Exam 1 Coverage
Psychology 311
Spring 2015

Here is a list of topics that definitely will be covered on the exam.

Disclaimer. This list is not exhaustive, but is meant to give you some study guidelines. It is not a binding contract! It is meant to help you realize the breadth and depth of concepts you have learned and are responsible for. A casual perusal of this list should provide you with a list of at least 50 potential questions and an excellent idea of what exam questions to expect.

1. The general logic and technical definitions and terminology underlying statistical hypothesis testing. α, β , Type I Error, Type II Error, Reject-Support, Accept-Support, etc.
2. Hypothesis Testing for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with independent samples*.
3. Confidence interval estimation of linear combinations of means for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with independent samples*.
4. Power Calculation for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with independent samples*.
5. Calculation of required sample size for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with independent samples*.
6. Hypothesis testing for 2-Sample or *k*-Sample generalized *t* statistics *with dependent samples*.
7. Confidence interval estimation of linear combinations of means for 2-Sample or *k*-Sample generalized *t* statistics *with dependent samples*.
8. Power Calculation for 2-Sample or *k*-Sample generalized *t* statistics *with dependent samples*.
9. Calculation of required sample size for 2-Sample or *k*-Sample generalized *t* statistics *with dependent samples*.
10. Confidence interval estimation of effect size for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with independent samples*.
11. Confidence interval estimation of effect size for 1-Sample, 2-Sample or *k*-Sample generalized *t* statistics *with dependent samples*.
12. Calculations involving the distribution of the *F* statistic. Cumulative probability, rejection points, power for a given value of α and λ .
13. Theory involving linear combinations. For example: What is the mean of $X - 2Y$? What is the variance of $X - 2Y$? What is the sampling variance of $\bar{X}_{\cdot 1} - \bar{X}_{\cdot 2}$?
14. Calculations involving the noncentral *t* distribution. Cumulative probability, rejection points, power for a given value of α and the noncentrality parameter.
15. Confidence interval estimation of the noncentrality parameter of a noncentral *t* or a noncentral *F* distribution.
16. Linear regression with one or more predictors. Specification of the model and testing with R.
17. One-way ANOVA with fixed effects: Basic calculations, power and sample size calculations, and effect size estimation with confidence intervals.

18. Statistical assumptions underlying the *t*-test and ANOVA. What are they?
19. Two-Way ANOVA with fixed effects. Main effects, Simple Main effects, and interactions. Identification from an interaction plot of cell means which effects are nonzero.
20. Calculation of ANOVA effects from a table of cell means or an interaction plot. If I give you the cell means, can you give me the $\alpha_j, \beta_k, (\alpha\beta)_{jk}$ values?
21. Computing *F*-tests for main effects, simple main effects, and interactions from raw data using R.
22. Computing *F*-tests for main effects or simple main effects from a table of cell means, variances, and *n*.
23. Calculation of power and sample size for the 1-Way ANOVA with random effects.
24. Calculation of the distribution of the 1-Way random-effects ANOVA *F* statistic.
25. Calculations involving the noncentral χ^2 distribution.
26. Computation of the *F*-test for main effects and interactions in a 2-way random effects design with both effects random.
27. Computation of the *F*-test for main effects and interactions in a 2-way mixed-effects design with one effect fixed and one effect random.