QGIS for Humanitarian Mapping

1. GIS Fundamentals (Mapping and Spatial Analysis) using QGIS

Course Objectives:

The course objective is to initiate the user in QGIS, a free and open source desktop geographic information system software, with a complex working environment which allows users to analyze and edit spatial information.

The goal of this course is to practically orient and expose participants to geospatial analysis using QGIS.

Course Outline

Day 1:	**Introduction to GIS** ❖ Introduction to GIS [Presentation] ❖ GIS concepts and the concept of Open Source. ❖ Characteristics of QGIS ❖ Orientation to QGIS Features and Functionality ❖ General tools

Day 2:	**Vector Data Management** ❖ Introduction to vectors ❖ Editing vector data [merging, reshape] ❖ Creating views and themes ❖ Working with attribute tables ❖ Working with vector symbology ❖ Basic vector analysis [spatial joins, buffers, vector queries] ❖ Creating a professional map

Day 3:	**Working with Raster Data** ❖ Introduction raster datasets ❖ Raster display and symbology ❖ Working with the Raster calculator ❖ Basic raster analysis [clipping, merging, extracting values] ❖ Creating raster maps
Day 4:	**Creating New Vector Data** ❖ Georeferencing Raster Data ❖ Working with tabular data ❖ Creating New Vector Datasets • Create a point vector dataset • Create a line vector dataset • Create a polygon vector dataset

Day 5:	**Working with QGIS Plugins and Online Publishing of Outputs** ❖ Description of Plugins incorporated in QGIS ❖ Operations through plugins ❖ Publishing maps online and other web-based platforms

2. Advanced GIS (Managing Geo Databases and Advanced Analysis) using QGIS

This course is Intended for users already familiar with the basics of QGIS, who wants to improve their skills, this course is focusing on advanced analysis regarding the management and manipulation of raster data, spatial analysis, using PostGIS and relational databases. The course is structured in units with different levels of difficulty that comes in help of the student who will learn to handle the advanced QGIS tools.

Course Goals

- Highlight the importance and utility of QGIS in performing complex spatial analysis.
- Understand the advanced concepts of QGIS.
- Learn about GIS key tools in an appropriate and professional way.
- Find about all possible difficulties which you may encounter in the execution of GIS projects, and their solutions through practical advanced exercises.

Course Outline:

Day 1:	**Working with Spatial databases in QGIS** Recap on GIS data types Introduction to SpatiaLite • Create a new database • Connecting to SpatiaLite in QGIS • DB Manager Introduction to PostGIS • Installation and configuration • Connecting to PostGIS database in QGIS Installing PostGIS Creating a PostGIS database Connecting to PostGIS in QGIS

Day 2:	**Advanced Presentation of data** ❖ Advanced Field calculations, Expressions and Functions ❖ Advanced labelling • Labelling using expressions • Data defined labelling • Matching label colour to features • Setting label properties • Label engine • Label priority ❖ Advanced editing • Splitting map features • Merging map features • Reshaping map features ❖ Creating an Atlas and dynamic maps ❖ 2D Animations • Create a GIF showing changes in a given phenomenon over time ❖ 3D Animations ❖ Create a 3D Flythrough
Day 3:	**Advanced Vector processing and Analysis in QGIS** ❖ Reviewing the Processing framework ❖ Batch processing of inputs ❖ Geoprocessing tools ❖ Performing advanced spatial joins ❖ Finding nearest neighbors ❖ Multi criteria analysis ❖ Proximity Analysis
Day 4:	**Advanced Raster Processing and Analysis** ❖ Reclassifying rasters. ❖ Working with map algebra (Raster calculator) ❖ Data interpolation techniques • IDW • Kriging • Natural neighbor ❖ Raster conversion tools ❖ Querying and masking raster data to obtain new information ❖ Performing summary statistics on raster data

	❖ Merging raster files

Day 5:	**Making Interactive Maps with QGIS** ❖ Sharing GIS data on the web • QGIS2web • QGIS2leaf • Cloud Publisher for QGIS ❖ Consuming GIS web services in QGIS • Web Map Service • Web Feature Service