MATH 318   Introduction to Probability and Statistics. 4 credits.

Math 318 is a calculus based course that is required of mathematics and statistics majors. This course is designed to lead into the applied statistics courses and to the capstone statistics course Math 426-427. This course lays the foundation for the theory of probability and statistics. Students are introduced to descriptive statistics, counting, probability, random variables, probability distributions, sampling distributions, estimation, test of hypothesis, regression and correlation.

Syllabus:

(a) Introduction to the nature of probability and statistics.
(b) Probability and counting.
  1. Permutations.
  2. Combinations.
  3. Probability.
  4. Conditional probability.
  5. Independence.
(c) Discrete random variables and distributions.
  1. Bernoulli and binomial distributions.
  2. Hypergeometric distribution.
  3. Poisson distribution.
(d) Continuous random variables and distributions.
  1. Uniform distribution.
  2. Exponential distribution.
  3. Gamma distribution.
  4. Normal distribution.
  5. t distribution.
  6. Chi-square.
(e) Multivariate probability distributions.
  1. Joint, marginal and conditional.
  2. Independence.
  3. Expectations.
  4. Covariance.
  5. Correlation
(f) Sampling and statistics.
  1. Sampling distributions of the sample mean and sample proportion.
  2. Central limit theorem.
(g) Inference
  1. Point and interval estimation of the population mean, proportion, and variance.
  2. Testing hypotheses related to one population mean, proportion, and variance.
  3. Testing hypotheses related to two population mean, proportion, and variance.