Data visualization

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Summary
Understanding why and how to present complex data interactively in an effective manner has become a crucial skill for any data scientist. In this course, you will learn how to design, judge, build and present your own interactive data visualizations.

Content
Tentative course schedule
Week 1: Introduction to Data visualization Web development
Week 2: Javascript
Week 3: More Javascript
Week 4: Data Data driven documents (D3.js)
Week 5: Interaction, filtering, aggregation (UI /UX). Advanced D3 / javascript libs
Week 6: Perception, cognition, color Marks and channels
Week 7: Designing visualizations (UI/UX) Project introduction Dos and don’ts for data-viz
Week 8: Maps (theory) Maps (practice)
Week 9: Text visualization
Week 10: Graphs
Week 11: Tabular data viz Music viz
Week 12: Introduction to scientific visualisation
Week 13: Storytelling with data / data journalism Creative coding
Week 14: Wrap-Up

Keywords
Data viz, visualization, data science

Learning Prerequisites
Required courses
CS-250 Algorithms I (BA)
CS-401 Applied data analysis (MA)

Recommended courses
CS-486 Interaction design (MA)
CS-214 Software construction (BA)

Important concepts to start the course
Being autonomous is a prerequisite, we don't offer office hours and we won't have enough teaching assistants (you've been warned!). Knowledge of one of the following programming languages such as C++, Python, Scala. Familiarity with web development (you already have a blog, host a website). Experience with HTML5, Javascript is a strong plus for the course.

Learning Outcomes
By the end of the course, the student must be able to:
• Judge visualization in a critical manner and suggest improvements.
• Design and implement visualizations from the idea to the final product according to human perception and cognition
• Know the common data-viz techniques for each data domain (multivariate data, networks, texts, cartography, etc) with their technical limitations
• Create interactive visualizations in the browser using HTML5 and Javascript

Transversal skills
• Communicate effectively, being understood, including across different languages and cultures.
• Negotiate effectively within the group.
• Resolve conflicts in ways that are productive for the task and the people concerned.

Teaching methods
Ex cathedra lectures, exercises, and group projects

Expected student activities
• Follow lectures
• Read lectures notes and textbooks
• Create an advanced data-viz in groups of 3.
• Answer questions assessing the evolution of the project.
• Create a 2min screencast presentation of the viz.
• Create a process book for the final data viz.

Assessment methods
• Data-viz (35%)
• Technical implementation (15%)
• Website, presentation, screencast (25%)
• Process book (25%)

Resources
Bibliography
Visualization Analysis and Design by Tamara Munzner, CRC Press (2014). Free online version at EPFL.
Interactive Data Visualization for the Web by Scott Murray O'Reilly (2013) - D3 - Free online version.

Ressources en bibliothèque
• Data Visualisation / Kirk
• The Truthful Art / Cairo
• Interactive Data Visualization for the Web / Murray
• Visualization Analysis and Design / Munzner

Notes/Handbook
Lecture notes

Moodle Link
• https://go.epfl.ch/COM-480