# Psychology 3020 Syllabus

# Inferential Statistics

Lecture Hours & Location: TuTh 8:00AM - 9:15AM, KH D3082

Lab Hours & Location: TuTh 9:25 – 10:40AM, KH D3068

Instructor: Dr. Ji Y. Son

Office/Hours: KH C3061, TuTh 7:30AM – 8:00AM, 10:40AM – 11:00AM

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Class website: **bit.ly/psy3020-fall18**

# Course Description

This course provides a basic introduction to statistics and data analysis. We start with how we take variation in the world and turn it into data. We then develop tools and concepts for *exploring* variation in data, *modeling* variation, and, finally, *evaluating* our models.

At the end of this course, students should:

1. Understand basic concepts that underlie descriptive and inferential statistics, and be able to use these concepts to make sense of new situations.
2. Be prepared - both cognitively and emotionally - to learn more advanced techniques in the future.
3. Be able to do basic data analyses using R.

This course is unique in that we will be using the “flipped classroom” model of instruction. A flipped classroom inverts the typical cycle of content acquisition and application. Usually, students get exposure to new knowledge in class (usually through lecture) and then apply that knowledge in homework. In flipped classrooms, students get exposure to new knowledge before arriving in class and instructors guide students to interactively clarify, apply, and synthesize that knowledge during class time. In this course, the “exposure to new knowledge component” is done through the Canvas modules and the “application” part is done during class time.

# Student Learning Outcomes

## General Outcomes

Students will be able to understand and apply basic analytic methods in psychology, including

1. selection of an analytic strategy that is appropriate to the data at hand
2. data organization and entry using standardized statistical packages (e.g., R)
3. implementation of data analysis by hand and via standardized statistical packages
4. checking for violation of statistical assumptions
5. interpretation of output/results from analysis
6. appropriate reporting of results (written, tabular, graphical) using standard APA format

## Specific Outcomes

Students will be able to:

1. describe the nature of descriptive statistics
2. explain the basic characteristics of samples and populations, statistics and parameters
3. identify and understand the differences among types of variable (explanatory and outcome variable) and levels of measurement (categorical and quantitative)
4. use statistical notation to model data (GLM notation)
5. use both tabular and graphical methods to effectively organize and present data
6. describe, calculate, and discuss the uses of measures of central tendency and variability
7. identify how central tendency, variability, and shape of a distribution are related
8. be familiar with the normal curve, derived scores, and basic probability issues
9. understand how to describe bivariate data (correlation and regression)
10. describe the basic characteristics of parametric and nonparametric statistics
11. explain the use, assumptions, and basic processes involved in the different parametric and nonparametric procedures used by psychologists
    1. describe the type of data required for each strategy
    2. articulate strengths and weaknesses of each strategy
    3. discuss basic assumptions associated with each strategy and how to check for (and deal with) violations of these assumptions
12. be familiar with basic probability concepts and the steps involved in hypothesis testing
    1. discuss the concept of statistical significance (in the context of probability and sampling distributions) versus practical significance (effect size)
    2. distinguish among type I and type II errors
13. analyze data, interpret results, and report findings for each individual analytic strategy
14. utilize critical thinking skills in psychology
    1. evaluate the nature of their data
    2. determine which analytic strategy is appropriate
    3. determine which assumptions must be checked
    4. engage in creative thinking as they select among different analytic methods (each of which may be used to analyze the same data set)
    5. present their findings in an intelligible and interesting manner

# Texts and Materials

1. **Interactive Textbook (Free, $0):** **bit.ly/psy3020-fall18** The course home page on Canvas is designed to be an interactive textbook + all other course information. It will be frequently updated throughout the semester. If something is not specified on the syllabus, it may be clarified on the website. Note, apologies for the inconvenience but I am using a different version of Canvas than the CalStateLA. You’ll know that this is a different Canvas because the URL will start with <https://canvas.instructure.com>... rather than <https://calstatela.instructure.com>...
2. **Required Clicker ($14):** <http://bit.ly/fall18-pollev>; Register AND certify your account for the course by week 3-Tuesday. If you do not, you forfeit all points from the days when you clicked in but were not certified/registered.
3. **Official Class Notebook (Free, $0)**: You will be given an official class notebook for this class. You should use this notebook to take all notes related to this class, both in lectures and while working through the online homework materials.

**Course Requirements**

## Academic Integrity

Students are expected to work within the letter and spirit of Cal State LA’s Academic Honesty statement. Please see http://ecatalog.calstatela.edu/ (Appendix D) for more information.

## Overview of Evaluation

Online Homework 15%

In-Class Work (including Participation & Poll Everywhere) 15%

Lab Quizzes 40%

Final Exam 30%

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Total 100%

The instructor reserves the right to raise (but not to lower) borderline grades when students have demonstrated unusually high levels of involvement, have made marked improvement over the semester, or have accomplished a notable achievement (e.g., a perfect score on the final or consistently exceptional leadership during course work). Grades will be assigned according to Cal State LA grading policy (A>=93, A->=90, B+>=87, B>=83, B->=80, C+>=77, C>=73, C->=70, etc.). Conventional rounding will be used.

Online Homework.All homework is to be completed online using your account at **bit.ly/psy3020-fall18** Read each page carefully, do all of the embedded R exercises, answer all of the embedded questions, and answer the practice quiz questions at the end of each chapter.

Homework will be due at the beginning of each week according to the schedule below. **You should expect the homework to take 6-8 hours per week, so start the previous week.**

Homework will be graded for completion, not correctness. There’s even a way to check if an answer is correct before you submit it. We’re trying to help you learn, not trip you up. Nevertheless, you will not get credit for gibberish responses that make no sense. Homework questions are designed to help you learn, and as a way to check your own understanding as you go. They are not there to demonstrate your understanding to your instructor.

As you work through the homework, be sure to write down (in your notebook) questions and things you don’t understand. **Bring these questions to lecture, lab, or office hours.** Everything covered in the online textbook is fair game for exams; it is your responsibility to make sure you have understood the content.

The flipped classroom assumes that everyone will do their fair share of preparation before coming to class. If you do not complete your homework, you do not have to come to class because you will receive a participation grade of 0 for that week. Without adequate preparation for class, you will not be able to effectively contribute to our learning community.

In-Class Work.Students will be frequently asked to discuss ideas and attempt questions in class. Missing class frequently and not attempting to answer questions will result in low coursework/participation scores. In order to assure that all students develop their ability to verbally communicate statistical concepts, there is cold-calling in this class.

Poll Everywhere (PE, essentially a clicker system) will also count as part of your in-class score. Most PE questions will be participation questions (1 point awarded for participation). Some PE questions will be graded for correctness.

In addition to verbal participation and poll everywhere, in-class work will entail group work, google docs, and other activities. We will drop your lowest two in-class scores. Consider those your “excused absences.”

Lab Quizzes. We will have five quizzes (approx. once every three weeks). Quizzes will be given during Thursday lab sections and may include both multiple choice and short answer questions. **Quizzes will be given online.** You may use your official class notebook during quizzes. Quizzes are cumulative, which means they can cover all homework assignments that are due prior to the quiz. We will drop your lowest quiz score.

# Special Arrangements

Announcements: Some announcements will be made at the beginning of class. Every effort will be made to post the content of the announcement on the course website (but some details or answers to in person questions will be inevitably left out). If you are late and miss the announcements, it is your responsibility to check the course website.

Making up assignments/exams: There is no way to make up for missed homework or in-class work. Please take note of the due dates listed on the course website. If there are technical difficulties, it is your responsibility to email us right away. If you see any errors in grading (available on the course website), let us know in a timely manner (with 2-3 weeks of the scores being posted).

If students have a legitimate reason (e.g., operation, jury duty) for missing the final exam, students will be given the opportunity to take exams *early* if arrangements are made (let me know at least 1 week in advance of normal test date so that a room could be reserved). Otherwise, no make-up exams will be given apart from dire and documented emergencies.

Incomplete:This option is for students, at the time of petition, who are passing the course but through extenuating circumstances are not able to complete all or part of the work of the last four weeks of the course. It is not an appropriate grade for failing students and students who are registered in the course but have not been in attendance.

Students with disabilities:For students with verifiable disabilities, reasonable adaptations that will enhance learning will be respected. Please register with the office for students with disabilities (OSD: <http://www.calstatela.edu/univ/osd>) before speaking with me.

# Homework & Quiz/Exam Schedule

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| --- | --- | --- | --- |
| Week | Due Mon 11:30pm | Homework:  During this week, work on chapters... | Quiz Content |
| 1 |  | Course Information & 1 & 2 & 3  Course Information due Week 1, Thursday |  |
| 2 | Aug. 27, Ch 1 & 2 & 3 | 4 Exploring Variation |  |
| 3 | Sept. 3, Ch 4 |  | Up through Ch 1-4 |
| 4 | Sept. 10, no homework due | 5 A Simple Model |  |
| 5 | Sept. 17, Ch 5 | 6 Quantifying Error |  |
| 6 | Sept. 24, Ch 6 |  | Up through Ch 1-5 |
| 7 | Oct. 3 (Wednesday), Ch 7 | 7 Adding an Explanatory Variable to the Model |  |
| 8 | Oct. 8, no homework |  |  |
| 9 | Oct. 15 – Dr. Ji will out of town but there is a quiz (maybe review sessions with grad student) | 8 Regression Models | Up through Ch 1-7 |
| 10 | Oct. 22, Ch 8 | 9 Sampling Distributions |  |
| 11 | Oct. 29, Ch 9 | 10 Confidence Intervals |  |
| 12 | Nov. 5, Ch 10 |  | Up through Ch 1-9 |
| 13 | Nov. 12, no homework due | 11 Comparing Models with F |  |
|  | Nov. 19 – no school | THANKSGIVING |  |
| 14 | Nov. 26, Ch 11 | 12 What you have learned | Up through Ch 1-11 |
| 15 | Dec. 3, Ch 12 |  |  |
| 16 |  | ~~Dec. 11, 7-9am~~  Dec. 13, 9:30-11:30am |  |