PSY K300, Fall 2019
Statistical Techniques – Syllabus

CLASS TIME AND PLACE
[Lecture Section 7337](#)
Wed and Fri, 9:05 – 9:55 AM, PY 100

LECTURE INSTRUCTOR INFORMATION	LAB INSTRUCTOR INFORMATION
Instructor: Rick Hullinger	Lab Instructors:
Office: PY A300B	Mingjia Hu (mh60@iu.edu)
Office Hours:	Rick Hullinger (rahullin@iu.edu)
Tuesday, 3:30 — 5:00 PM	Katie Kroeper (kkroeper@indiana.edu)
Wednesday 10:00 — 11:50 AM	Priyamvada Modak (pmodak@iu.edu)
Or by appointment	Paul Niou (niouz@iu.edu)
Office Telephone: 812-856-6854	Rong Zheng (zhengro@iu.edu)
Email Address: rahullin@iu.edu	See your lab section's Canvas site for office hours and other details.

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 statistics 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 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.

LECTURE PARTICIPATION
Clickers (IU's TopHat response system) will be used in this class, and you are required to have a TopHat account and a compatible device (a web-enabled smartphone, tablet, or laptop computer.) If access to such a device is a problem for you, please come see me as soon as possible so that I can help.

Except for the first week of the semester, there'll be at least two clicker questions in each lecture. There will be 26 such lectures and you must submit responses to at least half of the questions asked each day in order to earn full credit for the day's participation. Your participation in the clicker questions is a key way to improve your learning in the large lecture hall, and to provide feedback to me about what you understand. Clickers are used as formative assessment so there is no penalty for incorrect answers, but students who are answering thoughtlessly may not receive participation credit.

Each student will have their five lowest lecture participation scores dropped. Because each student gets five dropped scores, I do not make a distinction between excused and unexcused absences. If you miss lecture due to illness, oversleeping, or emergency, or do not respond to the clicker questions for any reason (dead phone battery, didn't answer in time, connection problems, etc.), participation for that day will be recorded as a zero.

Clicker misconduct (e.g., responding for anyone other than yourself, answering any clicker question while not physically in the classroom, etc.) will be considered academic misconduct, and will result in significant grade reductions or failure of K300 as well as other university sanctions.

Students who need accommodations for observance of religious holidays must contact the lecture instructor (Rick) as indicated in the [academic bulletin](). All requests for accommodations must be made before Monday, Sept. 23rd.

LAB & LECTURE PREP ACTIVITIES
Periodically throughout the semester before we discuss a new topic or use a new applet in lab, a short introductory assignment will be posted on the lecture's Canvas site to help you prepare for the new material. These "Quick Check" assignments will have a small number of multiple-choice questions embedded in them to facilitate your learning and to give you credit for your prep work.

LAB EXERCISES AND FOLLOW-UPS
There will be 11 sets of lab exercises throughout the semester. Work in the labs will be done collaboratively, in groups of 2 – 4 students, and each group will submit a single lab at the end of the class 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. In the lab following 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. On Wednesday, Dec. 18th at 8am, 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 a follow-up 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:

Lecture Participation:	5%
Lab & Lecture Prep Activities:	5%
Average of your ten best lab exercises:	15%
Average of your ten best follow-up exercises:	20%
Average of your two in-class exams:	20%
Average of your two take-home exams:	20%
Final Exam:	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. 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 (not just Canvas messages) 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?class=K300

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 or misrepresent your presence in lecture by answering clicker questions from outside of class. 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 Kaltura course capture system to 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 iubdss@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 Wells Library, Room W302. Walk-ins are welcome 8 AM to 5 PM, Monday through Friday. You can also locate a variety of campus resources for students and visitors that need assistance at: http://www.iu.edu/~ada/index.shtml

SEXUAL MISCONDUCT AND TITLE IX POLICY

As your instructor, one of my responsibilities is to create a positive learning environment for all students. Title IX and IU's Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help.

If you are seeking help and would like to speak to someone confidentially, you can make an appointment with:

> The Sexual Assault Crisis Services (SACS) at (812) 855-8900 (counseling services)
> Confidential Victim Advocates (CVA) at (812) 856-2469 (advocacy and advice services)
> IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that Title IX and University policy require me to share any information brought to my attention about potential sexual misconduct, with the campus Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist.

I encourage you to visit stopsexualviolence.iu.edu to learn more.

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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 2019
Statistical Techniques – Schedule

Week		Date	Description	Reading/Prep
1	Lab		**No Labs**	
	W	Aug 28	Introductions	
	F	Aug 30	Histograms	Histograms & Central Tendency
2	Lab		**No Labs: Labor Day**	
	W	Sep 04	Variability	Terms & Classifications
	F	Sep 06	Variability & the Standard Deviation	
3	Lab		**L1: Histograms and Central Tendency**	
	W	Sep 11	Normal Curves and Z scores	
	F	Sep 13	Hypothesis Testing: Evaluating Models, Part I	
4	Lab		**L2: Z scores and Hypothesis Testing**	Coin Flipping Intro
	W	Sep 18	Hypothesis Testing: Evaluating Models, Part II	
	F	Sep 20	The Null Model	
5	Lab		**L3: Hypothesis Testing**	Matching Intro
	W	Sep 25	p-Values and Statistical Significance	
	F	Sep 27	Statistical Significance	
6	Lab		**L4: Statistical Significance & p Values**	
	W	Oct 02	Exam 1 Review	
	F	Oct 04	In-Class Exam 1	
7	Lab		**Take Home Exam 1**	
	W	Oct 09	Critical Analysis I: Popular Media	
	F	Oct 11	Testing Two Conditions	
8	Lab		**No Lab: Exam Recovery**	
	W	Oct 16	Between- and Paired-Samples Analysis	
	F	Oct 18	No Lecture: Fall Break	
9	Lab		**L5: Between- and Paried-Samples Randomization**	Between & Within Intros
	W	Oct 23	Catching up and Theoretical Models: t Tests	
	F	Oct 25	Intro to JASP	
10	Lab		**L6: JASP *t* Tests**	t Test Inro
	W	Oct 30	Comparing More Than Two Groups	
	F	Nov 01	Comparing More Than Two Groups, Part II	
11	Lab		**L7: Parametric and Non-Parametric ANOVAS**	ANVOA Intro
	W	Nov 06	Correlations	
	F	Nov 08	Correlations, Part II	
12	Lab		**L8: Parametric and Non-Parametric Correlations**	Correlation Intro
	W	Nov 13	Exam 2 Review	
	F	Nov 15	In-Class Exam 2	
13	Lab		**Take Home Exam 2**	
	W	Nov 20	The Seamy Underbelly of Statistical Analysis	
	F	Nov 22	Meta-Analysis and replication	

Week		Date	Description	Reading/Prep
14	Lab		**No Labs, No Lecture:** **Thanksgiving Break**	
	W	Nov 27		
	F	Nov 29		
15	Lab		**L9: Effect Size & Confidence Intervals**	
	W	Dec 04	Critical Analysis II: Scientific Literature	
	F	Dec 06	Bayesian Approaches	
16	Lab		**L10: Review**	
	W	Dec 11	Bayesian Approaches, Part II	
	F	Dec 13	Final Exam Review	
17	**W**	**Dec 18**	**Final Exam, 8:00 AM -- 10:00 AM in PY 100**	