UConn's MATH 3160
Fall 2017 Syllabus

Math 3160 — Probability (Fall 2017)

Catalog description: Introduction to the theory of probability. Sets and counting, probability axioms, conditional probabilities, random variables, limit theorems. Three credits. Prerequisite: MATH 2110Q, 2130Q or 2143Q.

Open source educational materials are provided (no textbook is necessary for this course)

Current sections of Math 3160

Standard syllabus for Math 3160 Probability:

- **Combinatorics:** product rule and permutations; combinations.
- **Axioms of Probability:** sample spaces, events and set operations; probability axioms.
- **Conditional Probability and Independence:** conditional probability and Bayes' rule; probability trees; independent events.
- **Discrete Random Variables:** probability mass function (PMF), cumulative distribution function (CDF); expectation; variance, moments, moment generating function (MGF). Uniform, Bernoulli, Binomial, Poisson, Geometric, Hypergeometric distributions; expectation, variance, MGF of these RVs.
- **Continuous Univariate Random Variables:** probability density function (PDF), CDF, expectation, variance, moments, MGF. Uniform, Exponential, Gamma, Normal distributions; expectation, variance, MGF of these RVs. Transformations (functions) of continuous RVs.
- **Jointly Distributed Random Variables:** joint PMF/PDF, and CDF; marginal distributions; conditional PMF/PDF; conditional expectation and variance; covariance and correlation coefficients.
- **Limit Theorems:** Weak Law of Large Numbers, Central Limit Theorem, Normal approximations.