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Class hours  
Lecture: TuTh 9:30am-10:50am Donald Bren Hall (DBH) 1300  
Discussion: M 5:00pm - 5:50pm Rowland Hall 184

Office hours:  M 4:00pm - 4:50pm in DBH 2216 (and by appointment!!)

Course goals:  Introduction to statistical methods for analyzing data from experiments, observational studies and surveys. Methods covered include two-sample procedures, analysis of variance, linear regression. Course covers both the underlying theory behind these methods and how the methods are applied in practice.

Prerequisites:  This is a core class in the statistics MS and PhD program. Thus, prerequisites are knowledge that is assumed for students admitted to those programs: “Undergraduate preparation in statistics, mathematics, and computing should include multivariate calculus (the equivalent of UCI courses Mathematics 2A-B, 2D-E), linear algebra (121A), elementary analysis (140A-B), introductory probability and statistics (Statistics 120A-B-C), and basic computing (ICS 21).” Statistics 201 is an alternative course that assumes less mathematical background.

Course outline/schedule (tentative)

Th Sept 26 - Th Oct 3 (3 lectures): Introduction to inference / Inference in the two-sample case  
Randomization-based and model-based approaches to two-sample inference including discussion of study design and model checking.  
(Reading: Chapter 15, Appendix A.6-7)

T Oct 8 - T Oct 22 (4 lectures, No Class Th Oct 17): Analysis of variance (ANOVA)  
One-way analysis of variance for inference concerning more than two samples/populations including discussion of planned contrasts and multiple comparisons. Use of pairing/blocking to reduce variance.  
(Reading: Chapters 16-18, 21)

Th Oct 24 - T Oct 29 (2 lectures): Simple linear regression and correlation  
(Reading: Chapters 1-5)

Th Oct 31 - T Nov 12 (3 lectures): Multiple linear regression: basics  
(Reading: Chapters 6-7)

Th Nov 7 - MIDTERM EXAM

Th Nov 14 - T Nov 26 (4 lectures) - Multiple regression: model diagnostics/remedies and model building  
Evaluating regression assumptions and potential remedies; study of outlying and influential cases; model building strategies.  
(Reading: Chapters 8-12)

Th Nov 28 - NO CLASS (Thanksgiving holiday)

T Dec 3 - Th Dec 5 (2 lectures) - ANOVA v regression / ANCOVA / Factorial ANOVA / makeup  
(Reading: Chapters 19-20, 23-24)
Discussion: There is a weekly discussion section on Monday at 5pm (sorry). (No discussion on Monday November 11 due to holiday.) The discussion serves several purposes: (1) It is an ideal time for you to ask questions about class/homework; (2) It is an ideal time for R/RStudio instruction/discussion; (3) It can be used as needed for me to present additional material or make up for a missed lecture. You are not required to attend discussion UNLESS I ask you to attend on a given week. Attendance is highly recommended – if you do come, please bring your questions!

Exams: There will be an in-class midterm exam on Thursday November 7, 2019. The final exam will (likely) consist of two elements: (1) Take-home data analysis; (2) Standard two-hour final exam. The latter will occur on Thursday December 12, 2019 from 8:00-10:00am.

Homework: Students will be assigned (approximately) weekly homework (yes ... starting today). Homework will be generally due on Thursdays. The assignments will include both application-oriented and theory questions. The homework will require the use of the R software package to analyze data. All homework must be turned in to me (i.e., not the grader). Late homework will be penalized but it is much better to turn homework in late than not at all; homework turned in after solutions have been posted will not earn any credit.

R / RStudio: You are expected to use R (and RStudio) for data analyses. A document with detailed instructions for downloading R and RStudio is available at the course website.

Grading: Course grades are determined by performance on all work as follows: homework (approx 25%), midterm exam (approx 30%), final exam (approx 45%).

Academic Honesty: All students are expected to abide by UCI policies regarding academic integrity (see aisc.uci.edu). To be explicit about the expectations for this course: You are allowed to discuss homework with other students and with me. Every student must write-up the homework independently. If you submit a copy of someone else’s solution (or a past course answer key), then this is a violation of the academic honesty policy. Naturally cheating on an exam is also a violation. A first violation of the UCI academic honesty policy will result in zero on the assignment in question. A second violation will result in a failing grade in the course and reporting to UCI administration.

Textbooks and References:
Primary text: Applied Linear Statistical Models, MH Kutner, CJ Nachtsheim, J Neter, W Li (5th ed), McGraw Hill Irwin, 2005. Unfortunately the book is out-of-print so is not available at the bookstore. You can buy a used copy via Amazon or other website or you can purchase an Ebook comprised of the relevant chapters for our course from https://create.mheducation.com/shop/ (best to search for the eBook with its ISBN 9781307330694).


References (intro stat - Stat 7):
Introduction to the Practice of Statistics, Moore, McCabe, Craig (9th ed), WH Freeman, 2017.

References (prob and stat - Stat 120ABC):