



### STA 521 – Statistical Analysis II Course Syllabus

**Course description:** Analysis of variance, multiple comparisons, blocking designs, higher factorial experiments, unbalanced designs, fixed and random effects, nested designs, split-plot designs, analysis of covariance.

**Credit hours:** 3

**Course Prerequisites and Corequisites:** STA 520 or equivalent

<u>Course outline:</u>	<u>Approximate time spent</u>
<ul style="list-style-type: none"><li>• <b>Analysis of Variance</b><ul style="list-style-type: none"><li>○ One-way completely randomized design</li><li>○ Randomized complete block design</li><li>○ Latin Square Design</li><li>○ Multiple Comparisons</li></ul></li></ul>	25%
<ul style="list-style-type: none"><li>• <b>Analysis of Covariance</b><ul style="list-style-type: none"><li>○ Completely randomized design with one covariate</li><li>○ Multiple Covariates</li></ul></li></ul>	15%
<ul style="list-style-type: none"><li>• <b>Factorial Models</b><ul style="list-style-type: none"><li>○ Fixed, Random, and Mixed- Effects Models</li><li>○ Rules for obtaining Expected Mean Squares</li><li>○ Nested Designs</li><li>○ Split Plot Designs</li><li>○ Repeated Measures Designs</li></ul></li></ul>	45%
<ul style="list-style-type: none"><li>• <b>Unbalanced Designs</b><ul style="list-style-type: none"><li>○ Randomized Block Designs with Missing Values</li><li>○ Balanced Incomplete Block Designs</li></ul></li></ul>	15%

**Student Learning Outcomes (SLO):** At the end of STA 521, a student who has studied and learned the material should be able to:

1. Apply appropriate statistical models to solve real-world problems. [PLO: 5]
2. State the assumptions on which statistical procedures are based. [PLO: 1,2]
3. Discuss design concepts for experiments and important factors that need to be considered prior to data collection. [PLO: 2]
4. Select the appropriate statistical models for a given study. [PLO: 2]
5. Formulate statistical hypotheses in terms of the parameters of populations, test them using the appropriate test statistics, and interpret the results. [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)