**PSY 653: Methods of Research in Psychology II – Spring 2018**

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Office Hours: Wednesday 2:15 – 3:30 and by appointment

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Office Hours: Monday 3:40 – 4:40, Wednesday 2:50 – 3:50, and by appointment

Lecture: Monday 1:00 – 3:40 in BSB 357

Lab: Wednesday 3:50 – 5:05 in BSB 357

**Course description:**

PSY 653 is an applied course in statistical modeling and data analysis. The course builds on the general linear modeling foundation covered in PSY 652 and provides content on non-linear models, generalized linear models for binary outcomes, mediation analysis, multilevel modeling, an introduction to the Bayesian analysis framework, missing data approaches, and power analysis. Much of the class time will be spent *doing* statistical analyses – first alongside the instructor(s), and then independently to ensure mastery of the techniques. The primary goal is that students will complete the course ready to properly and confidently run many different types of statistical models with their own data.

Students are required to take the corresponding lab. During the lab sessions students will have the opportunity to further practice the analyses learned in class, become proficient in R, and work on data analysis projects.

**Prerequisite:** PSY 652

**Textbook:**

Field, A, Miles, J. & Field, Z. (2012). *Discovering statistics using R*. Los Angeles, CA: Sage Publications.

Optional textbooks:

Grimm, K.J., Ram, N., Estabrook, R. (2017). *Growth Modeling: Structural equation and multilevel modeling approaches.* New York, NY: Guilford Press.

Kruschke, J.K. (2015). *Doing Bayesian data analysis: A tutorial with R, JAGS, and Stan, 2nd Edition.* London, UK: Elsevier Inc.

Additional required readings will also be posted in the Course Dropbox Folder.

**Course Content, Learning Objectives, and Associated Textbook Readings for each Unit:**

Eight units are covered in PSY652. Chapters listed after each unit correspond to the textbook.

1. Non-linear Models in a OLS Framework (1/22)
2. Diagnostics and Remediation for OLS Models (1/29)
   * Required readings: Field Chapter 5 & Chapter 7, Sections 7.9-7.10
3. Mediation (2/5, 2/12)
   * Required readings: Mackinnon et al. (2007)
4. Logistic Regression (2/19, 2/26)
   * Required readings: Field Chapter 8
5. Introduction to Multilevel Modeling (3/5, 3/19)
   * Required readings: Field Chapter 19, Grimm et al. (2017) Chapters 1-3
6. Modeling in an ANOVA framework (3/26, 4/2)

Required readings: Field Chapters 9 – 14

1. Introduction to Bayesian Analysis (4/9)
   * Required readings: Depaoli et al. (2017)
2. Techniques for Missing Data (4/16)
   * Required readings: Graham (2009)
3. Power Analysis (4/23)
   * Required readings: Introduction to Power Analysis, ATS UCLA: https://stats.idre.ucla.edu/other/mult-pkg/seminars/intro-power/

**Grading:**

* Quizzes on Readings (equally weighted) 25%
  + Due dates posted on CANVAS
* Midterm Exam (in lab Wednesday, 3/7) 15%
* Final Exam (in lab Wednesday, 4/25) 15%
* R Notebooks (due Friday, 3/9) 15%
* Group Project 20%
  + Final Product 4/30
  + Presentation delivered on 4/30
* Participation 10%

90% - 100%=A; 80% - <90%=B; 70% - <80%=C; 60% - <70% D; <60% F

*Quizzes*

Most of the Units have associated readings. Students are expected to thoroughly read each assigned reading and complete the corresponding quiz on CANVAS by the posted date. The quizzes must be completed independently.

*Exams*

Two exams will be given during lab. The exams will be open note, but time limited.

*R Notebooks*

Over the course of the semester, students will compile a R Notebook to replicate the findings of two published studies that have used the Midlife in the United States (MIDUS) data. The majority of the work to compile the notebooks will be completed in class and lab, but there will be a few additional tasks that students will need to complete independently. A list of the required contents of each R Notebook will be provided by 3/2.

*Group Project*

Over the course of PSY 652 & PSY 653, students will work in a group to produce a full length, empirical paper using the MIDUS public use data. For PSY 653, the expected products are a manuscript that is ready to be submitted to a journal of your choice and a presentation (~ 20 minutes) of the findings. Your group will identify a journal and follow the author guidelines of the journal (the guidelines should be submitted with your paper). At a minimum the final paper must include the following sections: an introduction, hypotheses, methods, results, and discussion.

In addition, all analyses (including data wrangling, analysis, visualization, and model checking) should be completed via a R Notebook and submitted with the final paper. A corresponding presentation of the findings will be delivered on the last day of lecture (April 30).

*Participation*

Active participation by students in lecture, lab and as a group member for the Group Project is essential. The participation grade will be the average of three scores:

1. A rating of the student’s participation by the instructor (Kim Henry)
2. A rating of the student’s participation by the graduate teaching assistant (Shane Kentopp)
3. A rating of the student’s participation on the group project by fellow group members (confidentially reported and averaged across all members).

Late assignments will be accepted up to 24 hours after the due date for 50% maximum of the total points.