

Spatial methods for economists using Python

Semester:	Fall semester- FS 2025
Root Number:	512282
ECTS:	3 ECTS MASTER 6 ECTS PhD
Lecturer:	Prof. Dr. Olivier Schöni
Dates:	1 – 5 September 2025
Room:	University of Bern, A322 3 rd floor Altbau UniS, Schanzeneckstrasse 1, Bern

Course Description

In the last decade, the use of spatial data in empirical analyses has spread to a variety of economic fields, including urban and real estate economics, development and environmental economics, labor and public economics, economic history, and trade. The aim of the course is to provide students and researchers with an effective and systematic workflow allowing them to extract and structure information provided by spatial data. To this end, the course will primarily focus on the automation of tasks involving spatial data using Python and ArcGIS. Among others, these tasks include importing different formats of spatial data, projecting spatial data to a common reference system, defining a spatial structure, selecting areas according to specific rules, merging data according to their spatial relationship, computing spatial statistics, and exporting the results. Additionally, the course will show how to integrate these tasks into the workflow of standard statistical software, such as R and Stata. The programming part of the lecture is complemented with a discussion of papers

published in leading economic journals that exploit spatial data in their econometric analyses.

Audience:

The course is intended for PhD students, young postdoc researchers and advanced master students in economics or a closely related field.

Lecturer

Prof. Dr. Olivier Schöni

Olivier Schöni is Associate Professor at the Swiss Graduate School of Public Administration (IDHEAP) at the University of Lausanne. Prior to his current role, he was Assistant Professor at Laval University in the Department of Finance, Insurance, and Real Estate, and has held positions as Research Officer at the London School of Economics. His academic journey is characterized by a blend of quantitative academic research and practical insights into urban economics, real estate, and policy evaluation. His scholarly work includes publications in academic journals such as the *Journal of Urban Economics* and *Journal of Housing Economics*, and his research has been cited in prominent media outlets like *The Economist*.

Course Overview

Class	Date	Day	Time	Hours	Lecturer	Topic
1	1. Sep.2025	Monday	09:00 – 16:45 hrs	5	Olivier Schöni	Spatial methods for economists using Python
2	2. Sep.2025	Tuesday	09:00 – 16:45 hrs	5	Olivier Schöni	Spatial methods for economists using Python
3	3. Sep.2025	Wednesday	09:00 – 16:45 hrs	5	Olivier Schöni	Spatial methods for

						economists using Python
4	4. Sep.2025	Thursday	09:00 – 16:45 hrs	5	Olivier Schöni	Spatial methods for economists using Python
5	5. Sep.2025	Friday	09:00 – 16:45 hrs	5	Olivier Schöni	Spatial methods for economists using Python

Compulsory and recommended reading materials

Students will receive a reading list with the difference made between mandatory and optional reading materials.

Learning Outcomes

Students can write a script in Python to extract relevant information from GIS data, have a good understanding of how spatial data can be exploited in econometric analyses, integrate Python scripting into the code of standard statistical software, use ArcGIS to create maps and investigate spatial dynamics visually.

Exams and Grades

The final grade will be determined by a group project.

For Master's Students:

Each group of Master's students will complete a series of specific tasks assigned by the instructor. The project requires the preparation of a presentation document, which will be presented in a short video. The final grade will be a weighted average of the grades awarded for the submitted code, the written presentation, and the oral presentation.

For PhD Students:

PhD student groups must either replicate a spatial analysis from an existing academic paper or conduct an original analysis. Each group will submit a concise document of 10-12 pages. The final grade will be a weighted average of the grades awarded for the submitted code and the accompanying short document.

The course will follow the University of Bern grading system.