Workflow Automation in QGIS Training Course

Professional Development Training Course Outline

Category	GIS	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Geographic Information Systems (GIS) are indispensable for modern data-driven decision-making, with **QGIS** emerging as a leading open-source solution. As geospatial datasets grow in complexity and volume, the need for efficient and reproducible data processing becomes paramount. This training course focuses on empowering GIS professionals and enthusiasts to harness the power of **workflow automation** within QGIS, transforming time-consuming manual tasks into streamlined, error-free automated processes. By mastering the **Processing Modeler**, **PyQGIS scripting**, and **batch processing**, participants will significantly enhance their productivity and unlock new possibilities for advanced spatial analysis.

Workflow Automation in QGIS Training Course addresses the critical demand for **GIS efficiency** and **data reproducibility**. It delves into practical techniques for automating common and complex GIS operations, from data acquisition and cleaning to analysis and map production. Participants will learn to design robust **geoprocessing workflows** that minimize human intervention, reduce errors, and ensure consistent results. Through hands-on exercises and real-world **case studies**, this training will equip individuals with the skills to leverage QGIS's automation capabilities, contributing to more agile and effective geospatial projects across various industries.

Programme Curriculum

Workflow Automation in QGIS Training Course

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5 days

Course Objectives

Upon completion of this course, participants will be able to:

1. Master QGIS Processing Modeler for visual workflow design.
2. Develop and implement automated geoprocessing scripts using PyQGIS.
3. Execute batch processing for repetitive GIS tasks efficiently.
4. Integrate external scripts and tools into QGIS workflows.
5. Automate data cleaning and validation procedures in QGIS.
6. Generate dynamic map layouts and atlases programmatically.
7. Optimize GIS workflows for performance and scalability.
8. Implement version control for automated GIS projects.
9. Apply spatial analysis automation techniques for complex problems.
10. Create custom QGIS plugins for specialized automation.
11. Troubleshoot and debug QGIS automation scripts.
12. Design reproducible research workflows in QGIS.
13. Leverage open-source GIS automation for enhanced productivity.

Organizational Benefits

- Automates repetitive and time-consuming GIS tasks, freeing up staff for more complex analytical work and strategic initiatives.
- Minimizes manual labor and the potential for errors, leading to cost savings in data processing, quality control, and project timelines.
- Standardized automated workflows ensure consistent results and reduce human-induced errors, improving the reliability of spatial data.
- Faster data processing and analysis provide timely insights, enabling quicker and more informed decisions based on accurate geospatial intelligence.
- Automated workflows are easily scalable to handle larger datasets and can be replicated consistently, promoting best practices and scientific rigor.
- Equips GIS professionals with advanced skills in automation, increasing their technical capabilities and value to the organization.
- Organizations leveraging efficient GIS automation gain a significant edge in project delivery, resource management, and overall geospatial capabilities.

Target Audience

1. GIS Analysts and Specialists.

2. Geospatial Data Scientists
3. Environmental Consultants.
4. Urban Planners and Researchers
5. Remote Sensing Professionals.
6. GIS Managers
7. Students and Academics
8. Anyone with basic QGIS knowledge.

Course Outline

Module 1: Introduction to QGIS Automation Concepts

- Understanding the philosophy of workflow automation in GIS.
- Overview of QGIS automation tools: Processing Modeler, PyQGIS.
- Identifying suitable tasks for automation and assessing benefits.
- Setting up your QGIS environment for scripting and modeling.
- Introduction to geospatial data types and their role in automation.
- **Case Study:** Automating the daily download and re-projection of weather data from an online repository into a standardized local format.

Module 2: Mastering the QGIS Processing Modeler

- Building graphical models for sequential geoprocessing tasks.
- Defining inputs, algorithms, and outputs within the Modeler.
- Iterating and batch processing with the Graphical Modeler.
- Nesting models for complex, multi-step workflows.
- Documenting and sharing your QGIS models.
- **Case Study:** Creating a model to automate the process of reclassifying land cover, buffering selected features, and then intersecting them with a road network layer to identify areas for environmental impact assessment.

Module 3: Introduction to PyQGIS for Scripting

- Fundamentals of Python for GIS: data types, control flow, functions.
- Interacting with QGIS layers and data using PyQGIS API.
- Accessing and running Processing algorithms via Python.
- Reading and writing geospatial data with PyQGIS.
- Debugging PyQGIS scripts and handling errors.
- **Case Study:** Developing a PyQGIS script to automatically generate multiple buffer zones around a set of point features (e.g., potential facility locations) with varying distances, and exporting each buffer as a separate shapefile.

Module 4: Advanced PyQGIS for Data Manipulation

- Automating attribute table modifications and calculations.
- Performing spatial queries and selections programmatically.
- Working with raster data using PyQGIS (GDAL/OGR integration).
- Automating data cleaning, validation, and topological checks.
- Developing custom geoprocessing functions with PyQGIS.
- **Case Study:** Scripting a process to identify and correct topological errors in a digitized parcel boundary layer, including snapping vertices and removing duplicate geometries, using PyQGIS and GRASS tools.

Module 5: Batch Processing and Iteration

- Understanding batch processing scenarios and best practices.
- Implementing loops and conditional logic in PyQGIS for batch tasks.
- Processing multiple input files and generating multiple outputs.
- Automating repetitive analysis for large datasets.
- Strategies for efficient batch processing of raster and vector data.
- **Case Study:** Automating the batch conversion of hundreds of CAD drawings (DXF) to georeferenced shapefiles, applying a consistent projection, and performing a spatial join with a district boundary layer.

Module 6: Automated Map Production and Reporting

- Automating print layouts and map series using QGIS Atlas.
- Generating dynamic map elements: legends, scale bars, labels.
- Exporting maps to various formats (PDF, image files) programmatically.
- Creating automated reports with statistical summaries from spatial data.
- Integrating external reporting tools with QGIS outputs.
- **Case Study:** Designing an automated map atlas for a municipal planning department, generating a series of property maps with specific attributes and standardized symbology for each neighborhood.

Module 7: Integrating External Tools and Customization

- Running external command-line tools (GDAL/OGR) from QGIS.
- Leveraging Python libraries beyond PyQGIS for advanced analysis (e.g., GeoPandas, NumPy).
- Developing custom QGIS processing algorithms.
- Creating basic QGIS plugins for specialized functionalities.
- Version control for QGIS projects and scripts (Git introduction).
- **Case Study:** Building a custom QGIS processing tool that calculates a custom ecological index using a combination of raster inputs and then classifies the results, making it accessible to non-programming users.

Module 8: Real-World Applications and Best Practices

- Applying automation to common GIS challenges
- Optimizing scripts for performance and memory management.
- Strategies for deploying and managing automated workflows in production.
- Exploring advanced QGIS automation concepts and future trends.
- Capstone project: Participants design and implement an automated workflow for their specific domain.
- **Case Study:** Developing a comprehensive workflow to monitor deforestation, including downloading satellite imagery, performing automated land cover classification, and generating weekly change detection reports for a conservation organization.

Training Methodology

- Instructor-Led Presentations.
- Live Demonstrations
- Practical Exercises.
- Case Studies and Real-World Scenarios.
- Group Discussions and Q&A Sessions

- Individualized Support
- Project-Based Learning.
- Resource Sharing.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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