

QUANTITATIVE METHODS 830:200:H1

SUMMER 2017

Course Information

LOCATION: Busch Campus, SEC, 205

DAY/TIMES: M,T,W,R 11:00AM-1:30PM (attendance is mandatory).

Instructor

Serena De Stefani

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Office Hours: TBD

Textbook

Required:

Stats: Data and Models, 4th Edition

De Veaux, Velleman, Bock

Pearson, 2016

ISBN-13: 9780321986498

The lectures will be based on this book. The text cover all the principles of Classical Statistics from a general point of view.

The third edition of *Stats: Data and Models* is also OK.

Recommended:

Introduction to Statistics and Data Analysis For the Behavioral Sciences, 1st Edition

Robert S. Lockhart

W.H. Freeman and Company, 1997

ISBN-13: 978-0716729747

This is an excellent book that covers all the principles of Classical Statistics in a more conceptual way, in the context of psychological sciences. The book is out of print; I will provide a PDF on Sakai.

Course Description

This course is an algebra-based introduction to Statistics. You already know all the math you need to succeed in the course! Nothing more than addition, subtraction, multiplication and division; so don't worry about that.

The course will cover the foundational principles of Classical Statistics (probability, sampling, regression), the most common hypothesis testing techniques (t-tests, analysis of variance, etc.) and will serve as an introduction to Bayesian Statistics and to the R statistical software. All the R code will be provided (this is not a programming class).

We will follow the book very closely: it is very important that you keep up with the readings and lectures.

Lectures Schedule

Lectures Schedule

Date	Topic	Book Chapters	Homework Due
Week 1			
Mon 7/9	1) Introduction - Data - Samples - Variables	CH 1	
Tue 7/10	2) Displaying categorical and quantitative data	CH 2,3	
Wed 7/11	3) Comparing distributions - The normal model 1	CH 4,5a	HW (CH 1,2,3)
Thu 7/12	4) The normal model 2 - Scatterplots - Using R	CH 5b,6	
Week 2			
Mon 7/16	5) Linear regression 1	CH 7	
Tue 7/17	6) Linear regression 2	CH 8	HW (CH 4,5,6)
Wed 7/18	7) Re-expression and randomness	CH 9,10	
Thu 7/19	8) Surveys and study design	CH 11,12	HW (CH 7,8,9,10)
Week 3			
Mon 7/23	9) Probability	CH 13,14	
Tue 7/24	10) Random variables - Probability models	CH 15,16	HW (CH 11,12,13,14)
Wed 7/25	Review		
Thu 7/26	MIDTERM		CH 1-14
Week 4			
Mon 7/30	11) Sampling Distributions and CI for proportions	CH 17,18	
Tue 7/31	12) Testing Hypotheses: proportions and means	CH 19,20	HW (CH 15,16)
Wed 8/1	13) Tests review - Comparing groups	CH 21,22	
Thu 8/2	14) Paired samples - Comparing counts	CH 23,24	HW (CH 17,18,19,20)

Week 5

Mon 8/6	16) Regression Inference	CH 25	
Tue 8/7	17) Analysis of Variance	CH 26,27	HW (CH 21,22,23,24)
Wed 8/8	18) Multiple Regression	CH 28,29	
Thu 8/9	19) Bayesian Statistics 1		HW (CH 25,26,27,28,29)

Week 6

Mon 8/13	20) Extensions - Current Topics		HW (Bayesian Statistics)
Tue 8/14	Review		
Wed 8/15	FINAL EXAM		CH 15-29, Bayesian Statistics

Homework

Each homework is composed of three parts:

- Sakai submission of HW assignment (multiple choice), due at 10:30AM before class
- Write-up of **same** HW assignment, due at the beginning of class
- Weekly R assignments on Datacamp

Collaboration in solving the homework assignments is allowed and encouraged, but each student must submit his/her own version of the write-up. Failure to submit the written assignments will result in a zero for the assignment. Late assignments are not accepted, unless in case of a serious illness or family emergency: arrangements must be made BEFORE the homework due date. Late homework cannot be accepted for any reason once the answer key is posted, usually one day after the assignment deadline.

Tutoring

There will be a tutor available in the College Avenue Learning Center. See below the schedule for the first week of classes. You may check the schedule online at:

<https://rlc.rutgers.edu/events/summer-hours-2018-05-10>

<https://webapps.rutgers.edu/student-rlc/Tutor/Main/Student/StudentSearch>

Exams

There will be one midterm and one final exam, both multiple choice. The final is non-cumulative. A calculator is allowed and a cheat sheet will be provided with the most common formulas. The exams will have a conceptual part (definitions, principles, etc.) and a computational part. Except for the actual numbers, the structure and the process involved in solving the computational problems will be identical to those used in class. Make-up exams may be scheduled in case of a serious illness or family emergency: again, arrangements must be made BEFORE your exam date.

Special Accommodations

Students requesting special accommodations must follow the procedures outlined at

<https://ods.rutgers.edu/students/registration-form>.

Grading

Homework: 20%, distributed as:

Homework problems: 15%, multiple choice (plus in-class submission)

Datacamp: 5%

Attendance: 5%

Midterm: 30%

Final: 45%

Extra Credit: 5%

Classroom policies

No electronic devices (laptops, smartphones, tablets) are allowed in class during lecture, except for Thursday 7/12/2017, when we will look at the R statistical software together. But feel free to bring your computer to class if you need to ask questions about an R assignment before or after the lecture.

How to get an A in this class

Pay attention to details! Don't miss lectures or assignments. Take advantages of extra credit opportunities ("take care of the pennies, and the pounds will look after themselves"). Collaborate with other students and do not hesitate to ask for help if you need. Above all, do not disappear. Stay engaged.

Core Curriculum Learning Goals

This course has been certified as satisfying both Quantitative and Formal Reasoning Learning Outcome Goals (QQ and QR) of the SAS Core Curriculum. Specifically, students will be able to

- a) formulate, evaluate, and communicate conclusions and inferences from quantitative information (QQ),
- b) apply effective and efficient mathematical or other formal processes to reason and to solve problems.

Academic integrity

Current Academic Integrity Policy:

<http://academicintegrity.rutgers.edu/academic-integrity-policy/>