COM-480  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-305 Software engineering (BA)
CS-250 Algorithms (BA)
CS-401 Applied data analysis (MA)

Recommended courses
EE-558 A Network Tour of Data Science (MA)
CS-486 Human computer interaction (MA)
CS-210 Functional programming (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 language 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 HTM5 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 (15%)
• Process book (35%)

Supervision

Office hours No
Assistants No
Forum No

Resources

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

Ressources en bibliothèque
• Visualization Analysis and Design / Munzner
• Interactive Data Visualization for the Web / Murray

Notes/Handbook
Lecture notes

Websites
• https://www.kirellbenzi.com

Moodle Link
• https://moodle.epfl.ch/course/view.php?id=15487