

**Crafting with Data: Reality,
Illusions, Truth and the Future
Fall 2008 v1.02**

*NYU, Tisch School of the Arts
Interactive Telecommunications
Program*

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"No number is significant in itself: its only significance is in relation to other numbers."

-Zell Kravinsky, real estate genius & anonymous living kidney donor

Course Description:

Contemporary interaction designers and artists often manipulate scientific, historical, commercial and social information. Literacy in design, art or engineering requires the complement of literacy in data. This class makes a powerful addition to your skill set of programming, visual design and electronics. Students will become conversant in the tools available for extracting insightful information from real-world samples. In this class we learn about the "lies, damn lies and statistics" that are encountered in our daily information feeds. Basic training is provided in a variety of handy methods for interpretation and manipulation of data, yet no math beyond some simple arithmetic is required for completing this course. Materials are visually oriented, and the focus is on concepts rather than on mechanics. Exercises include analyzing maps, building physical models and exploring information via accessible computer simulations. Short projects teach how to understand where data comes from, what it looks like and what it means. Students will learn how to transform data in ways that avoid distortions, reveal truths and grandly illuminate their ideas.

Goals:

Students will develop their data literacy. They will gain a deeper understanding of how collections of information are properly created, examined, manipulated and presented. Assigned projects will explore data gathering, comprehension, exploratory analysis, parameters, probability, signal processing, prediction, confirmation and ethics. The class is carefully structured to support your other production classes. There are a variety of weekly assignments but no final project or paper, allowing you time to apply your newfound skills.

Class Schedule:

1. Intro and overview: introduction, introductions, overview & syllabus review.
Exercise One: 10 minute data gathering
Exercise Two: 10 minute results
Assignment: Locate an article that apparently uses data or statistics well, and one that appears to be misleading. Note your thoughts on each so you can quickly present them to your group in class next week.
Reading Assignment: How to Lie with Statistics, Darrell Huff & Irving Geis
2. Ethics and understanding: how to lie with statistics Demo: Arduino data gathering
Exercise One: Article presentations
Assignment: Use an Arduino to gather 500 samples of interesting data in two different conditions (1000 samples total). Post your data online so it can be downloaded.
Readings to discuss: How to Lie with Statistics, Darrell Huff & Irving Geis
3. Thinking Scientifically: creativity, criticism and the way of knowing
Demonstration: Mastermind, hypothesis, test, reformulate, test
<http://www.irt.org/games/js/mind/>
Assignments:
- Self-Portrait: Data is factual information; science finds its story. But data isn't only about science so we can turn that on its head. Find data for your own story. Create a self-portrait, using data.
Readings to Discuss: The Canon, "Thinking Scientifically"
The Scientific Method, Jose Wudka:
http://phyun5.ucr.edu/~wudka/Physics7/Notes_www/node5.html
4. The Modern Science of Measuring: a world of parameters
Presentations: Self-portraits in data
Assignment: Re-do data gathering assignment, with improvements
Readings to discuss: Lady Tasting Tea, chapter 1 & 2, Kuhn, Thomas S., "The Function of Measurement in Modern Physical Science", ISIS 52(2), 161–193, 1961.
<http://www.compilerpress.atfreeweb.com/Anno%20Kuhn%20Function%20of%20Measurement.htm>
5. Thinking Quantitatively: Estimation and Confidence
Exercise One: School Busses in America
Exercise Two: Subjective Probability Intervals and Calibration

Self Portrait presentations

Assignments:

- Countries in Africa survey, at least six respondents
- One-paragraph proposal for the following study: "Think of a question about New York and gather some data that answers it.
- Read over Nicholas Feltron's site: <http://feltron.com>

6. Looking at Data: exploratory data analysis and descriptive statistics

Speaker: Nicholas Feltron

Exercise One: Countries in Africa data analysis

Assignments:

- Think of a question about New York and gather some data that answers it. Is the express train worth the wait? Is there a prime street for dog-watching? Are people in DUMBO smarter than people in RAMBO?|
- IRB Tutorial and Exam. Please print your passing grade for me.

<http://www.nyu.edu/ucaih/>

Readings to discuss: Exploratory Data Analysis packet, Felton Annual Report http://feltron.com/index.php?/content/2007_annual_report/

7. Hands-on Statistics: central tendency and variance

Speaker: Caroline Brown: Data Research

Exercise Two: Measuring Heights

Exercise One: Families

Assignment:

- Question about New York assignment: revise method and gather final data. You'll be presenting your work at the next class, taking a first pass at analysis and visualization. After your presentation, you'll revise and re-present a final view.

- Toss a coin 100 times and write down the results OR imagine tossing a coin 100 times and write down the results. You'll be assigned to one task.

Readings to discuss: Descriptive Statistics:

http://davidmlane.com/hyperstat/desc_univ.html

8. Knowing Uncertainty: Probability and Conditional Probability

Exercise Zero: Birthdays

Exercise One: Measuring

Assignment: Complete New York Data

Readings to discuss: The Canon, Probabilities

9. Presentations: Coins, New York and Africa

Exercise One: Spinning Coins

Assignment: Begin your Quincunx

Readings to discuss: none this week

10. Testing for Truth: same or different, binomial and chi-square
Assignment: Finish Your Quincunx
Readings to discuss: The Lady Tasting Tea, Chapters 3-5
11. Testing for Truth: confirmatory stats and your favorite spreadsheet
Exercise One: A quick measurement
12. Seeing the Future: predictive procedures and open-source stats
Exercise One: Using R
13. Graphical Persuasion: how to lie with maps.
Readings to discuss: How to Lie with Maps, Mark Monmonier;
The Ghost Map, Steven Johnson
14. Judgment: designing attraction
Readings to discuss: Lady Tasting Tea, chapter 29

Assignments:

Assignments are due in the class for which they were assigned. No credit can be given for work turned in late.

Documentation:

Students will be responsible for making weekly blog posts to report results and reactions to the week's exercises, including those in class.

Student Presentations:

Students will give presentations in every class after the first one. Topics will be assigned by the instructor and may include overviews of statistical packages, database methodologies, important data artworks or presentations of published research papers.

Grading:

Class participation & attendance 30%

Presentations and assignments 40%

Projects and documentation 30%

Laptops:

Please keep your laptop closed when not in use for class projects. If you use it for note-taking, full-screen software like WriteRoom is a great way to prevent you from being distracted: <http://hogbaysoftware.com/products/writeroom>

Office Hours

Monday 3:30 – 4:30

Statistics Resources

<http://www.statsoft.com/textbook/stathome.html>

<http://davidmlane.com/hyperstat/>

Making the Most of It:

For best results, come to class early, participate in discussions, ask lots of questions, offer copious and constructive feedback, stretch yourself and have fun.