

Biometry- Biology 345

Sonoma State University

Study guide to Exam 3

Exam 3, next Thursday, will consist of 30 points of in-class and 70 points of take home questions. The take-home portion must be submitted by the following Tuesday, and you must complete it without assistance from any one.

In class portion

Definitions:

- Planned comparisons, unplanned comparisons, contrast, Tukey's HSD test
- Fixed effects, random effects, main effects, interaction
- Nested ANOVA, factorial ANOVA, randomized blocks ANOVA, repeated measures ANOVA
- Crossed factors, nested factors, cell means, marginal means, additivity, expected mean square
- Models 1, 2, and 3 factorial ANOVA, mixed model, Type I and III Sum of Squares
- Balanced design, unbalanced design, weighted mean, unweighted mean
- Block, treatment, residual mean square, covariate, ANCOVA, homogeneity of slopes

Concepts:

- How can we tell, based on a table of expected mean squares, which F tests to make?
- Under what conditions might we NOT use the error term to construct an F test.
- When do we expect SS to be additive and least squares means to equal raw means?
- Give an example of a table of cell means that shows additivity of main effects.
- Draw an experimental design, given a description of experimental conditions.
- What's wrong with a highly unbalanced ANOVA? Describe in terms of mean and standard deviation (or variance).
- Under what conditions might we decide that 'pooling' is OK?
- What factors should we consider in a factorial ANOVA when deciding whether a significant interaction renders it impossible to analyze significance of main effects.
- Given cell means, draw a plot and interpret effects of factor A, factor B, or interaction.
- Contrast a null hypothesis to test a random effect versus a null hypothesis to test a fixed effect.
- Describe null hypotheses tested in a factorial ANOVA with interaction.
- Compare the design of a randomized blocks model to a factorial model.
- What assumption exists in a randomized blocks design that is not present in a factorial ANOVA?
- Compare ANOVA to ANCOVA.
- How do you check for homogeneity of slopes in ANCOVA? How do you check for effects of treatment groups on a covariate?

Take home portion

- Conduct nested ANOVA using the Fit Model platform.
- Interpret the output of a nested ANOVA analysis and report results in a table.
- Calculate group means and analyze them using one-way ANOVA
- Conduct factorial ANOVA using the Fit Model platform.
- Compare cell and marginal means for a sample data set to assess how the interaction term measures non-additivity of main effects in factorial ANOVA.
- Conduct ANOVAs of different designs using the Fit Model platform.
- Use other commands to discern experimental designs.
- Use ANCOVA to analyze a data set where slopes differ among groups, and to interpret the output of such an ANCOVA.
- Use ANCOVA to analyze a factorial experiment with multiple covariates.