

PSY K300, Fall 2015

Statistical Techniques – Syllabus

CLASS TIME AND PLACE

Sections 6024 and 13294

Tu/Th, 4:00 – 5:15 PM, PY 226

INSTRUCTOR INFORMATION

Instructor: Rick Hullinger

Office: PY A300B

Office Hours:

Monday, 1:30 — 3:00 PM

Tuesday, 10:00 AM — 11:00 AM

Wednesday, 9:00 — 11:00 AM

Wednesday, 2:30 — 4:30 PM in PY 228

Or by appointment

Office Telephone: 856-6854

Email Address: rahullin@indiana.edu

TEACHING ASSISTANT INFORMATION

Teaching Assistants:

Hadi Hafizi (mhafizi@indiana.edu)

Ariana Gentile Polese (argentil@indiana.edu)

Office Hours:

By Appointment

COURSE GOALS

Many students think of K300 as a math course. While it is true that we will have to perform calculations along the way, this course is not about the math. I would consider this class a failure if all you learned to do was to plug numbers into arbitrary formulas for unknown reasons in order to generate meaningless answers. Instead, I want you to think about the underlying logic and principles of statistical analysis so that you understand *what the numbers tell you (and what they don't tell you)*, not just how to generate them. This approach will make you a far better consumer of the statistical (mis)information that bombards you every day and a better researcher should you choose to go in that direction.

In this course, successful students will be able to:

- Select and calculate appropriate descriptive statistics and make visual representations of data.
- Demonstrate an understanding of the importance of sampling randomness and measurement noise in statistical inference.
- Understand population parameters and how to estimate them.
- Pick an appropriate statistical technique to test a hypothesis about a particular treatment or experiment.
- Explain and interpret p values with respect to the null and alternative hypotheses.
- Perform a variety of statistical analyses either by hand or with the appropriate software tools.
- Discuss a set of results including p values, confidence intervals, and effect sizes, with respect to real world relevance and suggested next steps.
- Identify and critique examples of good and bad statistical reasoning in the popular press.
- Identify problems with classical statistical techniques and demonstrate an awareness of alternate methodologies including Bayesian ideas

TEXTBOOK

Nolan and Heinzen Essentials of Statistics for the Behavioral Sciences, 2nd edition. This class will be using an online version of the textbook (no paper text) through the publisher's LaunchPad website. You must purchase LaunchPad access card from the bookstore or directly from the [publisher's website](#) in order to access the textbook and complete the homework assignments.

You **must** have to have access to the website for this course. The textbook itself as well as a significant portion of the homework assignments in this class will be accessed through the LaunchPad. If you do not purchase LaunchPad access, you will not be able to complete and submit those assignments. Please contact me immediately if you have any trouble obtaining LaunchPad access.

HOMEWORK AND DATA ANALYSIS

There will be nine homework assignments in the course. Some of the problems will be written out and turned in during class, others will come from the textbook's website and will be completed and graded online. The details for each homework assignment will be posted on Canvas, and each assignment will be due on the specified date at the beginning of class. **Late homework will not be accepted.** When calculating your final homework score, I will drop your lowest homework grade. The top eight homework assignments together contribute 24% to your final grade.

Your homework must be neat, well organized and easy to read and follow. Grading statistics homework is tedious at best; please respect your TA by making the grading as easy as possible by doing the problems in order and clearly marking your final answers. I have given our TA the ability to deduct points from homework that is particularly disorganized or hard to follow, so it is in your best interest to be clear.

There will be six data analysis projects this semester. For each of these projects you will be given one or more data sets along with a few questions about the data. To complete these assignments you will spend some time investigating the data in order to answer the related questions. You will write up a short (a paragraph or less) answer to each question and submit your answers via Canvas. We will then spend time in class discussing these data and your thoughts. Your written answers and your participation in the in-class discussions together will contribute 18% to your final grade.

There will also be two "real-world statistics" assignments. These assignments will involve finding examples of statistical claims or analysis outside of the classroom and generating a short write-up, submitted via Canvas, analyzing the claims, techniques, and potential problems with the information. Together these two assignments will contribute 5% to your final grade.

EXAMS

During the first week of the semester you will be required to take an online pre-test to judge your current understanding of, and attitudes towards, statistics. These results will help me tailor the class to your specific needs. At the end of the semester, you will take a similar post-test to assess your progress and help me judge the effectiveness of the course. Students must complete *both* the pre-test and the post-test to receive credit for completing these assessments which count for 3% of your final grade in the course.

There will be three exams during the course of the semester. The first portion of the exam will be an in-class exam that will cover your understanding of the conceptual basis of statistics. This portion of each exam will be closed-book, closed-note, and you will not need a formula sheet or calculator. At the end of

the in-class portion, a take-home computational exam will be posted online. This portion of the exam will cover both your conceptual and computational aspects of the material. The take-home portion of each exam will be open-book, open-note, and open classmate, but each student must submit his or her own work. The take-home portion of the exams will always be due promptly at the beginning of the next class period and significant penalties will be levied for late submissions.

Each exam will focus primarily on the new material learned since the previous exam, but questions about older material will be included as well.

During finals week there will be an optional cumulative final exam. If you are happy with your grade in the course at the end of the semester, you do not need to take the final exam. Full details will be provided closer to the end of the semester.

If you have a scheduling conflict that will interfere with turning in an assignment or taking an exam at the scheduled time, you must let me know as soon as possible. With the exception of extreme and unforeseen circumstances, contacting me the day of (or even worse, after) an assignment or exam is due will be considered an unexcused absence and will result in a zero on work.

Your final grade is computed using one of the following formulas:

If you do not take the final exam:

Pre- and Post-Tests	3%
Average of your eight best homework assignments:	24%
Average of your data analysis projects:	18%
Average of your real-world statistics assignments:	5%
Average of your conceptual exams:	30%
Average of your take-home exams:	20%
	100%

If you take the final exam:

Pre- and Post-Tests	3%
Average of your eight best homework assignments:	24%
Average of your data analysis projects:	18%
Average of your real-world statistics assignments:	5%
Average of your conceptual exams:	20%
Average of your take-home exams:	15%
Final exam score	15%
	100%

Grading Scale:

A+: 97.0%-100%;	A: 93.0%-96.99%;	A-: 90.0%-92.99%
B+: 87.0%-89.99%;	B: 83.0%-86.99%;	B-: 80.0%-82.99%
C+: 77.0%-79.99%;	C: 73.0%-76.99%;	C-: 70.0%-72.99%
D+: 67.0%-69.99%;	D: 63.0%-66.99%;	D-: 60.0%-62.99%
F: Below 60%		

STUDENT RESPONSIBILITY

It is your responsibility to double-check your assignment and exam grades – both that the papers themselves were correctly graded and that the scores posted on Canvas match your actual grades. You have two weeks from the time an assignment or exam is returned to the class to address any grading issues with me. After that, the grades posted on Canvas will be considered final.

EXTRA CREDIT?

Nope.

CLICKERS

Clickers (Turning Technologies Response Card keypads) will be used in this class, and I **require** that you have one. I do not intend to use the clickers to take attendance or for graded in-class quizzes. Instead, they will be used as a way for me to get instant, anonymous feedback about whether you understand the concepts being taught, and to quickly collect data for in-class experiments and examples. If it appears that many of you are not bringing your clickers to class with you, I do reserve the right to change my policy to encourage clicker compliance.

EMAIL

I expect you to be checking your IU e-mail account no less than once a day. I will send frequent messages to the class with announcements, clarifications, instructions, and/or updates. You are responsible for the content of these messages exactly as if the material had been presented in class. Saying “I didn’t read that e-mail” or “I haven’t checked my e-mail for a few days” will not be considered a valid excuse for missing information. All class-wide e-mail messages are archived by the Oncourse Email Archive tool and will be available for reference throughout the course.

RESPECT

In order for this class to work well, there must be a certain level of respect between you and me and between you and your fellow classmates. Please be smart with your in-class behavior. Please turn off your cell phones and do not text-message your friends or surf the web while I’m teaching. If you’re distracted, chances are, you’re distracting someone else as well, and that’s not fair to the other members of the class. If you are being disruptive to me or to the class, I may ask you to leave.

FEEDBACK

Do not wait until the end of the semester course evaluations to let me know that I could be doing something better. Tell me as soon as possible so that I can make the class valuable and relevant as we go along. If you have any feedback, good or bad, about the course or how it’s being taught, please feel free to send it to me *anonymously* using this link:

<http://www.indiana.edu/~rahteach/feedback.html>

ACADEMIC HONESTY

This course is conducted under the University's Ethics Code. Specifically, it is considered cheating if you obtain any kind of information about answers and solutions to the assignments in this course – exams and homework – from any non-intended source or conversely transfer such information to others. It is also considered cheating if you lie to me about an absence relating to a homework assignment or an exam. The punishment for academic dishonesty will be no less than a zero on the assignment or exam and will likely be **failure of the course**. As per university policy, *all* incidents of academic misconduct must be reported to the Dean of Students office.

CLASS RECORDINGS

I will be using the Echo360 course capture system record and distribute the K300 class sessions to you through Canvas. Because I will be recording in the classroom, your questions or comments may be recorded. You may watch recordings online, or download them for off-line viewing on your computer, smartphone, or media player. These recordings are copyrighted by me, and provided by me and the University for your personal use. Please see the copyright statement below for the full terms of use. Due to possible unforeseen technical issues, I cannot guarantee that all class sessions will be properly recorded. It is important that you attend class, actively participate, and take notes. If you miss a class session, you cannot assume that a recording will be available.

STATEMENT FOR STUDENTS WITH DISABILITIES

Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.) You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; Captions and alternate media for print materials may take three or more weeks to get produced. Please contact Disability Services for Students at <http://disabilityservices.indiana.edu> or 812-855-7578 as soon as possible if accommodations are needed. The office is located on the third floor, west tower, of the Well Library, Room W302. Walk-ins are welcome 8 to 5, Monday to Friday.

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DISCLAIMER

This syllabus is an outline of the course and its policies, which may be changed for reasonable purposes during the semester at the instructor's discretion. You will be notified in class and / or via email if any changes are made to this syllabus, and an updated syllabus will be provided on Canvas.

PSY K300, Fall 2015 Statistical Techniques – Schedule

Week		Date	Description	Assignment(s) Due
1	Tu	Aug 25	Introduction & Levels of Measurement	Pre-Test
	Th	Aug 27	Distributions	
2	Tu	Sep 01	Central Tendency	Data Analysis #1
	Th	Sep 03	Central Tendency	HW #1
3	Tu	Sep 08	Graphs and Representations	
	Th	Sep 10	Critical Analysis: Popular Media	
4	Tu	Sep 15	Variability	Data Analysis #2 & Real World Stats #1
	Th	Sep 17	Variability	HW #2
5	Tu	Sep 22	Conceptual Exam 1	Take Home Exam #1
	Th	Sep 24	The Normal Curve and Z scores	
6	Tu	Sep 29	Z scores and Probability	Data Analysis #3
	Th	Oct 01	Distributions of Sample Means	
7	Tu	Oct 06	Hypothesis Testing	Data Analysis #4
	Th	Oct 08	Hypothesis Testing	HW #3
8	Tu	Oct 13	Statistical Significance	HW #4
	Th	Oct 15	Effect Size	
9	Tu	Oct 20	Conceptual Exam 2	Take Home Exam #2
	Th	Oct 22	Introduction to t Tests	
10	Tu	Oct 27	Introduction to t Tests	HW #5
	Th	Oct 29	Single-Sample t Tests	
11	Tu	Nov 03	Paired-Samples t Tests	HW #6
	Th	Nov 05	Independent Samples t Tests	
12	Tu	Nov 10	ANOVA	Data Analysis #5
	Th	Nov 12	ANOVA	HW #7
13	Tu	Nov 17	Correlation	Data Analysis #6 & HW #8
	Th	Nov 19	Correlation	
14	Tu	Nov 24	No Class (Thanksgiving)	
	Th	Nov 26	No Class (Thanksgiving)	
15	Tu	Dec 01	Review	HW #9
	Th	Dec 03	Conceptual Exam 3	
16	Tu	Dec 08	Interpreting Journal Articles	Take Home Exam #3
	Th	Dec 10	Critical Analysis II: Scientific Literature	Real World Stats #2 and Post-Test
17	Tu	Dec 15	Optional Final Exam 5:00 – 7:00 PM	