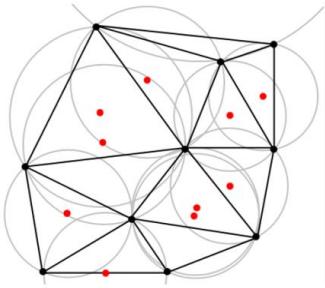
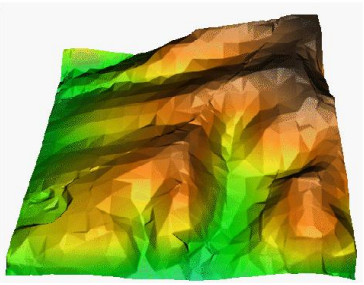
AC207 - Advanced GIS Geostatistical Analysis using R Course

Course Duration: 6 Days
Training Fee: KSH 48,000 | USD 480
Course Registration: **Register Here>>**

1.0. Introduction





Geostatistics is a class of statistics used to analyze and predict the values associated with spatial or spatio-temporal phenomena. It incorporates the spatial (and in some cases temporal) coordinates of the data within the analyses. The Geostatistical tools were developed as a means to describe spatial patterns and interpolate values for locations where samples were not taken. The general context is that there is some phenomenon of interest occurring in the landscape (the level of contamination of soil, water, or air by a pollutant; the content of gold or some other metal in a mine; and so forth). Geostatistical tools therefore provide a solution to the expensive and time-consuming exhaustive studies. Their ability to predict values associated with spatial and spatiotemporal phenomena has seen their application in many disciplines including meteorology, geology, public health, soil science, among others. Spatial Statistics, on the other hand, has tools that help in analyzing spatial distributions, patterns, processes, and relationships.

1.1. Course Overview

In this course, learners will be introduced to various geostatistical tools, and how they are used to create surfaces from a set of samples, in a way to model real world phenomena. We will also learn the various statistical tools for analyzing spatial distributions, patterns, processes, and relationships.

1.2. Course Objectives

- To understand the basic Geostatistics and Spatial-Statistics concepts
- To learn how to create and visualize surfaces during modelling
- To learn how to analyze and map patterns, and model spatial relationships of real-world phenomena.

1.3. Course Content/Outline

Introduction to Geostatistical Analyst

- What is Geostatistics; the geostatistical analyst extension; definition of terms
- Introduction to interpolation methods; Global polynomial, Local polynomial, Inverse distance weighted, Radial basis functions, kriging, Gaussian geostatistical simulations
- Creating surfaces: Geostatistical Analyst example applications; Key concepts for all interpolation method; Creating surfaces with deterministic methods, Creating surfaces with geostatistical techniques

- Evaluating interpolation results: Performing cross-validation and validation; Comparing models; Using validation to assess models
- Creating and modifying sampling and monitoring networks; An introduction to sampling/monitoring networks; How Create Spatially Balanced Points works; How Densify Sampling Network works
- Visualizing and managing geostatistical layers; working with geostatistical layers; Predicting values for specific locations.

Introduction to Spatial statistics

- Analyzing Patterns; clustered, dispersed, or random spatial patterns.
- Mapping Clusters; identify statistically significant hot spots, cold spots, or spatial outliers
- Measuring Geographic Distributions; Where's the center? What's the shape and orientation? How dispersed are the features?
- Modeling Spatial Relationships; regression analyses; spatial weight matrices
- Utilities; computing areas, assessing minimum distances, exporting variables and geometry, converting spatial weights files, collecting coincident points.

1.4. Case study

Analyzing Karen Village Topographical survey Data using Geostatistical and R Tools.

1.5. Expected Outcomes

At the end of this module, learners should;

- Have a basic understanding of the importance of geostatistical and spatial statistics tools
- Be proficient in using the geostatistical and spatial analyst extensions in ArcGIS

1.6. Training Materials (Hardware and Software)

- A laptop or PC
- ArcGIS and QGIS
- R Programming Tools

1.7. Who should attend

- Public Health professionals
- Meteorologists
- Soil Scientists
- Geologists
- GIS and Geospatial Students
- Government Bodies such as Ministry of Petroleum and Mining