## Stat 566 topics for final exam

## 1. Analysis of covariance

See notes from 4/22/2025 and 4/24/2025. Our model was:

$$y_{ij} = \mu + \tau_i + \beta(x_{ij} - \overline{x}_i) + \varepsilon_{ij}, \ i = 1,...,a, \ j = 1,...,n.$$

Be able to derive the parameter estimates, sums of squares, and ANOVA table if the model is changed (additional predictors, a second factor, different slopes for different factor levels, etc.).

2. Repeated measures

See notes from 4/29/2025. Be able to analyze a data set of this type, using the RCBD method.

3. Orthogonal polynomials

See notes from 5/6/2025. In a 1-way ANOVA with *a* levels of the factor, be able to decompose the SS, df, and *F* tests into a-1 *F* tests, each with 1 degree of freedom.

4. Response surface methodology

See notes from 5/8/2025, 5/13/2005, and 5/15/2025. Be able to test for curvature, given the results of a  $2^k$  with center points design, find the direction of steepest ascent, and fit a full quadratic model and find the optimal point, given the results from a central composite design.

5. Transformations in 1-way ANOVA

See notes from 5/20/2025. Be able to find the Box-Cox transformation of the *y*-values that will bring the residuals as close as possible to normality.

6. Mixed  $2^k$  and  $3^k$  designs

See notes from 5/22/2025. Be able to map a mixed design onto a larger  $2^k$  design, showing the resulting ANOVA and df.

7. Missing data in factorial designs

See notes from 5/27/2025. Be able to analyze a data set and compare the results from an exact analysis, an imputation, and Yates' method.