

## Syllabus

# Introduction to Geospatial Analysis with R for Development Economics

(Einführung in die Räumliche Analyse mit R in der Entwicklungsökonomik)

Summer semester 2021

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## 1. General Information

### *1.1 Course content*

This voluntary course is directed at Master's and Ph.D. students interested in learning how space is used in empirical economics, focusing on development economics. It introduces some basic tools employed in geospatial research. We will cover geographic projections, geospatial data types, and vector data processing (We do not cover raster data, e.g., night lights). After obtaining the toolkit, we will learn how to apply these techniques by working with modern geospatial datasets related to development economics.

### *1.2 Course goals*

The goal of the course is to provide students with a starting point of acquiring the methodological foundations to conduct a geospatial analysis themselves. After completing this course, students should be able to run their own simple spatial analysis and should find it much easier to dive further into spatial analysis themselves.

### 1.3 Prerequisites

Students should be familiar with basic econometrics and development economics.

Some experience with R will be beneficial. Students without such experience are encouraged to take a [preparatory R course online](#) and/or work through parts of the recommended R book. Nevertheless, we will also cover some basics of R during the first session.

### 1.4 Credit points

This course is an additional offer. *No credits can be earned.*

### 1.5 Registration

Please register via Stud.IP until **Friday, April 30, 2021**. The number of participants is restricted to 20, and priority is given to students that also participate in the Master seminar [Conflict and Development - Seminar M.WIWI-VWL.0184](#).

## 2. Course overview

### 2.1 Description of the teaching and learning methods

The course runs in three blocks on May 28, June 04, and June 25 between 09:00 and 13:00 c.t. On July 28, I offer an open Q&A where students can ask individual questions about spatial coding problems of a research project or their thesis. **The course language is English.**

### 2.2 Meetings

**IMPORTANT:** Due to the current situation (COVID-19 Pandemic), this course will be offered online. Please register for the course on Stud.IP so that you receive all pertinent information in due time (e.g., registration, virtual meetings).

**Session 1: Introduction to R** [Friday, May 28, 2021, 09:00 – 13:00 c.t.]

- Contents
  - Introduction to R
  - Understanding data formats, objects, and functions in R
  - Introduction to the “tidyverse” package
- Activities
  - First steps in R
  - Piping and tidyverse

**Session 2: Introduction to geospatial analysis** [Friday, June 4, 2021, 09:00 – 13:00 c.t.]

- Contents
  - Introduction to spatial analysis with R
  - Introduction to geospatial data types
  - Reading and writing vector data
- Key readings
  - Donaldson, D. and A. Storeygard. 2016. The View from Above: Applications of Satellite Data in Economics. *Journal of Economic Perspectives*, 30(4), 171–198.
  - Michalopoulos, S. and E. Papaioannou. 2018. Spatial Patterns of Development: A Meso Approach. *Annual Review of Economics*, 10(1), 383–410.
  - Golemund and Wickham 2017, Chapters 9–21.
  - Lovelace et al. 2018, Chapter 1.
- Activities
  - First steps in R with the sf-package

**Session 3: Vector data types and application** [Friday, June 25, 2021, 09:00 – 13:00 c.t.]

- Contents
  - Working with and manipulating spatial data
  - Making maps of vector data
  - Finding and accessing online vector data
  - Combining spatial and non-spatial data
- Key readings
  - Lovelace et al. 2018, Chapter 2.1, 2.3, 2.4, 3.2, 4.2, 5
  - AidData Research and Evaluation Unit. (2017). Geocoding Methodology, Version 2.0.1. Williamsburg, VA: AidData at William & Mary.
  - Collins Bartholomew (2018)
  - Mobile Coverage Explorer User Guide
- Activities
  - Working with spatial data and preparing it for economic analysis

**Q&A** [Wednesday, July 28, 2021, 10.00 – 12.00 c.t.]

*2.3 Examination and grading of the module*

None because students cannot earn credits with this class.

*2.4 Course materials*

- You find the required and recommended readings on each topic listed above (see 2.2)
- We are not really following any textbook, but this comes closest to explaining much of what is covered in the course:

Lovelace, R., Nowosad, J., and J. Muenchow. 2019. *Geocomputation with R*. CRC Press. [Available online, for free!](#)

- If you are struggling with R or are new to the tidyverse, then I recommend

Grolemund, G. and H. Wickham. 2017. *R for Data Science*. O'Reilly. [Available online, for free!](#)

- All lecture slides and exercise questions will be published on Stud.IP

*Copyright notice:* I owe a great debt to Richard Bluhm's GIS course previously taught at the Universities of Hanover and Göttingen.