



STA 321 – Applied Nonparametric Statistics Course Syllabus

Course description: Contingency table analysis, rank tests for one, two and many sample problems, rank correlation, introduction to nonparametric regression.

Credit hours: 3

Course Prerequisites and Corequisites: MTH 220

<u>Course outline:</u>	<u>Approximate time spent</u>
• Review of Probability & Basic Inference	10%
○ Counting Techniques	
○ Random Variables	
○ Sampling Distributions	
○ Hypothesis Tests	
• One-Sample Methods	15%
○ Confidence Intervals and Tests on the Median	
○ Estimating the Population CDF & Percentiles	
○ Type I Error and Power	
• Two-Sample Methods	15%
○ Permutation Tests	
○ Wilcoxon Rank-Sum Test	
○ Mann-Whitney Test	
○ Large Sample Approximations	
• K-Sample Methods	15%
○ K-Sample Permutation Tests	
○ Kruskal-Wallis	
○ Multiple Comparisons	
○ Ordered Alternatives	
• Paired Comparisons & Blocked Designs	15%
○ Sign Test & Signed Rank Tests	
○ Permutation Test for a Randomized Complete Block Design	
▪ Friedman's Test	
▪ Cochran's Q	
▪ Kendall's W	
• Tests for Association	15%
○ Spearman Rank Correlation	
○ Kendall's Tau	
○ Permutation Tests for Contingency Tables	
○ Fisher's Exact for a 2x2 Table	
• Linear Regression	15%
○ Basic Bootstrap Method	
○ Bootstrap Intervals for Location & Scale Parameters	
○ Correlation & Regression	

STA 321– Introduction to Nonparametric Statistical Analysis
Syllabus Continuation

Student Learning Outcomes (SLO): At the end of STA 321, a student who has studied and learned the material should be able to:

1. Recognize when normal-based statistics are appropriate and when they are not. [EEO: 1, 5, 7]
2. Apply non-parametric permutation techniques to statistical inference situations in which the normal-based statistics do not apply. [EEO: 1, 5, 6]
3. Know what software is appropriate for permutation methods and how to use the software. [EEO: 4, 7]
4. Know the relationship between rank-based tests and permutation tests. [EEO: 5]

There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.

Exemplary Educational Objectives (EEO):

1. To apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.
4. To use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.
5. To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
6. To recognize the limitations of mathematical and statistical models.
7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.