PSY K300, Spring 2018
Statistical Techniques – Syllabus

CLASS TIME AND PLACE
Lecture Section 4270
Wed and Fri, 9:05 – 9:55 AM, PY 100

LECTURE INSTRUCTOR INFORMATION	**LAB INSTRUCTOR INFORMATION**
Instructor: Rick Hullinger Office: PY A300B Office Hours: Tuesday, 1:30 — 4:00 PM Wednesday 10:00 AM — 12:00 PM Or by appointment Office Telephone: 812-856-6854 Email Address: rahullin@indiana.edu	Lab Instructors: Daniel Bullock (dnbulloc@indiana.edu) Cory Chew (corchew@indiana.edu) Vishakh Iyer (vishiyer@indiana.edu) Brett Jefferson (jefferbr@indiana.edu) Eugene Kim (emkim@indian.aedu) Meera Manchanda (mmanchan@indiana.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 (Turning Technologies Response Cards) will be used in this class, and you are required to have one. Except for the first week of the semester, there'll be at least one clicker question in each lecture. There will be 26 such lectures, and students must be present and responding to the clicker questions in at least 21 of those lectures to earn full credit. Your participation in the clicker questions is a key way to improve learning in the large lecture hall, and to provide feedback to the instructor. Students who submit responses in fewer than 21 lectures will have their lecture participation grades reduced. Clickers are used as formative assessment so there is no penalty for incorrect answers, but students who are routinely answering randomly will not receive participation credit. Clicker misconduct (e.g., responding with someone else's clicker, possessing more than one clicker in class, etc.) will be considered academic misconduct, and will result in confiscation of clickers, grade reductions in K300, and other university sanctions. If your clicker malfunctions or you forget your clicker, you are permitted to write your responses on a paper for only one lecture. Regardless of emergency, there will be no excused absences, and if you miss class for any reason it must count toward the five "dropped" lecture participation marks.

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. 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 Friday, May 4th) 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%
Average of your ten best lab exercises:	20%
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

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 Kaltura 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.

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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any way without my prior written permission. In addition to legal sanctions for violations of copyright law, students found to have violated these prohibitions may be subject to University disciplinary action under the Code of Student Conduct and/or violations of the University's Technology Acceptable Use Policies.

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, Spring 2018
Statistical Techniques – Schedule

Week		Date	Description
1	Lab		**L0: Introduction / Randomness**
	W	Jan 10	Thinking about Randomness
	F	Jan 12	Histograms
2	Lab		**No labs, MLK Jr. Day**
	W	Jan 17	Histograms and Summarizing Data
	F	Jan 19	Variability
3	Lab		**L1: Histograms and Central Tendency**
	W	Jan 24	Models and Simulations
	F	Jan 26	Evaluating Models
4	Lab		**L2: Intuitions and Models**
	W	Jan 31	Evaluating Models, Part II
	F	Feb 02	The Null Model
5	Lab		**L3: Evaluating A Model**
	W	Feb 07	The Null Model and p-Values
	F	Feb 09	Statistical Significance
6	Lab		**L4: Evaluating the Null Using p-Values**
	W	Feb 14	Exam 1 Review
	F	Feb 16	In-Class Exam 1
7	Lab		**Take Home Exam 1**
	W	Feb 21	Experimental Designs
	F	Feb 23	Random Assignment
8	Lab		**No Labs**
	W	Feb 28	Between-Samples Analysis
	F	Mar 02	Paried-Samples Analysis
9	Lab		**L5: Between- and Paried-Samples Randomization**
	W	Mar 07	Theoretical Models: t Tests
	F	Mar 09	Intro to SPSS
10	Lab		**No Labs or Lectures, Spring Break**
	W	Mar 14	
	F	Mar 16	
11	Lab		**L6: SPSS *t* Tests**
	W	Mar 21	Comparing More Than Two Groups
	F	Mar 23	Comparing More Than Two Groups, Part II
12	Lab		**L7: Between-Participants ANOVA**
	W	Mar 28	Correlations
	F	Mar 30	Correlations, Part II
13	Lab		**L8: Correlations**
	W	Apr 04	Exam 2 Review
	F	Apr 06	In-Class Exam 2

Week		Date	
14	Lab		**Take Home Exam 2**
	W	Apr 11	Parametric Models: ANOVA and Correlations
	F	Apr 13	The Seamy Underbelly of Statistical Analysis
15	Lab		**L9: SPSS ANOVA and Correlations**
	W	Apr 18	Meta-Analysis and replication
	F	Apr 20	Bayesian Approaches
16	Lab		**L10: Review**
	W	Apr 25	Bayesian Approaches, Part II
	F	Apr 27	Final Exam Review
17	**F**	**May 04**	**Final Exam, 8:00 AM -- 10:00 AM in PY 100**