



ICT Solutions for Brilliant Minds

Welcome to

# INTRODUCTION TO GEOSPATIAL PYTHON

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# ABOUT THIS COURSE

- An adaptation of the Automating GIS processes course at University of Helsinki: <https://autogis-site.readthedocs.io/en/latest/>
- A second part of the GeoPython course: <https://geo-python-site.readthedocs.io/en/latest/>

# REQUIREMENTS

- Knowledge requirements:
  - You must know:
    - Python programming language
    - Some knowledge of GIS
  - Good to know:
    - Working with Pandas library
- Devices:
  - A computer with internet connection

# LEARNING GOALS

- After completing this course, you should be able to:
  - test and produce **modular code** in the Python programming language
  - **manage spatial data** programmatically (for example, reading different data formats, re-projecting, re-classifying and storing data)
  - **apply spatial analysis methods** in Python (such as buffering, network analysis and spatial joins)
  - create **visualizations** (graphs and maps) from geographic data using Python
  - design and implement a geographical **data analysis workflow**

# TOPICS

- GIS in Python; Spatial Data Model, Geometric Objects, Shapely
- Working with (Geo) DataFrames
- Geocoding and spatial queries
- Geometric operations, reclassifying data
- Visualization, static and interactive maps
- OSM data acquisition and simple network analysis
- Raster data processing in Python

# PROGRAM

## Day 1, Monday

- 9:00-10:30 Lesson 1: GIS in Python; Spatial Data Model, Geometric Objects, Shapely
- 10:30-10:45 Coffee break
- 10:45-12:15 Lesson 1 continues
- 12:15-13:00 Lunch break
- 13:00-14:30 Lesson 2: Working with (Geo)DataFrames
- 14:30-14:45 Coffee break
- 14:45-16:15 Lesson 2 continues

## Day 2, Tuesday

- 9:00-10:30 Lesson 3: Geocoding and spatial queries
- 10:30-10:45 Coffee break
- 10:45-12:15 Lesson 3 continues
- 12:15-13:00 Lunch break
- 13:00-13:15 Running geospatial Python scripts on the supercomputer
- 13:15-14:30 Lesson 4: Geometric operations, reclassifying data
- 14:30-14:45 Coffee break
- 14:45-16:15 Lesson 4 continues

## Day 3, Wednesday

- 9:00-10:30 Lesson 5: Map visualisation
- 10:30-10:45 Coffee break
- 10:45-12:15 Lesson 6: OSM data acquisition and network analysis
- 12:15-13:00 Lunch break
- 13:00-14:30 Lesson 7: Raster data processing in Python
- 14:30-14:45 Coffee break
- 14:45-16:15 Lesson 7 continues

# COURSE MATERIALS

**CSC notebooks:** [notebooks.csc.fi](https://notebooks.csc.fi)

— **join code:** int-6ex9n1az

**Course's website:** [autogis-site.readthedocs.io](https://autogis-site.readthedocs.io)

**GitHub:** <https://github.com/Automating-GIS-processes/csc-intensive-course>

There are also instructions for setting up your own Python env:

<https://autogis-site.readthedocs.io/en/latest/course-info/installing-python.html>

Let's get to know each  
other