

Syllabus

ST499/599 Topics in Data Visualization

Course Name: Topics in Data Visualization

Course Number: ST499/599 001

Credits: This course combines approximately 60 hours of instruction, activities, and assignments for 2 credits.

Term: Summer 2015 Session 3 (June 22 - July 31)

Lectures: F 1300-1420 ALS 4000

Prerequisites: You should have taken or be taking ST499/599 Data Programming in R, or have some R experience.

Instructor: Charlotte Wickham, 76 Kidder

charlotte.wickham@stat.oregonstate.edu

Office Hours: (Tentative) Wednesday 3-4pm 3003 Cordley

Thursday 1-2pm 76 Kidder

Teaching Assistant: Bin Zhuo

zhuob@onid.oregonstate.edu

Course content

Course description

This course will give you the tools to critique and improve visualizations of statistical data. Through readings and discussion of seminal work, you will learn the principles of graphical perception and the visual encoding of quantitative information and learn how to use these principles to evaluate an effective visualization. Through exposure to famous and infamous visualizations, you'll explore what makes graphical representations of data successful or unsuccessful, and gain an appreciation of the different goals of visualization. A key part of the class will be critiquing other's visualizations and, as your visualization creation skills develop, your own and your classmates' visualizations.

This is a **hybrid** class. This means most material will be provided online (as videos, readings and discussions), and you will be expected to view/read/complete it before class on Friday. On Fridays (June 26th - July 31st, excluding July 3rd) we meet in ALS 4000 from 1-2:20pm. Most of this time will be spent in groups discussing, critiquing and coding.

You should expect the following week's material to be posted on Friday before 5pm.

Rough topic outline:

- Week 1 Introduction
 - the purpose of visualization
 - the guiding principles of visualization
 - the deadly sins of bad graphics

- describing graphics
- Week 2 Deconstructing and constructing graphics
 - parts of a graphic
 - constructing plots in `ggplot2`
 - replicating other peoples plots
- Week 3 Perception
 - perception of continuous variables
 - perception of groups
 - making comparisons easy
- **Assignment 1 due - construction**
- Week 4 Color and Scales
 - how we perceive color
 - the use of colour in graphics
 - scales in `ggplot2`
- Week 5 Polishing
 - polishing a plot
 - practice brainstorming, critiquing and polishing
- **Assignment 2 due - critique**
- Week 6 some selection of special topics
 - displaying distributions
 - displaying uncertainty
 - 3 or more dimensions
 - interaction and animation
 - spatial data/maps
 - networks/graphs
 - ?
- **Assignment 3 due - final visualization**

Measurable Student Learning Outcomes

- Deconstruct a graphic into the data displayed and how it is mapped to visual properties.
- Describe the order of accuracy of perceptual tasks and how this affects the choices made in constructing a visualization.
- Critique a visualization based on its purpose and use or abuse of perceptual principles.
- Suggest improvements of a visualization to enhance its effectiveness.
- Use color in visualization appropriately for the variable it is encoding and with sensitivity to visually impaired viewers.
- Translate an image or description of a graphic to a specification of the graphic using `ggplot2`.
- Rapidly prototype visualizations using `ggplot2` in R to answer a question about data.
- Combine tools for data manipulation and visualization, to collect, and clean data to create visualizations to answer your own questions of interest.

Evaluation of Student Performance

Assignments (50 points)

There will be three graded assignments worth 15, 15 and 20 points respectively. Roughly they will be assigned at the end of weeks 2, 4 and 5. The third assignment will require you to source your own data, so you may want to begin thinking about that.

Other activities (50 points)

Graded activities for the week will be posted at the start of the week. They could consist of discussion board posts, submitting R code, or submitting a written document. They may be due before class Friday or after class, they may be individual or group submissions, and they may be graded or Complete/Incomplete. **Read the instructions** carefully.

Final grade

Your final score will be out of 100 points (allocated between assignments and other activities as above). Your numerical score will be converted to a letter grade based on the following table:

| Points | Grade |
|-----------|-------|
| 95 - 100 | A |
| 88 - 94.9 | A- |
| 80 - 87.9 | B+ |
| 75 - 79.9 | B |
| 70 - 74.9 | B- |
| 65 - 69.9 | C+ |
| 60 - 64.9 | C |
| 55 - 59.9 | C- |
| 45 - 54.9 | D |
| 0 - 45 | F |

Learning Resources

All class materials will be posted online through canvas.

There is no assigned textbook for the class. Readings will be assigned from publicly available materials or materials available through the Oregon State University library.

Homework and assignments will be submitted on canvas unless otherwise specified.

Course Policies

Lecture time

Lecture time will consist of lecture, group activities and discussion. Occasionally it will be useful for a group or pair to have a laptop, I'll let you know if you should bring one.

University and Department policies

Disability statement

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting me prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at (541) 737-4098.

Academic integrity

Academic dishonesty is a serious offense and will be addressed following the guidelines set out in the Academic Regulations of OSU (go to <http://catalog.oregonstate.edu>, click on Registration Information then Academic Regulations, and read AR 15).

The [Student Conduct Code](#) defines Academic dishonesty as

... an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.

Examples include, but are not limited to, the following:

- verbatim copying of another student's homework assignment
- copying off another student's exam
- using prohibited materials (e.g., cell phone, cheat sheet) during an exam
- communicating with another student during an exam
- changing answers on an exam after the exam has been graded
- unattributed use of material copied from an article, textbook, or web site
- continuing to write on an exam after the instructor or TA has asked for the exams to be handed in.

You are responsible for knowing what academic dishonesty is, and for avoiding it. Ignorance of these rules does not absolve you from responsibility.