Stat. 6401: Final topics

Review the Rules of Probability

Independence versus Dependence

Conditional Probability

Law of Total Probability

Density function, Distribution function, Joint distribution, Marginal distribution, Conditional distribution

Probability Models

Discrete Probability Models: Bernoulli, Binomial, Poison

Continuous Probability Models: Uniform, Exponential, Normal

Transformation Methods: CDF Method, PDF Method, Jacobian Methods for multivariate transformation

Convolution: Sums and Quotients of Random Variables

Expectation, Variance

Law of the Unconscious Statistician

Order Statistics, minimum, maximum, median

Chevechev's Inequality

Convergence of Random Variables: LLN, CLT (know how to use to compute a probability), convergence in probability (know how to prove using Chevechev's Inequality), convergence in distribution (know how to prove using the CDF Method)

Methods of showing convergence: CDF Method, Continuity Theorem, pdf Method

Degenerate Distribution at a point

Slutsky's Theorem and related properties of convergence\

Normal distribution

Derived Distribution, Chi-Square, t, R, Beta

When sampling from the Normal Distribution, the sample mean and sample variance are independent. Know how to prove this result using MGFs.

Simulation, count how many times an event occurs divided by the number of iterations of the simulation