

# Application Development in Cartography

Autumn semester 2023  
ETH course number 103-0227-00 G  
6 ECTS

## Description

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After a brief introduction to the course, students will recap their knowledge in web programming. They learn how to create 3D maps using the virtual globe toolkit Cesium and how to develop modern web applications using the Vue.js framework.

Next, the students will learn the basics of 3D computer graphics, 3D map design and animations. They will start to work on a project of a certain topic, acquire the necessary data from suggested sources, and design the application. In the exercises, they will create 3D maps for their project.

Finally, the students will learn how to enhance their 3D maps, user interfaces and JavaScript code. In the exercises, they will implement the interactions for their project.

## Requirements

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The course addresses mainly students of the Geomatics Master (Major in GIS and Cartography), Data Science Master (Interdisciplinary Electives) and Spatial Development and Infrastructure Systems Master (Recommended Electives of Master Degree Program).

Basic knowledge in GIS techniques, cartography and web technologies (JavaScript, HTML, CSS) is required. This knowledge can be acquired in Cartography II, Introduction to Web Cartography Part 1+2 (MOOC), or similar courses.

## Place and Time

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Monday, 12.45-13.30	Lectures (L), exceptions see program	HIL G 22
Monday, 13.45-14.00	Demos (D)	HIL G 21
Monday, 14.00-15.00 + 15.15-16.30	Exercises (E)	HIL G 21
	<a href="#">Coding-related submissions (C)</a>	
	<a href="#">Project-related submissions (P)</a>	

Course start: Monday, 25.09.2023, 12.45, HIL G 22

In case no demo takes place, the exercise starts at 13:45.

Exception: guest lecture on Nov 6 is an extended lecture and the start of the exercise will be delayed accordingly. Demo originally planned for Nov 6 moved to Oct 30.

## Program

Week	Date	Type	Content	Staff
38	18.09.2023	*	No course	-
39	25.09.2023	L L L	Welcoming words Course overview Introduction to 3D Cartography	L. Hurni C. Jiao A. Neumann
		D C	Introduction to the interactive 3D web map project <a href="#">HTML, CSS, JavaScript assignment</a>	A. Neumann C. Jiao
40	02.10.2023	L	Virtual Globes	A. Neumann
		D C	Introduction to Cesium <a href="#">Cesium assignment</a>	A. Neumann C. Jiao
41	09.10.2023	L	Introduction to Web Application Development	C. Jiao
		D C	Introduction to Vue.js <a href="#">Vue.js I assignment</a>	C. Jiao A. Neumann
42	16.10.2023	L	Advanced Web Application Development	C. Jiao
		D C	Introduction to Node.js, NPM, Vite <a href="#">Vue.js II assignment</a>	C. Jiao A. Neumann
43	23.10.2023	L	Basics of 3D Graphics	A. Neumann
		D E P	Project template Topic description and data preparation <a href="#">Elevator pitch</a>	A. Neumann C. Jiao
44	30.10.2023	L	Topographic and Thematic 3D Cartography	K. Henggeler
		D E P	Integrated development environments Base map creation <a href="#">Application sketches</a>	A. Neumann K. Henggeler
45	06.11.2023  Lecture and exercises in room G21 or G10.5	L	Skitouren guru (extended lecture) (objectives, algorithms for avalanche risk assessment, route finding minimizing risks (cost optimization problem), technical architecture)	G. Sch mudlach
		D E P	Version control systems Thematic maps creation <a href="#">GitLab commit</a>	A. Neumann K. Henggeler
46	13.11.2023	L	Animated 3D Maps	A. Neumann
		E P	Map animation <a href="#">Production build</a>	A. Neumann K. Henggeler
47	20.11.2023	L	Map Design for the Web	L. Hurni

		E	Assisted Web Application Development	C. Jiao A. Müdespacher
48	27.11.2023	L	UI Design for the Web	L. Hurni
		E	Assisted Web Application Development	C. Jiao AdS dev
49	04.12.2023  Lecture, Demo and Exercises in G10.5	L	Clean Code	A. Müdespacher
		D	Setup of ESLint and Prettier	A. Müdespacher
		E	Assisted Web Application Development	A. Müdespacher
50	11.12.2023	L	No lecture but details to the final presentations and report are given	A. Neumann et al.
		E	Assisted Web Application Development	C. Jiao A. Müdespacher
51	18.12.2023	P *	Final student presentations Closing words and course evaluation	L. Hurni et al.
		E	Assisted Web Application Development	C. Jiao A. Müdespacher
01	08.01.2024	P	Final project and report	-

## Course Online

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All documents and information about the course are published on Moodle. Moodle is an e-learning platform, where ETH students can log in with their nethz id. The direct link to the Moodle course is: <https://moodle-app2.let.ethz.ch/course/view.php?id=20462> You will be enrolled automatically after choosing the course on <http://mystudies.ethz.ch> or on request by e-mail to Chenjing Jiao.

## Lecturers and Assistants

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### Course lead

Prof. Lorenz Hurni &  
Dr. Andreas Neumann

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[Andreas.Neumann@ethz.ch](mailto:Andreas.Neumann@ethz.ch)

HIL G  
HIL G 12.2

### Assistants

Katharina Henggeler  
Chenjing Jiao  
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HIL G 23.2  
HIL G 13.2  
HIL G 12.1

### Guest lecturer

Günter Schudlach

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