



Syllabus for Data Visualization Theory: A Practical Introduction Certificate in Data Visualization

Downtown Seattle Location
Tuesday, 10/13-12/15, 6-9PM

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Course Description:

Information visualization is the use of computer-supported interactive visual representations of abstract data to amplify cognition (Card, Mackinlay, Schneidermann, 1999).

Thanks to advances in computing, we now have the ability to collect, summarize and make visual representations of data that help us depict and discover relationships in the vast amounts of data being collected, and to make comparisons, view relationships, and see trends. In this course we will study techniques and tools for creating effective visualizations based on principles from visual design, perceptual psychology, and cognitive science. The goal of this course is to expose you to visual representation methods and techniques that increase the understandability of complex and varied data.

Course Learning Objectives:

At the conclusion of this course, students will be able to:

- Understand the role of human cognition and visual system as it relates to designing visualizations.
- Understand the role of visualization and interactivity with respect to reporting and visual analysis.
- Quantitatively and qualitatively evaluate existing visualizations.
- Design effective visualizations using a variety of tools.
- Evaluate current visualization products with respect to the principles learned in this course.

Course Format:

The format for the course teaching will consist of the following:

- Lectures (including guest lectures)
- Readings
- In class projects
- Individual projects
- Group projects

Course Materials:

Required: Munzner, Tamara. Visualization Analysis & Design. CRC Press, 2014.

Required: Jones, Ben. Communicating Data with Tableau, O'Reilly, 2014.

Optional: Tufte, Edward. The Visual Display of Quantitative Information. Graphics Press, 1983.

Optional: Cleveland, William S. Visualizing Data, Hobart Press, 1993.

Optional: Ware, Colin. Information Visualization: Perception for Design. Morgan Kaufmann, 2013.

Optional: Kirk, Andy. Data Visualization: A Successful Design Process. Packt Publishing, 2012.

Selected Academic Readings per topic.



Technical Requirements:

- Computer literacy, file management, and basic familiarity with web browsing required.
- Business experience may be helpful but not required.
- Database experience helpful and some experience dealing with extracts and files.
- Familiarity with Microsoft Excel.
- Experience with statistics, SQL and javascript is a plus, but not a requirement.

Program Webpage:

- Course Canvas Page: <https://canvas.uw.edu/courses/1019792>
- Course Description: <http://www.pce.uw.edu/courses/data-visualization-theory/downtown-seattle-autumn-2015/>

Course Topics:

- Forms of storytelling
- Visual Analytics (Basic concepts and building blocks for data visualizations, including design patterns to support various types of analysis: time series, comparisons, relationships, ratios, deviations, multivariate, and spatial)
- Design theories, methods, and applications
- Visual Cognition and Perception
- Fundamentals in Statistics
- Introduction to tools

Student Assessment:

Grading will be based on class participation in the form of both in class discussion and participation in group and individual exercises (25% of total grade), completion of homework assignments (25%), final individual project (25%), and attendance (25%) (all students must attend at least 80% of the sessions). Group projects and participation in in-class assignments will be evaluated by the instructor and fellow students. This course is Pass/Fail. No letter grade will be assigned. In order to pass, students need to attend 80% of the sessions and achieve a total score of 70% or above.

Policies and Values:

The syllabus contains the policies and expectations for the Data Visualization course. Please read the entire syllabus carefully before continuing in this course. These policies and expectations are intended to create a productive learning atmosphere for all students.

Throughout this course, discussion on the topics presented in the class is very much encouraged.

One of the primary goals of this course is to help inform your own values and perceptions with respect to different visualization techniques. The field of visualization is still a very active field of research and we will spend time becoming acquainted with some of the latest developments in field.

Students are expected to attend at least 80% of the class sessions and to remain in class for the duration of the session. Students in this course seeking accommodations to special needs should consult with the UW Disability Resources for Students team, <http://depts.washington.edu/uwdrs/>.

Course Topics and Assignments by Date

Note that the exact week to week syllabus is subject to change, but the below represents the current plan. Depending on availability of guest speakers and the required depth for each topic, the instructor reserves the right to modify the syllabus. It is the instructor's goal to ensure we cover all of the topics included below and to have exercises that will provide students with an opportunity to put into practice the material presented in lectures.

<i>Week</i>		
1	Topics	Introduction To Data Visualization Tools
		A History of Data Visualization
	Reading	None
	Exercise	Group Activity – Sketching data
2	Assignment	Reading for Week 2 lecture
	Topics	Data Vis and Data Types
		Visualization Types
	Reading	Munzner- VA&D, Ch. 1-2
3		Jones- CDWT, Ch. 1-3
	Exercise	Building a viz with LEGO
	Assignment	Reading for Week 3 lecture
		Find and Review 5 Visualizations
4	Topics	Tasks and Validation
		Part-to-Whole Techniques and Rates
	Readings	Munzner- VA&D, Ch. 3-4
		Jones – CDWT, Ch. 4-5
5	Exercise	Tool Spotlight: Tableau
	Assignment	Reading for Week 4 lecture
		TBD
	Topics	Marks and Channels
6		Statistics – Central Tendency & Dispersion
	Reading	Munzner- VA&D, Ch. 5

	Assignment	Jones – CDWT, Ch. 6-7 Reading for Week 5 lecture TBD
5	Topics	Data Vis Rules of Thumb Multivariate Analysis
	Exercise	TBD
	Reading	Munzner- VA&D, Ch. 6 Jones – CDWT, Ch. 8
	Assignment	Reading for Week 6 lecture TBD
6	Topics	Arrange Tables Changes Over Time: Time Series Data
	Exercise	TBD
	Readings	Munzner- VA&D, Ch. 7 Jones- CDWT, Ch. 9
	Assignment	Reading for Week 7 lecture TBD
7	Topics	Arrange Spatial Data Creating Maps
	Exercise	TBD
	Readings	Munzner- VA&D, Ch. 8 Jones – CDWT, Ch. 10-11
	Assignment	Reading for Week 8 lecture TBD
8	Topics	Facet into Multiple Views Building Dashboards in Tableau
	Readings	Munzner- VA&D, Ch. 12 Jones – CDWT, Ch. 12-14
	Exercise	Work on Final Projects
	Assignment	
9	Topics	Data Storytelling
	Readings	Selected readings on Data Storytelling
	Exercise	Tableau Story Points
10	Topic	Class Final Project Presentations
	Exercise	Presentation, scoring and awards