**Prove It With Science** *Monday 2-4 & Thursday 4-5*

January 23: Why you should Take this class/Bias in Qualitative Data

January 30: Experimental Design

February 6: Statistics I: Induction and Deduction, the basics and limitations of significance testing

February 13: Asking Decent Questions I: Can you really answer what you are asking?

February 27: Bias in Quantitative Data

March 6: Graphs Visuals and Effective Communication Part 1

March 20: Statistics II: Analyzing the statistics that everyone uses and no one understands

March 27: Asking decent questions II: Do your results mean anything?

April 3: Meta-biases in Science

April 10: Marketing Academia/ Responsible and Effective Science Communication Part 2

April 17: Student Presentations

April 24: Case Study Workshop/Party

**Assignments and Grading Breakdown**

- 5 â€œProblem Setsâ€ 25%
  - *Survey Assignment 5%*
  - *Statistics Assignment 5%*
  - *Paper Commercial 5%*
  - *Graph Assignment 5%*
  - *Induction-Deduction Assignment 5%*
- Semester-Long Case Study 15%
  - *â€œPersonal Outcomeâ€ 5%*
  - *â€œGroup Outcomeâ€ 5%*
  - *Participation 5%*
- Discussion Participation 20%
  - *Leading 1-2 discussion 10%*
  - *Participation in Discussions 10%*
- Final Presentation 15%
- First Draft 10%
- Final Draft 15%

**Course Textbooks**

*Bad Pharma* by Ben Goldacre (ISBN: 0865478007)

*How to Lie with Statistics* by Darrell Huff (ISBN: 0393310728)

*Merchants of Doubt* by Naomi Oreskes (ISBN: 1608193942)

**Final Paper and Presentation**

The third week of class each student will draw two HEB-related terms out of a hat. You will then be responsible for finding, analyzing and graphically depicting data to â€œshowâ€ that one word causes the other. You will present this information in a 12-15 minute presentation during the 12 lecture.

At the time of class presentation, you will also turn in an ~15 page paper that a) identifies the biased techniques you used in your presentation b) discusses, with relevant papers and examples from class, the problem with these techniques. You will turn in a first draft of this paper the Monday after Spring Break, and will get feedback from both me and your peers on how to improve your arguments.

**Case Study**

Over the course of the entire semester, we will participate in a case study about testing the efficacy of a new medical device that has recently been approved by the FDA. You will receive a role to play in this case

on January 29 (e.g., research scientist, science journalist, doctor, head of marketing) and **will be expected to contribute to discussions on canvas and produce documents relative to your role**. Each participant will have their own set of individual objectives and will be graded **both on whether the participant fulfilled the individual objectives and whether the final products represent ethical science and science communication**. The last day of class, we will reveal the effects of everyoneâ€™s decisions throughout the semester in the context of a discussion about research ethics.

**Class Participation**

Students are responsible for the readings from the course textbooks **before** Mondayâ€™s lecture. Expect to spend 20-30 minutes during Mondayâ€™s lecture discussing these readings in the context of the material being covered.

Starting **February 2nd**, we will have a discussion section for 1 â€“ 1.5 hours each week. You will be expected to lead one discussion and fully participate in all discussion sections. Please refer to the guideline on effective paper discussion for help

**Office Hours**

* in person: Monday 10-12, HEB Lounge

* digital (Google Hangout): Wednesday 10pm-midnight