

Syllabus for Statistics (440.605.82), Fall 2016

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Course Outline: This course provides a general survey of statistical methodology. Topics include probability and sampling, distribution theory, hypothesis testing, estimation (Maximum Likelihood and Method of Moments), and Analysis of Variance. It is also designed to provide the requisite background for 440.606 Econometrics.

Prerequisite: a course in calculus (or co-requisite JHU *Mathematical Methods for Economists*)

Required Textbooks (new or used):

(1) “Text”: Anderson, Sweeny, Williams, Camm, and Cochran *Statistics for Business and Economics*, **Revised** 12th edition. Norton & Company. NOTE: 12th edition has been revised. Some students rent the text (electronically) rather than purchase it.

There is an on-line version that, I believe, provides access to additional material (such as an “extra” chapter) that we do not make use of.

(2) “Supplement”: Spiegel, Murray, John Schiller, and R. Alu Srinivasan. *Schaum’s Outlines Probability and Statistics* (4th ed.) McGraw-Hill. 2013.

Optional Textbook. Ross, Sheldon. *A First Course in Probability*, any edition.

Pearson/Prentice Hall. There is a 9th edition. Used copies of earlier editions are available and are just as useful for reference. This is an advanced text. The material I want to use from Ross I bring to the course; most students do not get a copy.

Course Requirements:

- There are up to 10 problem sets planned (subject to revision, with consolidation to 9 problem sets towards the end of the course), a midterm, and a final. The final focuses on material covered since the midterm. Problem sets are assigned each week, with solutions due one week later.
- Please do not send a jpeg file—sending a pdf or Excel spreadsheet works best. Please do send scans of your handwritten work to accompany your Solution Sheet of final answers—you can get partial credit based on your work even if your final answer is not correct.
- Let me know ahead if you need extra time. Many students need an extension for one (or sometimes two) Problem Sets due to commitments of family and work. I tend to be very flexible for several days of extended deadlines (without penalty), e.g., instead of due on Tuesday night you can have until, say, Saturday or perhaps the next Tuesday. (I usually assess your work on the weekend, so if you propose getting your work to me by Saturday morning, that is no big problem for me and it leaves you almost the whole weekend to work on the next Problem Set). However, I do like to talk with you about extensions, and your proposed date for turning it in, BEFORE the Problem Set is due. So e-mail ahead of time.
- Try to structure your course work, career, and home life so that you would not need any more than one extra week for a problem set—that way you do not fall too far behind and accumulate too many assignments.
- Both exams are open-book, open-note. You can use your texts or other books. You can use calculators, laptops, or other electronic devices for calculations.

- Do not make use of the Internet during exam time. (The assessment is to test your ability to use your knowledge and statistical formulas—not your ability to use search engines to track down a solution to a comparable problem.) Each student is to work an exam independently.
- The independent, on-line structure of the course makes joint work on problem sets difficult, but I would not object to collaborations among two or three students. (If students do work jointly on problem sets, each student must still submit his or her own solutions rather than submitting just a copy.)
- The Discussion Board (DB) is excellent for posing questions to other students and me about the course, statistical concepts, and applying those concepts to problems analyzed in class or to other related problems. However, if you have a question about a problem on the problem set, I prefer that you e-mail directly me rather than pose the question to the DB. That way I can (at least sometimes) give a carefully chosen hint that leaves you with some thinking still to do instead of getting the whole solution from the DB.
- Each exam counts for 1/3 of your course grade, as do the problem sets (as a group).

Grading: The target grading scale is: 90-100 = A (with A+ at upper end, A- at lower end)

80- 89 = B (with B+ at upper end, B- at lower end)

79 and below = C (does not constitute graduate credit)

The grading scale is a “target” inasmuch as it is not absolutely fixed—I may move a boundary down, but I never move it upwards. For example, if you get a 90 that will never be less than A-.

University Policies [also available electronically with links in Syllabus section]

General. This course adheres to all University policies described in the academic catalog. Please pay close attention to the following policies:

Students with Disabilities. Johns Hopkins University is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact the coordinator listed on the [Disability Accommodations](#) page. Further information and a link to the Student Request for Accommodation form can also be found on the [Disability Accommodations](#) page.

Ethics & Plagiarism. JHU Ethics Statement: The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. Read and adhere to JHU’s [Notice on Plagiarism](#).

Dropping the Course. You are responsible for understanding the university’s policies and procedures regarding withdrawing from courses found in the current catalog. You should be aware of the current deadlines according to the [Academic Calendar](#).

Getting Help. You have a variety of methods to get help on Blackboard. Please consult the resource listed in the "Blackboard Help" link for important information. If you encounter technical difficulty in completing or submitting any online assessment, please immediately contact the designated help desk listed on the [AAP online support page](#). Also, contact your instructor at the email address listed in the syllabus.

Course Strategies

- Please view the videos and Powerpoints first (with print-offs of accompanying handouts while you view them) and only then read the text. This strategy helps use your time efficiently, enabling you to focus more on those parts of the text that I am emphasizing. Past students tell me the handouts are helpful because they complement the text.
- Plan on up to 3 hours weekly of videos and narrated Powerpoint instruction (akin to time you would spend in an in-person class), accompanied by several hours more of your readings and problem sets. A rule-of-thumb for a graduate course is 12 hours per week total (a full-time 4-course load would then involve 48 hours per week). Many students in this course devote less than 12 hours per week, but you do not yet know if you are in the category (see next two bullets).
- Plan to complete the problem set well ahead of the due time on Tuesday night. My strategy for assigning a Tuesday deadline is that it gives you the weekend to work the problems, plus another day or two for unexpected delays or to mull over a problem. Also, students can underestimate the number of hours required for a given problem set when sitting down on Tuesday evening to work it and 11:59 looms up much too quickly—so try to at least begin problem sets on the weekend if you can (see the next bullet).
- How much time does a problem set take? The average amount of reported time for the average problem set is about 4 or 5 hours. A couple of the harder problem sets take an extra hour or so. Note that these are averages. A few people may take as little as 3 hours, maybe even less depending on the problem set, while other people take 6 or even 8 hours. (In a wooden boatbuilding course I took two summers ago, the point was to take your time and ENJOY building the boat.) Until you know your own average time, do not leave problem sets for Tuesday night. You might need 6 hours but you have assumed you need only 3—then “Oops, it’s 11:59 already”; by the way, I gave extensions in those cases (even “after the fact” because I’m asleep at midnight), but don’t put yourself in that position.
- While I collect information on how much time it takes you to complete problem sets and exams, that information is for my planning purposes. I do not judge you for how long it takes, and I hope you do not judge yourself. What I have learned from data on completion times is:
 - (1) There have been higher performing AND lower performing students who complete the problem sets *quickly*. Some higher performing students get to the answer rapidly. Some lower performing students give up on a question (too soon, I think) and move on to the next.
 - (2) There have been higher performing students AND lower performing students who complete the problem sets *more slowly than the average*. Some higher performing students take time to go through every detail of a problem to figure it out, and then to write out their solutions with care and completeness (for my evaluation and their own future reference). Some lower performing students need the extra time to make much headway at all.
- In the end, I am interested in each student getting as much out of the course as possible in preparation for your future JHU work, whether that takes you above-average or below-average amount of time. Doing the problem sets is the best preparation for the exam and for your work in following courses. Show your work—problems are evaluated for partial credit.
- Warning: Do not take 3 JHU courses while working full-time. One student attempted that strategy and had to drop a course in the midst of the semester. Many students take 2 courses.

Tentative Schedule

The schedule is organized around Text Chapters; problems and assignments from the Supplement are provided as we proceed.

- Unit 1. Descriptive Statistics. (available Monday, 8/29)
Ch 1- Ch 3 (3.4) *P.S. 1 assigned (due Tuesday 9/6)*
- Unit 2. Descriptive Stat, Probability Theory, and Combinatorics (available Wednesday, 9/7)
Ch 3.5-3.6, Ch 4.1-4.3. *P.S. 2 assigned (due 9/13)*
- Unit 3. Probability Theory and Discrete Probability Distributions (9/14)
Ch 4.4-4.5; Ch 5.1-5.3. *P.S. 3 assigned (due 9/20)*
- Unit 4. Discrete Probability Distributions (9/21)
Ch 5.5-5.7 *P.S. 4 assigned (due 9/27)*
- Unit 5. Bivariate Dist'n for Discrete Random Variables, Continuous Distributions (9/28)
Ch 5.4, Ch 6.1, 6.4, 6.2 *P.S. 5 assigned (due 10/4)*
- Unit 6. Sampling and Sampling Distributions (10/5)
Ch 6.2 (cont), 6.3; Ch 7. *P.S. 6 assigned (due 10/11)*

Midterm, covering Ch 1 -7 Posted 10/12, due 10/18.

- Unit 7. Interval Estimation and Hypothesis Testing (10/19)
Ch 8, Ch 9.1-9.2 *No problem set for Unit 7.*
- Unit 8. Interval Estimation and Hypothesis Testing. (10/26)
Ch 9.3-9.8 *P.S. 7 assigned (due 11/1)*
- Unit 9. Inferences about Means and Proportions for Two-Sample Problems (11/2)
Ch 10. *P.S. 8 assigned (due 11/8)*
- Unit 10. Inferences about Variances (11/9)
Ch 11. *P.S. 9 assigned (due 11/15)*
- Unit 11. Comparing Multiple Proportions, Test of Independence and Goodness of Fit (11/16)
Ch 12. *P.S. 10 assigned (due 11/29)*
- Unit 12. Experimental Design and Analysis of Variance (11/30)
Ch 13. *No problem set for Unit 12.*

Final, focusing on material following the mid-term

(Subject to revision: posted on Monday, 12/5; Due on Saturday 12/10)