

PSY K300, Spring 2019

Statistical Techniques – Syllabus

CLASS TIME AND PLACE

[Lecture Section 4026](#)

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, 1:45 — 4:00 PM Wednesday 10:00 AM — 12:00 PM Or by appointment Office Telephone: 812-856-6854 Email Address: rahullin@iu.edu	Lab Instructors: Tessa Benson-Greenwald (tmbenson@iu.edu) Yanjun Liu (yanjliu@indiana.edu) Mattea Sim (matsim@iu.edu) Sen Yang (sy30@iu.edu) Cloe Moctezuma (cmoctez@iu.edu) Heidi Williams (heiwilli@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 question 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 routinely answering randomly will not receive participation credit.

Each student will have their six lowest lecture participation scores dropped. Because each student gets six 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.) it must count toward the dropped lecture participation marks.

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 procedures outlined by the Office of the vice Provost for Faculty and Academic Affairs](#). All requests must be made before Monday, Jan. 28th.

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, May 1st 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 <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 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.

COPYRIGHT

Copyright Rick Hullinger and Indiana University, 2019. All federal and state copyrights in these course materials are reserved by their respective creators. You are authorized to take notes in class and/or record my lectures for your own personal use. You are also welcome to share these materials with others. However you may not make any commercial use of my course materials or profit from them in 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 2019
Statistical Techniques – Schedule

Week		Date	Description	Reading/Prep
1	Lab		No Lab Week 1	
	W	Jan 09	Thinking about Randomness	Terms & Classifications
	F	Jan 11	Histograms	Histograms
2	Lab		L1: Histograms and Central Tendency	Central Tendency
	W	Jan 16	Variability	Variability
	F	Jan 18	Models and Simulations	
3	Lab		No Labs: MLK Jr. Day	
	W	Jan 23	Evaluating Models	
	F	Jan 25	Evaluating Models, Part II	
4	Lab		L2: Intuitions and Models	Coin Flipping Intro
	W	Jan 30	The Null Model	
	F	Feb 01	The Null Model and p-Values	
5	Lab		L3: Evaluating A Model	Matching Intro
	W	Feb 06	p-Values and Statistical Significance	
	F	Feb 08	Statistical Significance	
6	Lab		L4: Evaluating the Null Using p-Values	
	W	Feb 13	Exam 1 Review	
	F	Feb 15	In-Class Exam 1	
7	Lab		Take Home Exam 1	
	W	Feb 20	Experimental Designs	
	F	Feb 22	Random Assignment	
8	Lab		No Lab: Exam Recovery	
	W	Feb 27	Between-Samples Analysis	
	F	Mar 01	Paried-Samples Analysis	
9	Lab		L5: Between- and Paried-Samples Randomization	Between & Within Intros
	W	Mar 06	Theoretical Models: t Tests	
	F	Mar 08	Intro to SPSS	
10	Lab		No Labs, No Lecture Spring Break	
	W	Mar 13		
	F	Mar 15		
11	Lab		L6: SPSS t Tests	
	W	Mar 20	Comparing More Than Two Groups	
	F	Mar 22	Comparing More Than Two Groups, Part II	
12	Lab		L7: Between-Participants ANOVA	ANOVA Intro
	W	Mar 27	Correlations	
	F	Mar 29	Correlations, Part II	
13	Lab		L8: Correlations	Correlation Intro
	W	Apr 03	Exam 2 Review	
	F	Apr 05	In-Class Exam 2	

Week		Date	Description	Reading/Prep
14	Lab		Take Home Exam 2	
	W	Apr 10	Parametric Models: ANOVA and Correlations	
	F	Apr 12	The Seamy Underbelly of Statistical Analysis	
15	Lab		L9: SPSS ANOVA and Correlations	
	W	Apr 17	Meta-Analysis and replication	
	F	Apr 19	Bayesian Approaches	
16	Lab		L10: Review	
	W	Apr 24	Bayesian Approaches, Part II	
	F	Apr 26	Final Exam Review	
17	W	May 1st	Final Exam, 8:00 AM -- 10:00 AM in PY 100	