Web and Mobile GIS: one week course

Intended learning outcomes

The course aims to teach students the fundamental theories and technologies for disseminating and processing geographic information using Internet and World Wide Web.

The lectures will be focused on the most important technologies for transfer, process and visualize geographic data via Internet. Exercises are mainly directed towards to create Internet-based GIS services using different free and open source software, programming languages and API libraries. At the end of the course, students should know how to design and implement web maps, Internet-based geographic analysis, and mobile GIS and LBS solutions.

Course main content

- Basics of computer networking and web technology
- Client/server computing and the distributed component framework
- Open source Internet mapping software and standards for distributed GIS services
- Design and implementation of dynamic web maps and geographical analysis
- Mobile data collection using GNSS and others sensors
- Mobile solutions for capturing, storing, updating, analyzing, and displaying geographic information
- Cloud-based processing infrastructures for geospatial big data analysis (i.e., Google Earth Engine, DIAS)

Disposition

Lectures: 20 h & Labs: 20 h

The course will be organized in lectures and labs scheduled as follow:

DAY01:
- Lecture 1 – Introduction to Web and Mobile GIS technologies
- LAB 1 – How to develop your first web map

DAY02:
- Lecture 2 – WebGIS programming (HTML, Javascript and CSS basic concepts)
- LAB2 – Web Maps using OpenLayers

DAY03:
- Lecture 3 – WebGIS services (OGC standard, WMS-WFS-WCS, GeoServer)
- LAB3 – Full stack development of a web app – part A

DAY04:
- Lecture 4 – Mobile data collection (GNSS mobile positioning and tracking, ODK library)
- LAB3 - Full stack development of a web app – part B

DAY05:
- Lecture 5 – Advanced WebGIS app development (processing remote sensing data, mobile data integration)
- LAB4 – First Google Earth Engine Web App development

References

Internet GIS: Distributed Geographic Information Services for the Internet and Wireless Networks, authored by Dr. Zhong-Ren Peng and Dr. Ming-Hsiang Tsou. Published by Wiley. 2003.

Recommended prerequisites

- Background in GIS architecture
- Background in cartography and reference system
- Basic programming skills