Stat 141 (Experimental Designs 1)

1st Semester AY 2025-2026

Laboratory Exercise 6

Instruction: Answer the following as indicated.

An experiment was set up to compare the effect of different soil pH and calcium additives on the increase in trunk diameters for orange trees. Annual applications of elemental sulfur, gypsum, soda ash, and other ingredients were applied to provide pH value levels of 4, 5, 6, and 7. Three randomly selected levels of a calcium supplement (100, 200, and 300 pounds per acre) were also applied. All factor–level combinations of these two variables were used in the experiment. At the end of a 2-year period, trunk diameters of three orange trees were determined at each factor–level combination. One of primary goals of the experiment is determing the optimal pH level. The data is contained in the Excel file **Lab Exer 6.xslx**.

1. Construct the ANOVA table and conduct the sequential tests of hypotheses.
2. Estimate the variance components for the random effects.
3. Perform all necessary post hoc analysis. Prepare a visualization of the results and discuss the results.