Geostatistics - Software Application For Geospatial Analysis

Duration: 5 Days

Language: en

Course Code: IND02-104

Objective

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

- Understand the importance of geostatistics.
- Describe the use of geoscience in relation to oil and gas.
- Assess the concepts and methods of geostatistics.
- Utilise coding software such as RStudio to compile and analyse data.
- Explain the capabilities and limitations of excel and RStudio.
- Acquire available R packages for spatial data analysis.
- Identify the benefits of conducting spatial data analysis.
- Accurately import, analyse and interpret results from spatial data.
- Compile various sources of data with varying degrees of uncertainty.
- Understand advanced concepts techniques, including Monte Carloe simulation and clustering analysis.

Audience

This course is designed for anyone responsible for analysing geostatistical data. It would be most beneficial for:

- Data Analysts
- Data Scientists
- Geologists
- Software Engineers
- Petroleum Engineers
- Geospatial Analysts
- Geographic Information Systems (GIS) Officers
- Nature Recovery Advisors

Training Methodology

This course uses a variety of adult learning styles to aid full understanding and comprehension. Participants will receive collected sample datasets to analyse later using various models and methods.

Participants will be supplied with all the necessary equipment and software to carry out the given learning exercises. Combined with presentations, practical demonstrations, and activities, they will have ample opportunities to develop a well-rounded understanding of the concepts of geostatistics. They will also be able to use the provided data to conduct their own analysis using Excel and Rstudio to develop the related practical skills.

Summary

When it comes to industries where advanced knowledge of geology is necessary, such as oil and gas, conducting geostatistical analysis is crucial to building confidence in the area and allowing for accurate business function planning.

Geospatial analysis is the process of gathering data using various methods and analysing it to gain an in-depth understanding of a geographical location. Spatial analysis is commonly used in alignment with models such as Monte Carlo to predict data over a wide area without having to physically sample each individual location. These processes combined allow an organisation to accurately review the environment and proceed with its next steps.

Many limitations can be faced when conducting spatial analysis, but the type of software used is no longer one of these. Many free and low-cost software options are extremely effective. Excel and RStudio are the most popular programs for data analysis. It is essential for professionals to be highly competent in using this software, as it will allow for the most freedom when it comes to inputting data and providing the most accurate results.

Course Content & Outline

Section 1: Introduction to Geostatistics

- Defining geostatistics.
- The vitality of understanding geostatistics in different industries such as oil and gas.
- The four types of geostatistical reservoir modelling.
- Reviewing the available data analysis programs.
- The advantages and disadvantages of using coding software, such as Excel and RStudio.

Section 2: Spatial Data Analysis

- The concept of spatial data.
- How spatial data can provide in-depth knowledge of locations.
- Collecting spatial data samples.
- Minimising spatial resolution gaps.
- Using spatial weight matrices to quantify the spatial relationships within the sampled data.
- The principles of data analysis - statistical measures, correlation and autocorrelation.

Section 3: Variogram and Kriging

- Creating variograms to describe the relationship of spatial data.
- Collecting samples for the variogram model.
- Understanding the concept of nested sampling.
- The benefits of using nested sampling.
- Describing kriging.
- Utilising kriging to predict the values of unsampled locations.

Section 4: Big Data Analytics

- The concept of big data.
- Using clustering analysis to explore occurring groups within datasets.
- Conducting clustering analysis using RStudio.
- Understanding the difference between variance and covariance in relation to spatial data.
- Calculating the variance and covariance.
- The ways data can be distributed.

Section 5: Advanced Spatial Statistics

- Understanding the Bayesian theory in relation to data collection.
- The concept and principles of the Monte Carlo simulation.
- The advantages of using the Monte Carlo model for outcome prediction.
- Utilising the Markov chain and Monte Carlo model simultaneously to build confidence in results.
- Advanced machine learning and generative algorithms for the future of statistical prediction.

Certificate Description

Upon successful completion of this training course, delegates will be awarded a Holistique Training Certificate of Completion. For those who attend and complete the online training course, a Holistique Training e-Certificate will be provided.

Holistique Training Certificates are accredited by the British Assessment Council (BAC) and The CPD Certification Service (CPD), and are certified under ISO 9001, ISO 21001, and ISO 29993 standards.

CPD credits for this course are granted by our Certificates and will be reflected on the Holistique Training Certificate of Completion. In accordance with the standards of The CPD Certification Service, one CPD credit is awarded per hour of course attendance. A maximum of 50 CPD credits can be claimed for any single course we currently offer.

Categories

Energy and Oil & Gas, IT & Computer Application, Technology

Tags

technology, Geostatistics, Software, Application, Geospatial Analysis, Variogram

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