

# Introductory Statistics for Behavioral Scientists

## PSYC UN1610

- **Course Location:** Schermerhorn 200B
  - **Course Time:** Tuesday/Thursday 4:10 PM - 5:25 PM
  - **Lab Time:** Thursday 6PM - 8PM (In 200B and 200C)
- 

- **Instructor:** Greg Jensen
  - **Office:** Schermerhorn 500
  - **Office hours:** Monday 4pm-5:30pm, Thursday 2:30pm-4pm
  - **Email:** ggj2102@columbia.edu
- 

- **Teaching Assistant:** Ellen Tedeschi
  - **Office:** Schermerhorn 318C
  - **Office hours:** Wednesday 12pm-2pm
  - **Email:** eer2135@columbia.edu
- 

- **Teaching Assistant:** Michelle VanTieghem
- **Office:** Schermerhorn 409A
- **Office hours:** Friday 10am-12pm
- **Email:** mrv2115@columbia.edu

Students are welcome to attend all listed office hours, regardless of lab section. If you would like to make an appointment to meet at another time, you may do so by email, or by approaching us before or after class.

(Syllabus subject to revision)

## Course Description

This course provides an introductory overview to the basic statistical concepts and procedures used in experimental research. The focus is on becoming familiar with how to interpret and perform statistical tests, in order to design experiments and interpret their results. It is *not* a course on mathematical theory. No mathematical skills beyond basic algebra are required. The content of the course is instead intended to provide a basic degree of scientific literacy, with an emphasis on the psychological sciences.

In addition to the lectures, students are required to participate in a laboratory section that meets once a week. All students registered for PSYC UN1610 must also register for one of the PSYCH UN1611.00X sections. Lab activities will consist primarily of hands-on data analysis using Excel, applying the concepts introduced in lecture.

Please read this syllabus carefully to make sure you haven't missed anything important.

## Course Requirements

**Textbook:** *Introductory Statistics for the Behavioral Sciences, Seventh Edition (Required)* by Joan Welkowitz, Barry H. Cohen, and R. Brooke Lea (2012). Required reading will consist mainly of chapters from this text. Students are encouraged to obtain their own copies of the textbook.

- **Chapters are sometimes listed as required reading more than once** Students are *strongly* encouraged to use this as a cue to re-read those chapters prior to the class in question, either because they are particularly important, or because they are particularly challenging.
- **Each lecture will also have an accompanying recommended reading, available electronically** These are strictly optional and (to the extent possible) non-mathematical. You may find these supplementary readings to help make the problems of the course a bit less abstruse.

**Lecture Attendance:** Because each lecture builds on the material presented in previous lectures, regular attendance is crucial to success in the class. Thus, attendance will be collected at the start of every lecture. Please contact Professor Jensen or one of the TAs before class (the sooner, the better) when you become aware of an unavoidable conflict. Repeated unexcused absences will impact the class participation portion of the grade.

**Laboratory Attendance & Assignments:** Attendance to and participation in every lab section is MANDATORY. Each lab consists of a project, to be completed in class under the supervision of the TA. Foreseeable absences must be approved at least two weeks in advance. In cases of excused absences, as well as documented illness or family emergencies, students will have the opportunity to make up the lab assignments without penalty on their own time. In all other cases, lab assignments may be made up for partial credit provided they are completed within one week of the original lab section.

**Homework:** Homework assignments consist of problem sets posted to Courseworks. Typically, homework will be assigned on Tuesdays and be due by the end of class one week following. Please note the following:

- **Homework assignments must be completed individually.** Students are not allowed to share answers or to work together on problems, and doing so may result in disciplinary action on grounds of academic dishonesty.
- **Show all work for every problem.** The value, in points, of every problem will be indicated on the assignment, and points will be deducted for mistakes made, rather than based on the final answer. If, for example, a small arithmetic mistake occurs early in a problem, but the procedure is otherwise followed correctly, you can still get most of the points even though the answer will be wrong. If, however, you only write the answer, then the TAs will be unable to follow your reasoning and therefore be unable to give you partial credit.
- **Staple all sheets of your homework together.** Unstapled homework will have points deducted. We cannot guarantee that there will be a stapler in 200B. It is also a good idea to write your name on each sheet.
- **Homework not turned in by the end of class will be considered late.** Points will be deducted as a function of how late the homework is, so the sooner you are able to turn in a late homework, the better.
- **Homework must be turned in as a hard copy to be considered for credit.** Although electronic submission may be allowed (at the discretion of the TAs) in order to minimize the lateness of the assignment, it will be counted as a zero until such time as a hard copy is also provided.

**Projects:** The course does not make use of proctored exams. Instead, four “projects” will be assigned over the course of the semester, which should be treated like take-home exams. Please note the following:

- **Projects are due 48 hours after being assigned.** The turn-around on projects is very fast, so plan accordingly. If you anticipate being out of town or otherwise occupied during the project’s interval, please contact us immediately. For every day a project is late, there will be a substantial reduction in the final score. The fourth and final project will instead be due a week after being assigned.
- **Every student will receive a unique dataset.** Your personalized dataset will be emailed to your Columbia email address when the project goes live. If you don’t receive your dataset, contact us

immediately. Note that because each student's dataset is different, each exam will yield different answers that may have different interpretations.

- **Projects must be completed individually.** LSharing answers or working together on a project constitutes cheating on an exam, and will be treated accordingly. In addition to academic probation, the consequences of getting a zero on a project are very serious, because each project counts for at least 10% of the final grade.

### **Students With Disabilities**

Students with disabilities registered for this course and who require classroom accommodations should get in touch with me as soon as possible. Additionally, stop by the Office of Disability Services (ODS), located in Wien Hall, Suite 108A, to register for support services, if you have not already done so.

**Grading:** Final grades will depend on completed assignments, according to the following breakdown.

- **Homework:** 25%
- **Lab Assignments:** 5%
- **Participation:** 5%
- **Project 1:** 10%
- **Project 2:** 15%
- **Project 3:** 20%
- **Project 4:** 20%

Letter grades are subsequently assigned according to the following criteria:

Bound		Grade		Bound
	>	A+	≥	97
97	>	A	≥	93
93	>	A-	≥	90
90	>	B+	≥	87
87	>	B	≥	83
83	>	B-	≥	80
80	>	C+	≥	77
77	>	C	≥	73
73	>	C-	≥	70
70	>	D	≥	60
60	>	F		

Neither project grades nor overall course grades are “curved” in the traditional sense, and students will not be competing for a limited pool of each letter grade. If every student scores a 95 on the final, every final gets an A. However, project scores and final letter grades are corrected upward on the basis of the median and inter-quartile range of class performance. This correction can only ever improve your score, so the letter grades listed above represent the minimum letter grade that your raw score can earn, prior to the calculation of the corrected score. The raw scores for homework and labs are not adjusted.

Participation is partially, but not wholly, a function of class attendance. It reflects overall student engagement, and every student is assumed from the outset to have full participation points. Thus, a student who comes to class and does the work will get the full 5%. Participation credit can be lost in various ways (such as unexcused absences from lecture or sleeping in class), but extra effort (such as regularly attending office hours) will also be taken into consideration.

### **Academic Integrity**

Students are expected to do their own work. Getting someone else to do your work for you, or passing someone else’s work off as your own, is a breach of academic integrity and is a serious offense in academic circles. Whether you’re getting help from another student, or copying text from the Internet, anyone presenting the work as their own without attribution will be referred to Dean’s Discipline, with appropriate action to follow.

Details regarding Columbia’s definition of academic dishonesty (including examples), as well as the consequences, are available in **Columbia’s Guide to Academic Integrity**. Inform yourself about what the university’s policies on cheating and plagiarism are, because “I didn’t know!” is not an acceptable defense.

If you are falling behind on the material, or otherwise feeling mounting pressure from the class, it is *always* better to contact me or your TA, rather than resorting to academic dishonesty. We’re here to help, and we’re enthusiastic about doing so.

Date	#	Topic	Reading	Work Due	Lab
01/17/2017	1	“Why Am I Here?”			
01/19/2017	2	Variables & Measurement	Welkowitz Ch. 1 (Blastland Ch. 1)		Lab 1
01/24/2017	3	Data Visualization	Welkowitz Ch. 2 (Tufté Ch. 1)	Hw. 1	
01/26/2017	4	Central Tendency	Welkowitz Ch. 3 (Blastland Ch. 5)		Lab 2
01/31/2017	5	Variability	Welkowitz Ch. 3 (Gonick Ch. 2)	Hw. 2	
02/02/2017	6	Distributions	Welkowitz Ch. 4 (Salsburg Ch. 2)		Lab 3
02/07/2017	7	Discrete Probability	Welkowitz Ch. 16 (Blastland Ch. 3)	Hw. 3	
02/09/2017	8	Probability Density	Welkowitz Ch. 4 (Salsburg Ch. 9)	Project 1	Lab 4
02/14/2017	9	Statistical Inference	Welkowitz Ch. 5 (Salsburg Ch. 11)	Hw. 4	
02/16/2017	10	Confidence Intervals	Welkowitz Ch. 5 (Salsburg Ch. 12)		Lab 5
02/21/2017	11	The Small Sample Problem	Welkowitz Ch. 6 (Salsburg Ch. 3)	Hw. 5	
02/23/2017	12	Testing For A Change	Welkowitz Ch. 6 (Gonick Ch. 8)		Lab 6
02/28/2017	13	Testing For A Difference	Welkowitz Ch. 7 (Gonick Ch. 9)	Hw. 6	
03/02/2017	14	Correlation	Welkowitz Ch. 9 (Blastland Ch. 12)	Project 2	Lab 7
03/07/2017	15	Linear Regression	Welkowitz Ch. 10 (Gonick Ch. 11)	Hw. 7	
03/09/2017	16	Linear Models	Welkowitz Ch. 10 (Dancey Ch. 12)		Lab 8
03/21/2017	17	Analysis of Variance	Welkowitz Ch. 12 (Salsburg Ch. 5)	Hw. 8	
03/23/2017	18	Multiple Comparisons	Welkowitz Ch. 13 (Dancey Ch. 10)		Lab 9
03/28/2017	19	Factorial ANOVA	Welkowitz Ch. 14 (Dancey Ch. 11)	Hw. 9	
03/30/2017	20	Making Sense of ANOVA	Welkowitz Ch. 14 (Dancey Ch. 11)		Lab 10
04/04/2017	21	Nonparametric Tests	Welkowitz Ch. 8 (Salsburg Ch. 16)	Hw. 10	
04/06/2017	22	Nonparametric Tests Redux	Welkowitz Ch. 17 (Salsburg Ch. 10)	Project 3	Lab 11
04/11/2017	23	Effect Size	Ellis Ch. 1 (Wainer Ch. 1)	Hw. 11	
04/13/2017	24	Power Analysis	Welkowitz Ch. 11 (Ioannidis, 2005)		Lab 12
04/18/2017	25	Bayes’ Rule	Stone Ch. 1 (Salsburg Ch. 13)	Hw. 12	
04/20/2017	26	Bayes’ Rule Redux	Goodman (1999) (Kruschke Ch. 2)		Lab 13
04/25/2017	27	Analytic Strategy	McElreath Ch. 1 (O.S.C, 2015)	Hw. 13	
04/27/2017	28	Future Directions			
05/04/2017				Project 4	