COM-480 **Data visualization**

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Cursus	Sem.	Type
Computer science	MA1, MA3	Opt.
Data Science	MA1	Opt.
SC master EPFL	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
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

1. Introduction
2. The Web : languages, tool, librairies
a. Basics (environnement, tools
b. HTML5, Javascript, DOM
c. D3.js
d. Basic charts
3. Visualization fundamentals
a. Human perception, user experience
b. Data types
c. Marks & Channels
d. Color theory
e. Methodology for designing a data-viz
4. Visualizing data, algorithms
a. Multivariate data
b. Maps
c. Trees
d. Networks
e. Volumes
5. Case studies

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

Knowledge of one of the following progrmaming language such as C++, Python, Scala.
Familiarity with web-development (you already have a blog, host a webiste). Experience with THML5, 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 int he browser using HTM5 and Javascript

Teaching methods

Ex cathedra lectures, exercises, and group projects.

Expected student activities

- Follow lectures
- Read lectures notes, and textbooks
- Do an oral presentation of an original data-viz found on the web
- Create an advance data-viz in groups (group project)
- Write a series of blog post on the creation of the data-viz (group project)

Assessment methods

- Oral presentation of data-viz found on the web (10%)
- Group project data-viz (50%)
- Written report on the group project as a series of blog posts (40%)

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