



Z_GIS ONLINE COMPACT

Automated GIS Workflows with QGIS and Python

UNIGIS Salzburg provides materials for the **Z_GIS online compact** courses and is responsible for the tutoring.

Communication and course materials are in English language.



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Automated GIS Workflows with QGIS & Python

The goal of this course is to introduce the use of QGIS for typical GIS tasks, such as data visualization, editing, and analysis. Participants will also learn to use Python (in particular the QGIS Python API PyQGIS) to automate GIS workflows. Concepts that lend themselves to automation are first introduced using the QGIS GUI before we go into detail of achieving the goal in Python.

Learning Objectives

- Introducing Open Source GIS & QGIS
- Data Creation and Editing
- Introducing PyQGIS
- Visualizing spatial data
- Creating GIS Maps
- PyQGIS for automated map creation
- Exploratory data analysis
- Spatial Analysis
- Automated spatial processing
- PyQGIS for spatial analysis
- Presenting spatial data on the web
- Automating
- Extending QGIS with Python
- Developing QGIS plugins

Course Content I

Lesson 1 – Introducing Open Source GIS & Open Spatial Data

This lesson provides an introduction to the principles of open source (common licenses, pros and cons) in general and the open source geospatial ecosystem in particular (OSGEO, open spatial data sources).

Lesson 2 – Introducing QGIS

This lesson provides an introduction to QGIS and covers installation and first steps in QGIS. After this lesson, you'll have gained a better understanding about how an open source project like QGIS works and you'll be ready to start using the software.

Lesson 3 – Data Creation & Editing

This lesson covers getting to know the QGIS user interface, viewing spatial data from different data sources, and how to create new datasets from scratch and edit existing ones.

Lesson 4 – Introducing PyQGIS

This lesson covers the first steps with PyQGIS. This will enable you to do basic things, such as loading data and accessing vector attributes using Python.

Lesson 5 – Visualizing Spatial Data

This lesson covers styling and labeling spatial data. This will enable you to design useful visualizations of spatial data and corresponding attributes.

Lesson 6 – Creating GIS Maps

This lesson covers designing maps for print. This will enable you to create maps for reports and other presentation purposes.

Lesson 7 – PyQGIS for Automated Map Creation

This lesson covers using PyQGIS to automatically create maps. It builds on the introduction of PyQGIS in lesson 4 and the introduction to creating map layouts in lesson 5.

Course Content II

Lesson 8 – Exploratory Data Analysis

This lesson covers core functionality and plugins for exploratory data analysis. This will enable you to gain a better understanding of the data you are working with.

Lesson 9 – Spatial Analysis

This lesson introduces the QGIS Processing toolbox. This will enable you to perform spatial analysis in QGIS.

Lesson 10 – Automated Spatial Processing

This lesson covers automating spatial processing using batch processing and the model builder. This will enable you to create automated workflows to perform different analyses more efficiently and reproducibly.

Lesson 11 – PyQGIS for Spatial Analysis

This lesson covers performing spatial analysis in PyQGIS. This will enable you to create even more sophisticated spatial analysis workflows.

Lesson 12 – Presenting spatial data on the web

This lesson covers how to present spatial data on the web. The tools presented in this lesson require minimal setup. As such, these are not meant to replace more sophisticated web map server setups (through GeoServer, MapServer, or ArcGIS Server) but should be considered complementary tools in your tool belt that enable quick sharing on the web.

Lesson 13 – Extending QGIS with Python

This lesson covers extending QGIS functionality by writing custom actions and Processing scripts using Python.

Lesson 14 – Developing QGIS plugins

This lesson covers developing Python plugins for QGIS.

Lesson 15 – Summary & Outlook

This lesson invites you to review the advances you made throughout this module. Beyond that, the main focus of this lesson is to provide you with more pointers for how to advance your studies.