

Geographic Information Systems

M1 EDDS, 20h **UE 8-3: AI & Methods for Economics**

Personal Computer required !

Aim of the course

This course introduces Geographic Information Systems (GIS) and spatial analysis tailored to the needs of economists and data scientists. It blends practical mapping skills, spatial data wrangling, and economic insights into location-based phenomena using R and QGIS.

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

- - Understand basic GIS concepts and spatial data structures (vector/raster)
- - Manipulate, visualize, and analyze spatial data using QGIS and R
- - Merge spatial and non-spatial (tabular) data
- - Apply spatial statistics to economic and decision science problems
- - Produce clear, reproducible spatial visualizations and reports
- - Execute small, independent GIS projects with a scientific and policy-oriented lens

Syllabus

| Week | Topic |
|------|---------------------------------------------------------------------------------------------------|
| 1 | Introduction to GIS & Spatial Data Models — Coordinate systems, vector vs raster, projections |
| 2 | Getting Spatial Data: Sources & Formats — Shapefiles, GeoJSON, OpenStreetMap, INSEE, Eurostat |
| 3 | Exploratory Spatial Data Analysis (ESDA) — Joins, buffers, distance, spatial joins |
| 4 | Map Design & Thematic Mapping — Choropleths, classification, color theory, cartographic standards |
| 5 | Spatial Data Manipulation in R — sf, tidyverse, coordinate transformations, raster basics |
| 6 | Basic Spatial Econometrics — Spatial autocorrelation, Moran's I, spatial lag models (intro) |

Evaluations: full CC

- micro-projects as intermediate steps
- 1 final exam during Course time-slot

References

<https://r.geocompx.org/> Dorman, M., Graser, A., Nowosad, J., & Lovelace, R. (2025). Geocomputation with Python. CRC Press.

https://ycroissant.github.io/micsr_book/chapters/spatial.html