

Course Syllabus

Quantitative Methods 830:200

Spring 2013

Lecture: Tuesdays & Thursdays 6:40-8:00pm in Hill Auditorium
Instructor: Dr. Melchi M. Michel
Office: 125 Psychology Bldg. (Busch Campus)
Email: melchi.michel@rutgers.edu
Phone: (848) 445-8919
Office Hours: Th 10:00-11:00am (or by appointment)

Recitation Sections

| Section | Day & Time | First Meeting | Location | TA |
|---------|--------------------|---------------|----------|-----|
| 10 | T 8:10pm – 9:30pm | 9/20 | SEC 209 | TBA |
| 11 | W 5:00pm – 6:20pm | 9/19 | SEC 208 | TBA |
| 12 | Th 3:20pm – 4:40pm | 9/19 | LCB 109 | TBA |
| 13 | Th 5:00pm – 6:20pm | 9/19 | SEC 210 | TBA |

Teaching Assistants

| | Office Hours | Location | Email |
|----------------|--------------|------------------|---------------------------|
| Lloyd Robotham | TBA | 515 Tillett Hall | lloyd.robtham@rutgers.edu |
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Course Materials

Textbook: Privitera, G. J. (2012). *Statistics for the Behavioral Sciences*. Sage Publications.
ISBN: 9781412969314

You will need to bring this textbook to your recitation sections.

Clicker: Turning Technology, *ISBN: 9781934931400*

Clicker questions will be asked in lecture for extra credit points. You are not required to purchase a clicker, but I hope you do because, in addition to allowing you to earn extra credit points, it will enhance your learning experience and help me to focus attention on the material with which you have the most trouble.

Calculator: You will need a simple calculator capable (at a minimum) of computing square roots. An inexpensive solar-powered scientific calculator would be preferable, since these allow the use of parentheses, have a straightforward squaring function, and are unlikely to run out of power in the middle of an exam. I recommend the **Texas Instruments TI-30X IIS**, which can be purchased online for under \$15. *Note: even if you have calculator functions on your smartphone or computer, you will need this calculator for exams. You will not be permitted to use phones or laptops during the exams.*

Access to a PC: You will need internet access to view course materials on the Sakai site.

Course Goals

This course has been certified as satisfying both Quantitative and Formal Reasoning Learning Outcome Goals (QQ and QR) of the SAS Core Curriculum.

The purpose of this course is to provide you with an introduction to statistics in the behavioral sciences. While I realize that most students do not choose to take this class but take it reluctantly as a requirement for their major, I would like to try to convince you over the course of this semester that statistics is understandable and inherently interesting. This course will necessarily involve some math, but nothing beyond middle school arithmetic and some basic algebra. If you can add, multiply, divide, and know how to apply mathematical formulas to numeric values, then you have all the skills necessary to succeed in this course.

There are three key objectives that I would like to meet over the course of this semester. First, I would like you to become familiar with the key underlying concepts involved in descriptive and inferential statistics. These include general probability, measurement, variability, point estimation, confidence intervals, inference, and hypothesis testing. Having you memorize dozens of equations is not an objective of this course. There are several key equations that I will expect you to remember, but my view is that you can always check the book or other sources for necessary equations after the course is finished. The focus of this course is not rote memorization, but the development of a conceptual and mathematical understanding of these topics.

Second, I would like you to become a knowledgeable consumer of behavioral research. As you continue your studies in psychology, you will be increasingly exposed to peer-reviewed journal articles and other primary sources of research (some of you may even eventually publish your own research). I would like you to be able to read, understand, and critically evaluate the statistical methods used in this research. Finally, I would like you to be able to appreciate the role that statistics plays in everyday life. After this class you should be able to read news with a more critical view of the use of statistics in popular media.

Course Requirements

Midterm Exams: Two time-limited midterm exams will be given during normal lecture hours. Each of these exams will consist of two parts. The first part will be conceptual (i.e., no calculations, only multiple choice and short written answers to objective questions) and the second part will be computational. For the computational portion of the exam you will be permitted to bring one standard letter-sized (8.5 x 11in) sheet of paper with any formulas or notes on it. *In order to receive any credit on the computational part of the exams, you must show your work.* Only calculators are permitted, no other electronic devices may be used.

Comprehensive Final Exam: The final exam will be structured similarly to the midterm exams, but will be somewhat longer. As with the midterm exams, you will be allowed to bring a single letter-sized sheet of paper with any formulas or notes on it. Again, only calculators will be permitted.

The midterm and final exams will together make up 85% of your grade. To compute your overall exam grade, the final exam will count as two midterm exams, giving you a total of four exam scores. The



lowest of these resulting scores will then be dropped and your overall exam score will be taken as the average of the three remaining scores. Note that all three exams must be taken (e.g., you cannot simply miss one of the midterms and use it as a dropped score). A missed exam will result in a course grade penalty of one whole letter grade (e.g., from B+ to C+).

If an exam is cancelled or postponed on the day of the exam, there will be a member of the Psychology Department in the room at the scheduled time to make the announcement. Notices posted on doors or on the blackboard are likely hoaxes.

Make Up Exams: In order to qualify for a make-up for either of the midterms or the final exam, you must notify me *in advance* by telephone or email *and* provide appropriate documentation (e.g., a physician's note, an obituary or funeral notice, a police report, etc.). Except in case of an unforeseeable emergency, you must notify me at least one week in advance of the exam. If you do not meet *all* of these criteria, you will not be permitted to take a make-up. In addition, because make up exams must be generated *ad hoc*, they may differ significantly in structure from the in class exams.

Homework/Classwork Assignments: Homework/classwork assignments assigned throughout the semester will contribute to 15% of the course grade. Problem sets will typically be assigned in class (and posted on the Sakai site) on Thursday and will be due at the beginning of class the following Thursday. Each homework problem will be worth two points: one point for a good faith effort at completion, and one point for correctness of the answer. No late homework assignments will be accepted. As with the exams, to receive any credit on computational questions, you must show your work.

Clicker Questions: You can earn extra credit points by purchasing a clicker and bringing it to class to answer clicker questions. Each day in class there will 1-4 clicker questions available. Any answer to a clicker question gets you half credit because it shows you were in class and paying attention, and a correct answer (for questions that have a correct answer) will get you full credit. Use of clickers is not required but does allow you to earn extra credit points. Thus, try not to get worried if you occasionally forget your clicker or it occasionally does not work properly. You can earn up to 10 points on your final course grade by answering the clicker questions regularly in class.

Extra Credit: The midterm and final exams may include several extra credit questions. Otherwise, the only way to get extra credit is to regularly answer clicker questions in class. There are no other extra credit options available.

Attendance

Regular class attendance is expected of all students, but will not be directly enforced (i.e., I will not lower your course grade for missing classes). Nonetheless, you are strongly encouraged to attend all lectures and recitations. Historical student performance in this course indicates that you are highly unlikely to do well in this course if you do not regularly attend class. Attending class makes you more likely to conceptually grasp the material covered in lectures, some of which is not covered in the book. Attending recitations will help solidify your procedural knowledge and will likely improve your

homework/classwork score, since TA's will spend much of the recitation going through assigned homework problems.

If you expect to miss class, please use the University website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. You will not be penalized on the basis of this information.

Academic Integrity

Collusion (getting any form of assistance from other students or outside sources) on exams or quizzes is prohibited. Students suspected of doing so will be brought up on charges before university's Office of Student Conduct, and penalties, up to and including expulsion, will be imposed for those found guilty. (See <http://policies.rutgers.edu/PDF/Section10/10.2.13-current.pdf> for specifics).

Academic Accommodations

Should you require academic accommodations, you must file a request with the Office of Disability Services for Students (<http://disabilityservices.rutgers.edu/request.html>). You should register with disability services as soon as possible. It is your responsibility to self-identify with the Office of Disability Services and to provide me with the appropriate documentation from that office at least one week prior to any request for specific course accommodations. There are no retroactive accommodations.

Anticipated Course Schedule (*subject to change*)

Note: Assigned readings should be read in advance of the associated lectures.

| Date | Topics | Assigned Readings |
|-------------------|---------------------------------------------------------------------------------------|---------------------------------|
| Tues. 1/22 | Course Orientation, Review of Syllabus and Available Resources | Appendix A Review and Self-Test |
| Thurs. 1/24 | Basic Statistical Concepts and Notation | Chapter 1 |
| Tues. 1/29 | Measures of Central Tendency, Frequency Distributions, Plotting Data & Reading Graphs | Chapters 2&3 |
| Thurs. 1/31 | Measures of Dispersion or Variability | Chapter 4 |
| Tues. 2/5 | Basic Concepts of Probability | Chapter 5 |
| Thurs. 2/7 | Probability, Normal Distributions, & z-Scores | Chapter 6 |
| Tues. 2/12 | Sampling Distributions | Chapter 7 |
| Thurs. 2/14 | Catch up & Review | |
| Tues. 2/19 | Exam 1 | |
| Thurs. 2/21 | Intro to Hypothesis Testing | Chapter 8 |
| Tues. 2/26 | z-Tests and Intro to t-Tests (One Sample) | Chapter 9 (9.1-9.6) |
| Thurs. 2/28 | t-Tests II (Two Independent Samples) | Chapter 9 (9.7-9.10) |
| Tues. 3/5 | t-Tests III (Two Related Samples) | Chapter 10 |
| Thurs. 3/7 | Estimation & Confidence Intervals | Chapter 11 |

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| Tues. 3/12 | Introduction to ANOVA | Chapter 12 (12.1-12.5) |
| Thurs. 3/14 | ANOVA I Continued (One-Way, Independent Samples) & Post-hoc Tests | Chapters 12&13 (12.5-12.7,13.5) |
| 3/19 & 3/21 | SPRING BREAK – NO CLASSES | |
| Tues. 3/26 | ANOVA II (One-Way, Repeated Measures) | Chapter 13 |
| Thurs. 3/28 | Catch up & Review | |
| Tues. 4/2 | Exam 2 | |
| Thurs. 4/4 | ANOVA III (Factorial Design) | Chapter 14 |
| Tues. 4/9 | ANOVA III Continued | Chapter 14 |
| Thurs. 4/11 | Correlation | Chapter 15 |
| Tues. 4/16 | Linear Regression | Chapter 16 |
| Thurs. 4/18 | Nominal Data & The Chi-Square Test | Chapter 17 |
| Tues. 4/23 | Nonparametric & Distribution-Free Tests | Chapter 18 |
| Thurs. 4/25 | TBA (Catch up or Advanced Topics) | |
| Tues. 4/30 | Review | |
| Thurs. 5/2 | Review | |
| TBA | FINAL EXAM @ Time TBA Be sure to check http://finalexams.rutgers.edu/ for updates | |

The schedule above is subject to change. Please check the Sakai site regularly for announcements and updates.