# Syllabus

Course Name: Topics in Data Visualization
Course Number: ST599 001
Credits: This course combines approximately 60 hours of instruction, activities, and assignments for 2 credits.
Term: Summer 2014 Session 3 (June 23 - Aug 1)
Lectures: MWF 1300-1350 BEXL 320

**Instructor**: Charlotte Wickham, 76 Kidder charlotte.wickham@stat.oregonstate.edu

Office Hours: (Tentative) Monday and Wednesday 2-3pm 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, students 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.

#### Rough topic outline:

- Introduction (2 3 lectures)
  - the guiding principles of visualization
  - the deadly sins of bad graphics
- Deconstructing and constructing graphics (3 4 lectures)
  - parts of a graphic
  - constructing plots in ggplot2
  - polishing plots for publication
- Assignment 1 construction
- Perception (3 4 lectures)
  - preattentive vision
  - perceptual tasks and their ease
  - making comparisons easy
  - the use of colour in graphics
- Assignment 2 critique

- Special topics (1 lecture each)
  - displaying distributions
  - displaying uncertainty
  - 3 or more dimensions
  - interaction and animation
  - spatial data/maps
  - networks/graphs
  - ?
- Assignment 3 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**

#### Readings

Required readings will be posted each week. I expect everyone to read these, and by the specified date if given. Optional readings (worth credit) will be posted under homework.

#### Assignments (50 points)

There will be three graded assignments worth 15, 15 and 20 points repectively. 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.

#### Homework (50 points)

Homework activities will be posted throughout the week. I expect to assign a total of at least 60 points worth of activities over the entire six weeks. These will be graded Complete/Incomplete. A Complete attempt earns you the full points assigned, an Incomplete earns you zero points. You may do as many

as you want, although a maximum of 50 points will contribute to your final grade. You may also submit them whenever you want, although you will benefit most from them if you complete them as they are posted.

If you want specific feedback on an attempt, bring it along to office hours and we can discuss it.

#### Final grade

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

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

## Learning Resources

All class materials will be posted at: http://vis.cwick.co.nz

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 Blackboard 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.