



Cloud Computing and Generative AI in Spatial Analysis

Duration: 30 hours

Instructor: Joan Perez – Urban Geo Analytics

Objectives

This course aims to familiarize participants with a modern cloud-based geospatial analytics ecosystem, integrating large-scale data processing tools, generative artificial intelligence models (LLMs, VLMs), and reproducible collaborative workflows. It addresses new practices in territorial analysis built on automation, API-first design, visual intelligence, and distributed programming.

By combining Google Cloud, GitHub, Python, and vision-language models such as LLaVA, participants learn to design and deploy a complete pipeline — from the collection of urban data to automated thematic mapping powered by AI prompts. The course targets geographers, urban planners, analysts, and developers wishing to integrate cloud-native and zero-shot approaches into their research or consulting workflows.

Course Details

The course begins with an introduction to cloud-first, reproducible, and collaborative work environments. Students learn to use tools such as Google Colab, GitHub, and Google Drive to structure a multi-module project, manage code versions, organize Python dependencies, and centralize geographic resources. Particular attention is given to documentation, directory architecture, and team project management.

A theoretical module then focuses on generative artificial intelligence and its possible applications in geography. The main principles of LLMs and VLMs (transformers, prompting, zero-shot learning) are introduced, along with their potential for task automation, image analysis, and spatial information extraction. The course emphasizes “zero input” approaches, where all data required for analysis (networks via OSM, imagery via Street View API) are collected online through automated geographic scraping scripts, without any pre-existing database. Students learn to use models like LLaVA to interpret urban scenes, as well as to leverage LLMs to generate, debug, or optimize Python code for spatial data manipulation.

The second part of the course is organized around a collaborative project, replicating the conditions of a guided mini-hackathon. Students are divided into groups with clearly defined



roles. Each group is responsible for developing a specific module of the spatial analysis pipeline: data collection and structuring, morphological enrichment, machine learning and AI inference, visualization, and mapping. Modules are developed in parallel on dedicated GitHub branches, with intermediate milestones ensuring interoperability.

At the end of the training, the modules are integrated into a complete, reproducible, automated spatial analysis protocol. The final deliverable — a PDF report, documented Colab notebook, and GitHub repository — demonstrates the seamless workflow, the ability to use generative models, and the mastery of cloud and open-source tools within a project-oriented logic.

Skills Acquired

By the end of the course, students will be able to:

- Design and structure a collaborative geospatial project using cloud computing;
- Use GitHub and Google Colab to manage a modular spatial analysis workflow;
- Understand the principles of LLMs and VLMs, and their applications in territorial sciences;
- Apply generative AI models for image interpretation and coding assistance;
- Develop modular Python scripts organized around an API-driven logic;
- Produce reproducible outputs in the form of maps, scores, clusters, and summary reports;
- Work in teams with a clear division of roles from development to final integration.

Commercial Proposal

Service title:

Training *Cloud Computing and Generative AI in Spatial Analysis*
30 hours – In-person training

Instructor: Joan Perez – Urban Geo Analytics

Estimated duration: 30 hours

Total cost: Contact us

This proposal can be finalized and contracted through the **MALT** platform, which manages administrative processes and guarantees for both parties.