Exam 2 Information

The exam will be given on Canvas.  It will be closed notes, closed book. The exam will be timed.  It will be a mix of short answer and conceptual questions.

While this exam is not focused on material from modules 1-3 it is necessary that you understand those concepts in order to understand the concepts on this exam.

**Module 4 – will be majority of exam**

* ~~Know how to recognize factors as blocking factors.~~
* ~~Know how to include a blocking factor in an analysis for a continuous factor.~~
* ~~Understand the special structure of a Latin Squares Design.~~
* ~~Understand how to analyze a replicated Latin Squares Design.~~
* ~~Understand the model fit to each of a CRD, RCBD, LSD and GCBD.~~
* ~~Know when to use each different type of experiment.~~
* ~~Know how to analyze a RCBD when there are replicates between the blocks.~~
* ~~Know how to include a blocking factor in an analysis with a binary factor.~~
* ~~Understand why the analysis of a blocking factor should not be subject to statistical testing.~~
* ~~Be able to construct a completely randomized block design (RCBD) plan for a blocked experiment with one factor.~~
* ~~Be able to construct an LSD plan for a blocked experiment with two blocking factors.~~
* **Know how to calculate the degrees of freedom for a blocked experiment**.
  + **# of levels** – 1

**Module 5**

* ~~Understand the mechanics of paired testing and when to use it.~~
* ~~Understand what pairing experimental units does to the variance.~~
* ~~Be able to describe covariate imbalance and know why it is a problem.~~
* ~~Understand why~~ **~~blocking will not solve covariate imbalance.~~**
  + **~~Covariate imbalance matching.Rmd (Blocking)~~**
* ~~Understand why randomization might not solve this problem and how to use re-randomization~~
* ~~Understand how to use propensity matching and the concept of optimal matching~~
* ~~Be able to discuss the advantages and disadvantages of between-subject vs. with-in subject testing.~~
* ~~Understand the mechanics of propensity score matching.~~
  + ~~Technique~~

**Experiment Fun!**

* **~~Understand what it means to randomize across multiple replicates vs. using blocks to create replicates~~**
  + ~~In experiment, no blocking~~
  + ~~Correct way to randomize was to take all 20 helicopters and drop in a random order~~
* ~~Understand the difference in analysis between the two situations above.~~
* **~~Understand the best method to obtain an estimate for sigma for a power analysis.~~**

**Logistic Regression**

* **~~The three reasons we can’t use multiple linear regression to fit a model with a binary response and why. You should be able to explain these.~~**
* ~~The basic operation of manipulating the probabilities to get a continuous number (just know we use the logit transform).~~
* ~~Understand the relationship between the logit (p) and the logistic regression coefficients.~~
* ~~Understand the relationship between P(y=1) and the logistic regression coefficients.~~
* ~~How to interpret (simple and multiple logistic regression model) coefficients~~
* **How to calculate predicted probabilities from the logistic model.**
  + Practice in example
* How the logistic regression coefficients are computed and a little about the method of maximum likelihood
* How to evaluate the logistic regression model as an explanatory model.

**Complete practice assignment**

* Do not interpret coefficients in terms of log(odds)
  + Must do it in terms of odds

**Module 6**

* Be able to explain the advantages of using a factorial plan vs. one-factor-at-a-time when you have multiple factors to study.
* Be able to create a factorial design plan with any number of factors.
* Be able to interpret/assess interactions in a factorial design.
* Understand the analysis of a factorial design (ANOVA, interaction plots, assumptions)
* Be able to analyze a factorial experiment when the response is a proportion and when the response is continuous using the chi-square test.

**In-class assignment**

**Important Stuff**

* Be able to state what kind of design an experiment should be
* Can you pick the right design out of two options