

COM-480

Data visualization

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| Cursus | Sem. | Type |
|--|----------|------|
| Computational and Quantitative Biology | | Obl. |
| Computational biology minor | E | Opt. |
| 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. |
| Financial engineering | MA2, MA4 | Opt. |
| Learning Sciences | | Opt. |
| Minor in digital humanities, media and society | E | Opt. |
| SC master EPFL | MA2, MA4 | Opt. |
| Statistics | MA2, MA4 | Opt. |

| | |
|----------------------------|---------------------|
| Language of teaching | English |
| Credits | 6 |
| Session | Summer |
| Semester | Spring |
| Exam | During the semester |
| Workload | 180h |
| Weeks | 14 |
| Hours | 4 weekly |
| Lecture | 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-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 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%)

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

- [Data Visualisation / Kirk](#)
- [Visualization Analysis and Design / Munzner](#)
- [The Truthful Art / Cairo](#)
- [Interactive Data Visualization for the Web / Murray \[2 ed. 2017\]](#)

Notes/Handbook

Lecture notes

Moodle Link

- <https://go.epfl.ch/COM-480>