

PB HLTH 145 – Statistical Analysis of Continuous Outcome Data Fall 2016

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Weekly schedule:

Monday:	Homework set:	9am	bCourses
Tuesday:	Lecture (John):	3:30-5pm	240 Mulford Hall
Wednesday:	Lab (Lina)	3-4pm or 4-5pm	340A Haviland Hall
Thursday:	Office hours (Lina)	11:30am-12:30pm	109 Haviland Hall
	Office hours (John)	2-3:30pm	109 Haviland Hall
Friday:	Lecture (John):	3:30-5pm	240 Mulford Hall
	Discussion (Lina):	1-2pm (87 Evans Hall) or 2-3pm (2011 VLSB)	
	Homework due:	5pm	bCourses

Texts: Required: [Applied Regression Analysis and Generalized Linear Models](#) (3rd edition), by John Fox (Text)

Optional: [An R Companion to Applied Regression](#) (2nd edition), by John Fox (RComp)

Text books are available on reserve at the [Moffitt Library](#)
Lecture slides and lab keys uploaded to bCourses weekly

Software: [R](#)

Grading:	Weekly homework assignments (due: 5pm on September 9 th , 16 th , 23 rd , 30 th , October 14 th , 21 st , 28 th & November 4 th , 18 th)	10%
	Midterm exam (date: 3:30-5pm on October 6 th)	30%
	Final exam (date: 3:30-5pm on December 1 st)	30%
	Regression project report (due: 5pm on December 12 th)	30%

- **Weekly lab/homework assignments:** Assignments will be published on bCourses by 9am Monday and relevant lecture material will be covered by the Tuesday lecture. You will have a chance to work through the assignment during the lab session on Wednesday and to discuss in the discussion session on Friday. Assignments will be due on bCourses by 5pm Friday. They will be graded for completion, with a comprehensive key provided afterwards.
- **Midterm & final exams:** These will take place in-class. You will be well-prepared if you have attended all classes and completed the lab/homework assignments.
- **Regression project:** Students will ideally work in pairs to perform an analysis on a continuous outcome data set of their choice. Guidelines are provided on bCourses and on the first day of class. Project workshops will be held throughout the semester. You should aim to achieve the following by these dates:
 - By Monday October 10th: Form groups, Choose data set, Think about research question
 - By Monday November 14th: Initial analysis, Plan for complete analysis
 - Monday December 12th: Final report write-up due

Schedule:

Week 0 (Aug 25 – Aug 26):

Thu: Overview of course
RComp: Ch.1 (p.1-14, p. 37-41)

Week 1 (Aug 29 – Sep 2):

Tue: Simple linear least squares regression
Text: Ch. 5 (p. 82-92)
RComp: Ch. 4 (p. 149-155)

Wed: Introduction to R (lab)
RComp: Ch.2 (p. 44-47, p. 53-55) & Ch. 3 (p. 115-117)

Thu: Statistical inference for simple linear least squares regression
Text: Ch. 6 (p. 106-112)

Fri: Introduction to R (discussion)

Week 2 (Sep 5 – Sep 9):

Tue: Making predictions & transforming data
Text: Ch. 4 (p. 55-75)
RComp: Ch. 3 (p. 126-145)

Wed: Regression lab #1

Thu: Multiple linear least squares regression
Text: Ch. 5 (p. 92-102) & Ch. 6 (p. 112-117)
RComp: Ch. 4 (p. 155-157)

Fri: Regression homework #1 (discussion)

Week 3 (Sep 12 – Sep 16):

Tue: Dummy variable regression (dichotomous factors)
Text: Ch. 7 (p. 128-132)
RComp: Ch. 4 (p. 157-160)

Wed: Regression lab #2

Thu: Dummy variable regression (polytomous factors)
Text: Ch. 7 (p. 133-138)

Fri: Regression homework #2 (discussion)

Week 4 (Sep 19 – Sep 23):

Tue: Dummy variable regression (modeling interactions & principal of marginality)
Text: Ch. 7 (p. 140-150)

Wed: Regression lab #3

Thu: Outliers, Studentized residuals
Text: Ch. 11 (p. 266-274)

Fri: Regression homework #3 (discussion)

Week 5 (Sep 26 – Sept 30):

- Tue: Measuring influence, Should unusual data be discarded?
Text: Ch. 11 (p. 276-282 & p. 288-289)
RComp: Ch. 5 (p. 285-302)
- Wed: Regression lab #4
- Thu: Missing data in regression models (descriptive overview)
Text: Ch. 20 (p. 605-613 & p. 619-623)
- Fri: Regression homework #4 (discussion)

Week 6 (Oct 3 – Oct 7):

- Tue: Review for midterm (lecture)
- Wed: Review for midterm (lab)
- Thu: 3:30-5pm: Midterm exam (weeks 0-5)
- Fri: Project workshop (discussion)

Week 7 (Oct 10 – Oct 14):

- Tue: One-way ANOVA
Text: Ch. 8 (p. 153-159)
RComp: Ch. 4 (p. 160-162)
- Wed: ANOVA lab #1
- Thu: Two-way ANOVA (deviation-regressor coding, ANOVA in R)
Text: Ch. 8 (p. 159-166)
RComp: Ch. 4 (p. 166-171 & p. 213-216)
- Fri: ANOVA homework #1 (discussion)

Week 8 (Oct 17 – Oct 21):

- Tue: Two-way ANOVA (ANOVA model, testing hypotheses)
Text: Ch. 8 (p. 166-177)
RComp: Ch. 4 (p. 192-197)
- Wed: ANOVA lab #2
- Thu: Higher-way ANOVA (three-way, higher order, empty cells)
Text: Ch. 8 (p. 177-187)
- Fri: ANOVA homework #2 (discussion)

Week 9 (Oct 24 – Oct 28):

- Tue: Analysis of covariance, Linear contrasts of means
Text: Ch. 8 (p. 187-194)
- Wed: ANOVA lab #3
- Thu: Step-wise model selection
Text: Ch. 13 (p. 358-361) & Ch. 22 (p. 669-675)
RComp: Ch. 4 (p. 208-213)
- Fri: ANOVA homework #3 (discussion)

Week 10 (Oct 31 – Nov 4):

- Tue: Model selection criteria
Text: Ch. 22 (p. 675-685)
- Wed: Model selection lab
- Thu: Linear regression in matrix form (descriptive overview)
Text: Ch. 9 (p. 202-203 & p. 208-212) & Ch. 11 (p. 289-290)
- Fri: Model selection homework (discussion)

Week 11 (Nov 7 – Nov 11):

- Tue: Project workshop (case studies)
- Wed: Project workshop (lab / discussion)
- Thu: Dealing with collinearity, Principle components analysis
Text: Ch. 13 (p. 341-355)
- Fri: *Veteran's day (Holiday)*

Week 12 (Nov 14 – Nov 18):

- Tue: Dealing with collinearity, Principle components analysis
Text: Ch. 13 (p. 356-366)
RComp: Ch. 6 (p. 325-328)
- Wed: Collinearity lab
- Thu: Bootstrapping
Text: Ch. 21 (p. 647-660)
RComp: Ch. 4 (p. 187-188)
- Fri: Collinearity homework (discussion)

Week 13 (Nov 21 – Nov 25):

- Tue: Project workshop, Review for final
- Wed-Fri: *Thanksgiving (Holiday)*

Week 14 (Nov 28 – Dec 2):

- Tue: Review for final (lecture)
- Wed: Review for final (lab)
- Thu: 3:30-5pm: Final exam (weeks 7-12)
- Fri: Project workshop (discussion)

Week 15 (RRR week, Dec 5 – Dec 9):

- Tue: 3-5pm: Office hours (John)
- Wed: 3-5pm: Office hours (Lina)
- Thu: 3-5pm: Office hours (John)
- Fri: 10am-midday: Office hours (Lina)

Week 16 (Finals week, Dec 12):

- Mon: 5pm: Regression project write-up due