

COM-480

Data visualization

Vuillon Laurent Gilles Marie

Cursus	Sem.	Type
Computer science	MA2, MA4	Opt.
Cybersecurity	MA2, MA4	Opt.
Data Science	MA2, MA4	Opt.
Data science minor	E	Opt.
Digital Humanities	MA2, MA4	Opt.
Electrical Engineering		Opt.
Electrical and Electronical Engineering	MA2, MA4	Opt.
Learning Sciences		Obl.
SC master EPFL	MA2, MA4	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
Hours	4 weekly
Courses	2 weekly
Project	2 weekly
Number of positions	

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 Interaction design (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 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%)

Supervision

Office hours	No
Assistants	No
Forum	No

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.
The Truthful Art: Data, Charts, and Maps for Communication by Cairo, Alberto. Royaume-Uni, New Riders, (2016).
Data Visualisation: A Handbook for Data Driven Design by Kirk, Andy. Royaume-Uni, SAGE Publications, (2019).

Ressources en bibliothèque

- [Interactive Data Visualization for the Web / Murray](#)
- [Visualization Analysis and Design / Munzner](#)
- [Data Visualisation / Kirk](#)
- [The Truthful Art / Cairo](#)

Notes/Handbook

Lecture notes

Websites

- <https://www.kirellbenzi.com>

Moodle Link

- <https://moodle.epfl.ch/course/view.php?id=15487>