Course Policies and Syllabus

Instructor	Lelys Bravo de Guenni
Office	Baskin Engineering 357B
Email	lbravo@soe.ucsc.edu
Phone	831-459-1653 (email is preferred)
Office Hours	Wednesday and Friday 10:30-11:30 am or By Appointment

Website: https://ams80B-spring16-01.courses.soe.ucsc.edu/. Note that the grades will be uploaded in *eCommons*. You can log into *eCommons* at the following url: https://ecommons.ucsc.edu/portal using your Gold ID and password.

Lectures: Monday, Wednesday and Friday 03:30-4:40 pm, Merryl Acad 102

Bibliography:

- Cairo, Alberto (2013). *The Functional Art.* New Riders

- Yau, Nathan (2013). *Data Points - Visualization That Means Something.* Wiley

- Few, Sthepen (2004). *Show Me the Numbers - Designing Tables and Graphs to Enlighten.* Analytics Press.

- Yau, Nathan (2011). *Visualize this.* Wiley

- Kosslyn, Stephen (2007). *Clear and to the Point.* Oxford University Press

- Tuft, Edward (2001). *The Visual Display of Quantitative Information.* Second Edition. Graphics Press.

- Huff, Darrell (1954). *How to Lie with Statistics.* W. W. Norton & Company.

There is no mandatory book for the class, but specific sections of each recommended text will be used. You do not need to buy a specific text, but if you do, I suggest that you get Cairo's (2013), Few's (2004) or Yau's (2013) book. You can get one of them, not all three unless you are extremely interested in this field. There is also a multitude of interesting readings on the web, as or example, the Visual Business Intelligence Newsletter published by Stephen Few at http://www.perceptualedge.com. This website also contains a number of examples and case studies that will be used during this course.

Software: Most visualizations and infographics nowadays are created by using computer software. Although spreadsheets such as Microsoft's Excel can be used to create simple visualizations, they provide limited flexibility and cannot deal with complex problems such as generating maps. In this class we will employ Tableau (http://www.tableausoftware.com). For the most part, lab sections will focus on the use of software to create visualization solutions. In addition to the software in the labs, you have access to an educational license for your personal computer. To use that license you will need to first download the software from

http://www.tableausoftware.com/tft/activation

Click on the link above and follow the on-screen instructions (On the link above select Get Started. On the form, enter your university email address for *Business email*; and under *Organization*, please input the name of your school). The first time you run the program you will be prompted to enter the license key, use **TDKD-5AC0-7300-972B-28D6**.

For composition, we will be using Adobe Illustrator, but you could use any other scalable vector graph (svg) editor. Illustrator is available in all windows labs. We will not invest a huge amount of time of detailed features of Illustrator, but it will be covered in one lab section.

Computer Labs: Lab sections are optional, but each week there is an exercise for students to work on (with the help of the TAs if necessary) that is due on the Friday of the following week. You are allowed to complete the exercises on your own, but if you need help you MUST attend the section you have signed up for.

The available sections that you can sign up for:

Section	Days	Time	Room
01A	Tu	05:00PM-06:10PM	MingOng Cmp Lb 103
01B	Tu	06:10PM-07:20PM	MingOng Cmp Lb 103
01C	F	04:50PM-06:00PM	MingOng Cmp Lb 103

Teaching Assistants:

- Daniel Helkey - dhelkey@ucsc.edu. **Office hours:** TBA

- Rene Gutierrez - rgutie17@ucsc.edu. **Office hours:** TBA

Course Description

The main goal of this class is to introduce the basic ideas of data visualization and information graphics, with emphasis on applications to global and local problems in sciences, economics, politics, society, environmental issues and just about anything. The aim is to learn the importance to effectively represent data through many examples, using statistical charts, maps and explanation diagrams to discover the stories behind the data and to learn from them.

Grading Policy and Exams Information

- **Quizzes (40%):** There will be **two (2) quizzes** worth 20% each one, as indicated on the schedule. The first one will be on 04/25 and will cover the material up to 04/18. The second will be on 05/27 and will cover the material up to 05/20.

- **Laboratory Homework (20%):** Lab sections are optional, but each week there is an exercise for students to work on (with the help of the TAs if necessary) that is due on the Friday of the following week. You are allowed to complete the exercises on your own, but if you need help you MUST attend the section you have signed up for. Homework should be submitted electronically using eCommons.

- **Final project (30%):** The **final project** is a team project, and all members of the team are expected to contribute to its completion. Students will self-select into **groups of five people** that will collaborate to create a complex infographic or interactive visualization about a topic that is important for them. Students are strongly encouraged to create teams with diverse

backgrounds. In particular, teams should consider including at least one individual with skills in math/computer science and at least one individual with a background in arts/design. Having at least one individual with a background in social sciences or the humanities would also be useful. Team membership lists should be submitted in writing using the form available at the eCommons site on April 16. (Note that this date falls right after the last drop-out date.) If you cannot form a team by April 16, I will assign you to one myself. The form used to report team memberships can be found at:

resources/teamform.pdf

The form asks you that you come up with a team name. You can pick whatever name you want (for example *Slugh*), but once you pick one, you need to stick to it for the rest of the quarter! The instructor will use those name when organizing activities. To submit them use the *Drop Box* tab on the left panel of eCommons. Only one member per team (the team *leader*) needs to submit this form. The same team leader should submit all other assignments associated with the project.

- **Peer-review evaluation of class projects (10%):** During the final weeks of the quarter teams will be making presentations of their draft projects. Each team will be evaluated by two other ones. Details of the process are presented below in the Peer-review section. This is an individual assignment, in the sense that every student needs to evaluate the presentation of two teams.

- **Extra-credit:** You are encouraged to read (the online version of) your favorite newspaper and, if you find a visualization that you think has a MAJOR flaw, write a letter to the newspaper explaining the flaw and suggesting an alternative visualization. To get the extra-credit you need to submit the letter and your alternative visualization through eCommons, along with proof of submission. Your letter DOES NOT need to be published for you to get the extra-credit (but it would be great if it does). Please make sure to contact me to show me the letter before submitting it.

Project Evaluation: The evaluation of the project involves **four stages**:

1 **Draft number 1** (4%), due 04/18: A two-page summary identifying data sources and issues to be investigated using this data. Students are free to pick their own dataset and questions, but if you need some hints, a good source of ideas is http://hackforchange.org/challenges (note that just a small number of projects in this website are a fit for this class). Some interesting datasets can be found at http://www.data.gov and https://www.google.com/publicdata/directory, but you will need to think of questions that can be answered with these datasets (typically a worse approach than to start with a problem and finding data to illuminate it). The book by Alberto Cairo "The Functional Art" (which is one of our main textbooks) has a number of good examples. For examples of interesting visualizations, see:

http://manyeyes.com/software/analytics/manyeyes/, but keep in mind that an infographic or interactive visualization should include multiple displays interconnected by a common storyline.

2 **Draft number 2** (8%), due 05/16: At this stage, students are expected to provide five to six (preliminary) visualizations for their datasets, along with a brief text with an analysis of

each one of them (one paragraph for each visualization). The instructor will provide feedback to help improve the visualization. Although story flow is not a critical consideration at this point, students should start paying attention to this issue.

- **Draft number 3** (4%), due 05/27: Students are expected to provide a draft of the layout of their infographic/interactive visualization. At this point it is critical to focus on the overall presentation as well as in story flow and thematic coherence: What is the punch line behind your infographic/interactive visualization? A title for the project should also be included at this point.

- **Final presentation** (14%) due 06/07: A public exhibition of the works will be held in the Engineering Courtyard on Tuesday, 06/07 between 12:00M and 3:00PM (this is the time scheduled by the registrar for the final exam). You can either use a poster (if you are doing an infographic) or you can bring a computer (ONLY if you are building an interactive visualization). If you decide to use a poster, it MUST be printed in the DIN A1 format. (for more about the DIN format see, for example, http://en.wikipedia.org/wiki/Paper-size). All team members should be present at the exhibition and they should all be ready to answer questions about their visualization. The final product will be evaluated by a panel of 3 to 4 faculty from different departments. An electronic copy of the poster/interactive visualization (to be posted online on the course website) as well as a self-evaluation of the project using the visualization wheel (with a 400 word narrative) is also due on this day.

Peer-Review process:
We will be using the final two lectures for a peer review of the visualizations that you must create for your final project (the ones due on Friday 05/27). Instructions on how to prepare for those follow:

1. Prepare either a Tableau workbook and/or a short PowerPoint presentation that includes a discussion of the premise of your infographic and the 5 or 6 visualizations your team has created. The discussion of the premise should address the question of what is the main question/point that you are trying to answer/prove? Be succinct but clear. Since you are expected to have between 5 and 6 visualizations, you should have no more than 6 or 7 slides in your presentation.

   If you use PowerPoint, please use the basic (plain) template. No backgrounds or colors aside from those in the actual visualizations!!!! Preparing the slides should not take more than 10 minutes once you have created the individual visualizations and have decided on the text for the first slide!

2. One member of the team will present the slides and briefly discuss them. You should keep your presentation to about 7 minutes so that we can fit everybody in the time we have available. All members of the team must be present for the presentation, but only one person per team needs to actually stand up and speak. Pick the person in your team that has the presentation skills!

3. Each one of you will be asked to evaluate two sets of visualizations using a form provided by the instructor. Those forms need to be filled out immediately; you will have to turn them in at the end of the lecture; 10% of your grade in the class depends on you turning these in.

4. A schedule telling you when your team is supposed to present, and which other teams you need to evaluate, will be provided one week before the presentations.

Exam Accomodation: If you need DRC accomodation, or cannot make it to class on an exam day for a pre-approved reason such as an official UCSC sports team event, please make arrangements within the first two weeks of class. Please come to speak with me after class or during office hours or send me an email.

Tentative Schedule for Statistics **AMS80B-1** **Spring 2016**

Date	Topics
March 28	Class Overview.
30	Introduction to Data Visualization (Cairo Ch. 1).
April 01	Introduction to Data Visualization (Cairo Ch. 1).
04	Basic principles of Information Visualization (Kosslyn Ch. 1).
06	Basic principles of Visualization Design (Cairo Ch. 2, Few Ch. 3 and 9).
08	Basic principles of Visualization Design (Cairo Ch. 2, Few Ch. 3 and 9).
April 11	Evaluating Visualizations: the visualization wheel (Cairo Ch. 3 and 4).
13	Exploratory Data Analysis (Few Ch. 2 and 5).
15	Exploratory Data Analysis (Few Ch 2. and 5). **Team Membership form due**.
18	Visual cues for number representations(Few Ch. 6 and 7, Cairo Ch. 5). **Draft 1 of final project (dataset selection and motivation) due**.
20	Visual cues for number representations (Few Ch. 10 and 11, Cairo Ch. 6).
22	Visual cues for number representations (Yau Ch. 3 and 5).
April 25	QUIZ 1 (20%).
27	Teams meet with instructor.
29	Teams meet with instructor.
May 02	Case studies on visualization design (Various online materials).
04	Case studies on visualization design. Building interactive visualizations (Various online materials).
06	Case studies on visualization design. Building interactive visualizations (Various online materials).
May 09	Principles of graphic design (Cairo, Ch. 8 and 9, Yau, Ch. 6).
11	Principles of graphic design (Cairo, Ch. 8 and 9, Yau, Ch. 6).
13	Principles of graphic design (Cairo, Ch. 8 and 9, Yau, Ch. 6).
May 16	Visualizing spatial information. **Draft 2 of final project (basic visualizations) due**.
18	Visualizing relational data and text.
20	Visualizing relational data and text.
May 23	Principles of statistical narrative.
25	Review class.
27	QUIZ 2 (20%). **Draft 3 of final project (layout) due**.
Mayo 30	HOLIDAY
June 01	Peer-review of visualization of final project (10%)
June 03	Peer-review of visualization of final project (10%)
June 07	Public Exhibition (Engineering Courtyard). Setup at 12:00 m. Open to the public from 12:30 pm until 3:00 pm