

Project in Data Visualization - Milestone 2

[Take a look at the App!](#)

Project Goal

As briefly described in the first milestone, the goal of this project is threefold:

1. Visualize the network of courses currently offered at EPFL and their dependencies on a directed graph
2. Create an interactive, user-friendly tool for filtering courses by various parameters and viewing course information
3. Present a data story to summarize interesting insights about the data

Design, Features and Tools

One can think of the project in terms of two interrelated components; one relates to the user interface (UI) and the other to the data visualization. In this section we give a functional prototype review and list current and future features. We discuss the design of both components and the tools used for implementing them. All sketches can be found [here](#).

User Interface

The web app is a single-page application built with [Vue.js](#). Most of the UI is implemented with [Vuetify](#), a Vue UI library. We took inspiration from the first few lectures about Web Development and JavaScript basics to build the app. *Lecture 4.1 (Data)* provided particularly useful tips for acquiring the data, handling JSON format and creating the API to query the data.

Core features

- ☒ Currently the prototype includes a sidebar with dropdowns that enable the user to filter the data.
- ☒ A tabbed interface for pseudo-navigation in the home view, enabling the user to switch between network and list views.
- ☒ The List view is provided as an alternative to the Network tab. It offers a simple paging functionality.

Extra features

- ☐ Expand sidebar to enable more space for the main content (especially important when viewing on mobile).
- ☐ Enable user to pick which courses he/she wants to see (autocomplete search box)

Visualizations

For general viz design approaches we take inspiration from the following lectures: *Lecture 5.1 (Interactions, Views)*, *Lecture 5.2 (Interactive D3)*, *Lecture 6.1 (Perception, Color)*, *Lecture 6.2 (Mark and Channels)*, *Lecture 7.1 (Design for Data Viz)*, *Lecture 7.2 (Do's and Don'ts)*.

Dependency graph

The main visual component is the graph view/visualization (see [Figure 1](#)), which we created with the help of *Lecture 10 (Graphs)*. The courses themselves are represented by the nodes and dependencies between courses as (directed) edges, where the source is a prerequisite for the target. The graph is implemented using [d3-force](#). The [concrete implementation](#) can be viewed on GitHub.

Core features

- ☒ Enable filtering of courses by level, program, specialization, credits, section, and semester
- ☒ Update graph dynamically when filter is changed
- ☒ Color entering nodes in green, updated nodes in orange and exiting in red (by default)
- ☒ Determine node size from the number of credits (by default)

- ☐ Make edges appear as directed (with arrow tips)
- ☐ Render ingoing and outgoing neighbours of the current set of nodes in a passive color (like gray), with lower opacity.
- ☐ Display minimal meta information about a course when hovering over it (id, name, credits, in-/out-degree)
- ☐ Display page with detailed info about a course when selecting it on the graph (as in the list view)

Extra features

- ☐ Display meta info about the graph, such as total counts of nodes and edges, node degree or centrality summaries
- ☐ Enable user to select how node sizes are determined: number of credits (default), popularity, in-degree, out-degree, etc.

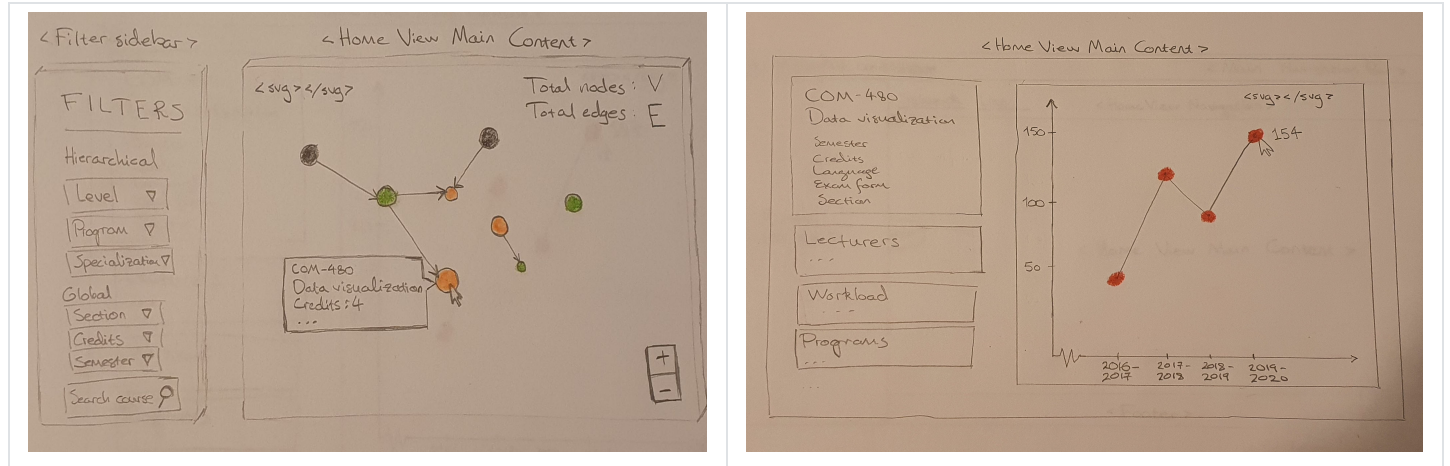


Figure 1: Draft sketch of the graph visualization. The filter sidebar is on the left, and the main graph SVG element on the right. Green nodes are new compared to last selection and orange are those that remained unchanged. The black/gray nodes are nearest neighbours to the current selection. When hovering over a node, a tooltip appears displaying meta info about the course.
([View full size](#))

Figure 2: The course details component ([View full size](#))

Line Chart of Course Registrations

[Figure 2](#) shows the design of the course details page. As described above, this page appears when clicking on a course either on the graph or the list view. The view shows a detailed individual view of the metadata of a given course, including the lecturers, the workload, the language, the exam form and more.

The visual component in this view is a line chart of course registrations. For this feature, we will mainly take inspiration from *Lecture 11 (Tabular Data)*. It will show number of registrations for a given course over the years. Content from *Lecture 5.2 (Interactive D3)* will help us to create the axes.

Core features

- ☐ Axes with tickmarks descriptive labels
- ☐ Render marker as a simple red shape
- ☐ Hovering over a data marker displays the statistic $(x, y) == (\text{year}, \text{registrations})$
- ☐ Descriptive title

Data Story

The data story serves as a summary of meaningful insights that can be gleaned from the data, which are hard to glean just by looking at the graph. We anticipate that the story will serve as a useful introduction to the data and provide inspiration for how users can use the interactive tool for their benefit.

Here is a list of ideas we have for the story:

- A wordcloud of words that appear in course names (size can be determined by the number of dependent courses, frequency, etc.)
- An interactive visualization of course registrations.
- An interactive visualization of registrations per section.