

Stat 503

Probability and Mathematical statistics

Course Syllabus:

- Introduction and some simple concepts.
- Measures of location (Central tendency measures) and measures of dispersion (Measures of variability).
- Sample space, events counting sample points (combinations only)
- Probability of an event, additive rules.
- Conditional Probability, Multiplication Rule.
- Independent random events
- Random Variables (R.V.), Discrete Probability distributions
- Continuous Probability distributions, Chapter Review.
- Moments of a Random Variable, Mean of a linear combinations of Random Variables.
- Chebychev's Inequality.
- Discrete Uniform distribution. Binomial distribution
- Hyper geometric distribution. Poisson distribution
- Normal distribution. Areas under the standard normal curve
- Applications of the normal distribution
- Random Sampling, Some important statistics, Sampling distributions
- Sampling distribution of the mean from normal populations, t-distribution
- Statistical Inference, Classical estimation methods, Estimation of the mean
- Standard error of a point estimate, estimating the difference between two means
- Estimating a proportion
- Estimating the difference between two proportions
- Testing a statistical hypothesis, One- and Two-tail tests, Types of errors
- Testing means with known population variance, Relation to confidence intervals
- Testing means with unknown population variance, two sample testing, paired comparison
- Testing simple proportion and two proportions
- Simple linear regression and multiple regression, correlation and its applications
- ANOVA one and two ways and its applications
- Principal component analysis, clustering technique