PSY K300: Statistical Techniques
Fall 2022 Syllabus

CLASS TIME AND PLACE
Section #11586
Asynchronous Video Lectures MW through Canvas
In-Person Workshops Friday 1:50 PM – 2:40 PM, in PY 101

INSTRUCTOR INFORMATION	TA INFORMATION
Instructor: Rick Hullinger	Sreekar Chigurupati
Office: ~~PY A300B~~ Online only this semester	Office Hours:
Office Hours via Zoom:	By appointment
Monday 12:00 PM – 2:00 PM	Email Address: srchig@iu.edu
Tuesday 1:00 PM – 3:00 PM	
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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. I would consider this class a failure if what you learned to do was to plug numbers into arbitrary formulas for unknown reasons to generate more meaningless numbers. 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 course will investigate statistics in a hands-on way. We'll explore the theories and concepts in lectures on Monday and Wednesday, and we'll put the concepts into practice in interactive workshops each Friday. This semester you will tackle the process of statistical inference using a variety of different approaches. Along the way you will gain understanding of how statistical inference works and learn how to use appropriate statistical techniques to solve new problems that you encounter after leaving this class. You will become a savvier consumer of the statistical information that bombards you every day and a better researcher should you choose to go in that direction.

This course will include challenging material. However, the tests and assignments are designed so that any student who is willing to put in the time to digest the course content, work hard outside of class, develop and use good study strategies, and contact the me or the TA when they are struggling, can develop a thorough understanding of the material and ultimately succeed in the course.

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.
- Interpret and manipulate basic statistical notations and formulas including summation notation and formulas for both descriptive and inferential statistics. Specific examples will include formulas for the mean, variance, and standard deviation; calculation and interpretation of z scores and understanding of the standard normal distribution; and ability to conduct and interpret the results of t-tests.
- 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.

STUDENT SUCCESS

I care about the success of *every* student in this class, even if the class size and format prevent me from getting to know each of you individually. When you have questions about the course material, questions about the subject more broadly, concerns to discuss, accommodations you need, or thoughts you want to share, please reach out to me. I am here to help you succeed.

Many students face obstacles to their education because of work or family obligations or unforeseen personal difficulties. If you are experiencing challenges throughout the term that are impacting your ability to succeed in this course, or in your undergraduate career more broadly, please let me know as soon as possible so that we can work together to form a plan for your academic success.

TEXTBOOK & COURSE MATERIALS

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

LECTURE PARTICIPATION

Monday's and Wednesday's lectures will be presented as pre-recorded videos via Canvas. You are expected to watch these videos each week on Monday and Wednesday. Along with the videos, short lecture participation quizzes will be posted on Canvas. The quiz questions will be similar to the questions posed in the videos and all answers will be available in the lecture materials. You must complete these quizzes by 11:59 PM ET (Indiana time) on the day of the lecture and your score on these quizzes will make up your lecture participation score.

Each student will have their four lowest lecture participation scores dropped. Because each student gets four dropped scores, I do not make a distinction between excused and unexcused absences. If you miss lecture due to illness, travel, emergency, or do not complete a lecture participation quiz for any reason, participation for that lecture will be recorded as a zero.

LECTURE FEEDBACK

Along with the lecture participation quizzes, each week a lecture feedback survey will be posted asking you about any topics that were not completely clear to you from the week's materials. Your answers will help me shape our weekly workshop time and structure the course materials as we move forward. These weekly feedback surveys will be due on Wednesday evenings at the same time as the Wednesday Lecture Participation Quizzes. Feedback on 10 or more of the surveys will earn full lecture feedback credit for the course. I appreciate your honest and thoughtful answers.

FRIDAY WORKSHOPS

Friday's class will be held in person in room PY 101. We will use these sessions to work through any confusion from the pre-recorded lectures and to explore software-based techniques for performing statistical analysis. I will use clickers ([IU's Top Hat response system](#)) to promote engagement and participation in these workshops, with a handful of clicker questions presented each Friday. To answer these questions, you will be required to set up a Top Hat account. Your responses to the clicker questions will make up your workshop participation credit.

Each student will have their three lowest workshop participation scores dropped. As with the lecture participation, there is no distinction between excused and unexcused absences from the Friday workshops.

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.

HOMEWORK

After each Friday workshop, you will have access to a homework assignment that will focus on the concepts and the software that you learned about that week. You must complete each homework assignment and submit your work by 11:59 PM on Wednesday following the workshop. You are free to discuss the content and concepts of the homework with your classmates, but you must do your own work and the answers you submit must be your own. Each student will have their two lowest homework assignments dropped. Late homework will not be accepted.

EXAMS

There will be two sets of exams this semester. The first portion of each exam will be an in-class exam during a Friday class period that will cover your understanding of the conceptual basis of statistics. The in-class exams will be closed-book and closed-note. They will not require computations or the use of any software to analyze data. Following each of these exams, you will be given a take-home exam. The take-home exam will ask you to demonstrate your mastery of the concepts you have learned by analyzing new sets of data using the software and tools we have studied. Like the homework, you are welcome to discuss the take-home exams with your classmates, but you must do your own work and the answers 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.

There will be a cumulative final exam on Friday, Dec 16th, from 5:20 – 7:20 PM. That schedule stinks, but there is nothing I can do about it, I'm sorry. Please plan accordingly. The final exam will have the same format and style as the in-class exams.

If you have a scheduling conflict that will interfere with a workshop, turning in a homework assignment, or taking an exam at the scheduled time, you must let me know as soon as possible. Except for extreme and unforeseen circumstances, contacting me the day (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.

GRADING

Your final grade is computed using the following formula:

Lecture Participation:	10%
Lecture Feedback:	5%
Workshop Participation:	10%
Average of your eleven best HW exercises:	25%
Average of your two in-class exams:	20%
Average of your two take-home exams:	20%
Final Exam:	10%
	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%

RELIGIOUS AND CIVIC OBSERVANCES

Students missing class (lecture, workshop, or exam) or needing an extension for a religious observance can find the officially approved accommodation form by going to the Vice Provost for Faculty and Academic Affairs webpage for religious accommodations. The form must be submitted at least 2 weeks prior to the anticipated absence.

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.

HEALTH AND SAFETY

IU is following recommended public health guidance in response to the pandemic. In recognition of all IU community members owe to each other, we expect every member of the IU community will adhere to all current policies and practices. For current information on that guidance see https://covid.iu.edu. Students are expected to follow the university directives and the classroom policies established by their instructors. Willful non-compliance with campus or instructor policies will be considered personal misconduct and will be handled following the procedures outlined in the Student Code of Conduct).

EMAIL
I expect you to be checking your IU email account (not just Canvas messages) 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. 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.

ACADEMIC HONESTY
This course is conducted under the University's Code of Conduct & Policies. Specifically, it is considered cheating if you obtain any kind of information about answers and solutions to the assignments in this course – exams, quizzes, and homework – from any non-intended source or conversely transfer such information to others. It is also considered misconduct if you lie to me about an absence or extension relating to a homework or an exam or misrepresent your presence in the workshops. 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.

ACCESSIBILITY AND ACCOMMODATION
Indiana University is dedicated to ensuring that students with disabilities (e.g., chronic health, neurodevelopmental, neurological, sensory, psychological & emotional, including mental health, etc.) have the support services and reasonable accommodations needed to provide equal access to academic programs. To request an accommodation, you must establish your eligibility by working with Disability Services for Students (iubdss@indiana.edu or 812-855-7578). Additional information can be found at accessibility.iu.edu. 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 your campus office 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: https://ada.sitehost.iu.edu/

SEXUAL MISCONDUCT AND TITLE IX POLICY
As your instructor, one of my responsibilities is to create a positive learning environment for all students. IU policy prohibits sexual misconduct in any form, including sexual harassment, sexual assault, stalking, sexual exploitation, and dating / 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) 855-5711 (counseling services)
        A Confidential Victim Advocates (CVA) at (812) 856-2469 or cva@indiana.edu
        IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that University policy requires me to share certain information brought to my attention about potential sexual misconduct, with the campus Deputy Sexual Misconduct & Title IX Coordinator or the University Sexual Misconduct & 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 http://stopsexualviolence.iu.edu/index.html to learn more.

BIAS-BASED INCIDENT REPORTING
Bias-based incident reports can be made by students, faculty and staff. Any act of discrimination or harassment based on race, ethnicity, religious affiliation, gender, gender identity, sexual orientation or disability can be reported through any of the options:
      1) fill out an online report at https://reportincident.iu.edu
      2) email biasincident@indiana.edu ;
      3) call the Dean of Students Office at (812) 855-8187.
Reports can be made anonymously.

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GROUPME AND OTHER EXTERNAL MESSAGING PLATFORMS
Please note that you may receive emails from other students about joining GroupMe (or similar external group messaging platforms) for individual classes via Canvas. Even though invitations to join these groups may be issued through Canvas, they do not imply my endorsement. While apps like GroupMe can be an effective tool for keeping in touch with classmates and clarifying information related to the course, they can also be a source of unauthorized information sharing or collaboration among students. Collaborative efforts on assignments, quizzes and exams, including sharing or discussing answers when the instructor has not expressly authorized collaboration is considered cheating. If academic dishonesty occurs via GroupMe or similar messaging platforms, everyone involved in the thread may be found responsible for academic misconduct because membership in the group suggests that they have been able to view the information shared.

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.

Statistical Techniques
Fall 2022 Schedule

Week			Date	Description
1	M		Aug 22	Introductions
	W		Aug 24	Levels of Measurement
	F		Aug 26	Workshop 1: Excel Basics
2	M		Aug 29	Histograms
	W		Aug 31	Central Tendency
	F		Sep 02	Workshop 2: Formulas and Central Tendency
3	M		Sep 05	No Lecture - Labor Day
	W		Sep 07	Variability and the Standard Deviation
	F		Sep 09	Workshop 3: Excel Graphs and Histograms
4	M		Sep 12	Normal Distributions
	W		Sep 14	Z Scores
	F		Sep 16	Workshop 4: Excel Variability, Plots, and Z Scores
5	M		Sep 19	Models and Model Evaluation, Part I
	W		Sep 21	Models and Model Evaluation, Part II
	F		Sep 23	Workshop 5: Simulating and Evaluating Models
6	M		Sep 26	The Null Model
	W		Sep 28	p Values
	F		Sep 30	Workshop 6: Calculating p Values
7	M		Oct 03	Consumer Statistics
	W		Oct 05	Exam 1 Review
	F		**Oct 07**	**Exam 1**
8	M		Oct 10	Statistical Significance
	W		Oct 12	Hypothesis Testing with Z Scores
	F		Oct 14	No Workshop - Fall Break
9	M		Oct 17	Experimental Designs, Part I
	W		Oct 19	Experimental Designs, Part II
	F		Oct 21	Workshop 7: Between- and Within-Participants Models
10	M		Oct 24	Parametric Statistics: t Tests, Part I
	W		Oct 26	t Tests, Part II
	F		Oct 28	Workshop 8: t Tests in JASP
11	M		Oct 31	Problems with Statistical Significance
	W		Nov 02	Effect Size and Confidence Intervals
	F		Nov 04	Workshop 9: Confidence Intervals and Effect Sizes in JASP
12	M		Nov 07	ANOVAs, Part I
	W		Nov 09	ANOVAs, Part II
	F		Nov 11	Workshop 10: ANOVAS in JASP
13	M		Nov 14	Correlation, Part I
	W		Nov 16	Correlations, Part II
	F		Nov 18	Workshop 11: Correlations in JASP

Week			Date	Description
14	M		Nov 21	No Lectures or Workshop - Thanksgiving Break
	W		Nov 23	
	F		Nov 25	
15	M		Nov 28	Meta-Analysis and Replication
	W		Nov 30	Exam 2 Review
	F		**Dec 02**	**Exam 2**
16	M		Dec 05	Linear Regression
	W		Dec 07	Bayesian Approaches
	F		Dec 09	Workshop 12: Linear Regression in JASP
17	M		Dec 12	Finals Week, No Lectures
	W		Dec 14	
	F		**Dec 16**	**Final Exam, 5:20 pm -- 7:20 pm in PY 101**