Department of Mathematics and Statistics

STA 520 – Statistical Analysis I
Course Syllabus

Course description: Probability, statistical inference, rank tests, chi-square tests, linear regression and correlation, analysis of variance, multiple regression.

Credit hours: 3

Course Prerequisites and Corequisites: MTH 220 or equivalent

Course outline:	Approximate time spent
• **Descriptive Statistics**	5%
o Graphical Methods	
o Measures of Central Tendency	
o Measures of Variability	
• **Probability**	15%
o Probability Laws	
o Conditional Probability and Independence	
o Probability Distributions for Random Variables:	
▪ Discrete	
▪ Continuous	
o Random Sampling	
o Sampling Distributions	
• **Statistical Inference (Estimation and Hypothesis Tests)**	15%
o Inferences about a single population parameter	
o Inference comparing parameters of two populations	
• **Statistical Inference Comparing Parameters for**	
More Than Two Populations	25%
o Analysis of Variance (ANOVA)	
o Kruskal-Wallis Test	
• **Multiple Comparisons**	10%
o Fisher's Least Significant Difference Test	
o Tukey's Test	
o Student-Newman-Keuls Test	
o Duncan's Test	
o Dunnett's Test	
o Scheffe's Test	
• **Chi-Square Tests**	10%
o Goodness-of-Fit Test	
o Tests for Independence and Homogeneity	
• **Regression**	20%
o Correlation and Simple Linear Regression	
o Multiple Regression	

Student Learning Outcomes (SLO): At the end of STA 520, a student who has studied and learned the material should be able to:

1.   Solve problems encountered in research projects and make decisions based on data and life experiences beyond the classroom and university setting. [PLO: 2,3,4,5]
2.   Investigate the nature of independence and/or dependence among several variables. [PLO: 1]
3.   Formulate statistical hypotheses in terms of the parameters of populations. [PLO: 1,2]
4.   Test hypotheses using appropriate test statistics. [PLO: 3,4,5]

Program Learning Outcomes (PLO):

Students graduating from SFASU with an M.S. degree and a major in statistics will demonstrate:

1.   A command of core probability and statistical concepts through major definitions and theorems. **[*Concepts*]**   (Probability and Statistical Inference)
2.   Strategic competence in formulating a standard probabilistic/statistical model for a given problem. **[*Modeling*]** (Model Choice and Model Interpretation)
3.   Skill in using statistical software in order to process and interpret data. **[*Data Processing*]** (Computational Skills and Model Validation)
4.   The ability to independently apply principles of probability and statistics to model and solve new or non-standard problems. **[*Independent Thinking and Application*]** (Existing Literature Comprehension, Independent Progression, Resourcefulness)
5.   Proficiency in communicating probability and statistics in a format appropriate to expected audiences. **[*Communication*]** (Written Communication, Oral Communication)

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