encouraged to discuss your ideas on homework problems with peers and professors, but you are not permitted to refer to any notes from such discussions while preparing the solutions you plan to submit for grading.* Think about dividing the time you spend solving a homework problem into 3 stages: first work alone and record your preliminary ideas on white paper; then work with peers and record shared ideas on colored paper; finally resume working alone on white paper without looking at anything written on colored paper.

**Tests and Grades:** There will be an in-class test on February 19 and a take-home final over spring break. Grades will be determined by performance on homework assignments (20%), the in-class test (30%) and the take-home final (50%).

**Lecture and Office Hours:** Class meets MWF 10:35 am to 11:30 am in Koshland INSC E309. Lynne Butler will be available in her office, INSC H212, from 11:35 am to 12:30 pm. Should you wish to schedule an alternative meeting, she may be reached in her office (610-896-1300), at home (609-818-9540), or by email ([lbutler@haverford.edu](mailto:lbutler@haverford.edu)). Feel free to use her workspace H211, where she is nearby to help with homework assignments and experiments.