

This is a first course in probability intended for any mathematics and engineering, statistics, or mathematics majors, or any student planning to take STAT-261* or higher level courses in Probability.

Textbook: *Fundamentals of Probability*, 2nd Edition
by S. Ghahramani (Prentice Hall)

Prerequisite: Integral and Differential Calculus.

Corequisite: MATH-280* or 221*.

Instructor: G. Takahara

Evaluation:	Final examination	60%
	Mid-term test	30%
	Homework	10%

Outline:

1. *Basic concepts of probability theory:* axioms of probability; counting; conditional probability; law of total probability and Bayes' rule; independence of events (Sections 1.1-1.4, 1.6, 1.7, 2.1-2.4, 3.1-3.5 of text).
2. *Discrete Random Variables:* random variables; distribution functions; expectation, variance, and moments of a discrete random variable; uniform, Bernoulli, binomial, Poisson, and geometric distributions (Sections 4.1-4.6, 5.1-5.3 of text).
3. *Continuous Random Variables:* probability density functions; functions of random variables; expectation, variance, and moments of a continuous random variable; uniform, normal, and exponential random variables (Sections 6.1-6.3, 7.1-7.3 of text).
4. *Multiple Random Variables:* pairs of random variables; joint distributions; independent random variables; conditional distribution and expectation; functions of two random variables; multivariate distributions, covariance and correlation (Sections 8.1-8.4, 8.7,9.1-9.5 of text).
5. *Sums of Independent Random Variables:* Markov and Chebysev inequalities, laws of large numbers; the central limit theorem. (Sections 10.2-10.5 of text).