PSY K300, Fall 2016
Statistical Techniques – Syllabus

CLASS TIME AND PLACE
Lecture Section 10772
Wed and Fri, 9:05 – 9:55 AM, PY 100

LECTURE INSTRUCTOR INFORMATION
Instructor: Rick Hullinger
Office: PY A300B
Office Hours:
    Monday, 1:30 — 4:00 PM
    Wednesday, 10:00 AM — 12:00 PM
    Or by appointment
Office Telephone: 856-6854
Email Address: rahullin@indiana.edu

LAB INSTRUCTOR INFORMATION
Lab Instructors:
    Ryan Best (rmbest@indiana.edu)
        Section 30688: M 9:05 – 9:55 AM
        Section 30689: M 10:10 – 11:00 AM

    Rick Hullinger (rahullin@indiana.edu)
        Section 30690: M 11:15 AM – 12:05 PM
        Section 30691: M 12:20 – 1:10 PM

    Sam Cohen (cohense@indiana.edu)
        Section 30693: T 1:00 – 1:50 PM
        Section 30692: T 2:30 – 3:20 PM

COURSE GOALS
Many students think of K300 as a math course. While it is true that we will perform some calculations along the way, this course is not about the math. We would consider this class a failure if what you learned to do was to plug numbers into arbitrary formulas for unknown reasons in order to generate meaningless answers. Instead, we 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 course will explore statistical analysis in a hands-on way. We'll generate and analyze data in a series of lectures and interactive lab exercises. This semester you will tackle the process of statistical inference using a variety of different approaches. Along the way you will gain a grounded understanding of how statistical inference works, and you will learn how to apply statistical techniques to new problems that you encounter after leaving the class. You will become a more savvy 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 & COURSE MATERIALS

We will not be using a textbook for this course. All of the readings and notes that you need will be presented in class and/or provided for you on Canvas.

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 in lecture, and to quickly collect data for in-class experiments and examples. If it appears that many of you are not bringing your clickers to lecture with you, I do reserve the right to change my policy to encourage clicker compliance.

LAB EXERCISES AND FOLLOW-UPS

There will be 12 sets of lab exercises throughout the semester. Work in the labs will be done collaboratively, in groups of 2 – 4 students, but you must submit your own completed lab worksheet, through Canvas, at the end of the lab period. Each lab exercise will also have a follow-up activity for you to complete at home and submit via Canvas. These follow-up exercises must be complete independently to ensure that you understand the concepts covered in the lab. Late labs and follow-up activities will not be accepted. Your lowest lab and lab follow-up scores will be dropped from the final grade calculation.

EXAMS

There will be two exams during the course of the semester. The first portion of each 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 lab after each in-class exam, you will be given a take-home exam. The take-home exams will ask you to demonstrate a mastery of the concepts you have learned by analyzing new sets of data and explaining the concepts behind the tools used for analysis. You are free to discuss the content and concepts of the take-home exams with your classmates, but the work you submit must be your own.

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

During finals week (8am, on Monday, December 12th) there will be a cumulative, conceptual final exam similar to the in-class exams taken during the semester.

If you have a scheduling conflict that will interfere with a lab, 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 the late work.

Your final grade is computed using the following formula:

Average of your ten best lab exercises:	20%
Average of your ten best follow-up exercises:	20%
Average of your two in-class exams:	22%
Average of your two take-home exams:	22%
Final Exam:	16%
	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. After that, the grades posted on Canvas will be considered final.

EXTRA CREDIT?
Nope.

EMAIL
We expect you to be checking your IU e-mail account no less than once a day. We 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 messages will be sent using the Canvas Announcement tool, so archived messages can always be found on the Canvas sites.

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 lectures 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 2016
Statistical Techniques – Schedule

Week		Date	Description
1	Lab		**L0: Introduction / Randomness**
	W	Aug 24	Thinking about Randomness
	F	Aug 26	Summarizing Data
2	Lab		**L1: Histograms / Mean, Median, Mode**
	W	Aug 31	Variability / Standard Deviation
	F	Sep 02	The Normal Distribution and the Central Limit Therom
3	Lab		**No Labs, Labor Day**
	W	Sep 07	Models and Simulations
	F	Sep 09	Evaluating Models
4	Lab		**L2: Intuitions and Models**
	W	Sep 14	Samples and Populations
	F	Sep 16	The Null Model
5	Lab		**L3: Evaluating A Model**
	W	Sep 21	Introduction to p-Values
	F	Sep 23	Statistical Significance
6	Lab		**L4: Evaluating the Null using p-values**
	W	Sep 28	Exam Review
	F	Sep 30	In-Class Portion of Exam 1
7	Lab		**Take Home Exam 1**
	W	Oct 05	Experimental Design / Independent Samples
	F	Oct 07	No Classes, Fall Break
8	Lab		**No Labs**
	W	Oct 12	Two Independent Samples
	F	Oct 14	Two Related Samples
9	Lab		**L6: Between- and Within-Subjects Randomization**
	W	Oct 19	Theoretical Models: t Tests
	F	Oct 21	Intro to SPSS
10	Lab		**L7: SPSS t-Tests**
	W	Oct 26	Exam Review
	F	Oct 28	In-Class Portion of Exam 2
11	Lab		**Take Home Exam 2**
	W	Nov 02	Comparing More Than Two Groups
	F	Nov 04	Comparing More Than Two Groups
12	Lab		**L8: Comparing Multiple Groups**
	W	Nov 09	Correlation
	F	Nov 11	Correlation
13	Lab		**L9: Correlation**
	W	Nov 16	The Seamy Underbelly of Statistical Analysis
	F	Nov 18	Meta-Anlaysis

Week		Date	Description
14	Lab		No Classes, Thanksgiving Break
	W	Nov 23	
	F	Nov 25	
15	Lab		**L10: Bad Stats (p-Hacking)**
	W	Nov 30	Theoretical Models: ANOVA and Correlations
	F	Dec 02	Bayesian Approaches
16	Lab		**L11: SPSS ANOVA and Correlations**
	W	Dec 07	Bayesian Approaches
	F	Dec 09	Final Exam Review
17	**M**	**Dec 12**	**Final Exam**