

CEMA 0907 – Applied Statistics
Brown University
Summer 2018

Instructor: Anthony Scotina (Anthony_Scotina@brown.edu)

Course Times and Location: MTWRF 12:15-3:05, J. Walter Wilson 503

Course Description: Statistics is the science of collecting and interpreting data. The *Summer at Brown* course has been designed exclusively so that students can learn statistics, be able to present their work to their peers, and have fun doing so. The points of this course include:

1. The development and understanding of the most common statistical tools, including confidence intervals and hypothesis testing
2. To be able to distinguish real world relevance of terms like statistical significance, experiment design, and interpretation of results
3. Apply statistical tools to answer questions in whatever topics the students are interested in
4. Develop skills such as reading statistics in the news, presenting using Microsoft PowerPoint, and computing using R

Textbook: *OpenIntro Statistics* by Diez et al.

- Link to download: <https://www.openintro.org/stat/textbook.php>

Computing: Students are required to have daily access to a computer. The use of the R statistical environment (downloadable from <http://www.r-project.org/>) with the RStudio interface (downloadable from www.rstudio.org) is thoroughly integrated into the course. Students will also need access to Microsoft PowerPoint (or something similar, like Google Slides), either on campus or on their own computers.

Prerequisites: Applied Statistics is highly computational. Two or three years of high school math (including geometry and algebra) is suggested.

Grading:

- **Homework and Participation [20%]:** Homework will be assigned periodically and due in class the next day. Doing statistics is the best way to learn statistics. You are welcome to collaborate with other students, but you must turn in your own work and write up all assignments in your own words. On the top of every homework, write the names of *everyone* you collaborated with in doing problems.
- **Projects [20% each]:** Each student will be responsible for completion of three, one-week mini-projects, covering the topics learned in class each week, and developed through meetings with the instructor. Projects will be completed in pairs or small groups.
- **Exam [20%]:** There will be one final exam, held on the *second to last* day of class (July 5). One two-sided 8.5×11 “cheat sheet” will be allowed for this exam, with whatever material you wish to put on it.

Course Schedule

This is a tentative, evolving schedule. As always, topics may be added, deleted, or rearranged during the course of the semester. Any changes will be announced in class.

Note: OI = OpenIntro Statistics textbook

Date	Topics	Readings	Assignments
18-June	Descriptive Statistics Lab 1	OI 1.1–1.6	HW 1
19-June	Probability Distributions Lab 2	OI 3.1–3.2	HW 2
20-June	Sampling Distributions Lab 3; Project Discussion	OI 4.1–4.5	Projects
21-June	Bootstrap Confidence Intervals Project Meetings		Projects
22-June	Project Presentations		HW 3
25-June	Hypothesis Testing Lab 4	OI 5.1–5.3	HW 4
26-June	Simple Linear Regression Lab 5	OI 7.1–7.4	HW 5
27-June	Multiple Linear Regression Lab 6	OI 8.1–8.3	Projects
28-June	Probability and Proportions Lab 7; Project Meetings	OI 2.1–2.5, 6.1–6.2	Projects
29-June	Project Presentations		HW 6
2-July	Chi-Squared (χ^2) Tests Lab 8	OI 6.3–6.4	HW 7
3-July	Advanced Graphics with ggplot2 Applied Statistics Jeopardy!		Review/Projects
4-July	NO CLASS – Independence Day		☹️
5-July	FINAL EXAM Project Meetings		Projects
6-July	Project Presentations		☺️