Geostatistics for Resource Estimation Training Course

Professional Development Training Course Outline

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

Course Introduction

Geostatistics for Resource Estimation Training Course is designed to equip professionals with advanced skills in mineral resource modeling, ore body estimation, spatial data analysis, and mining geostatistics workflows. In today’s data-driven mining and exploration industry, accurate grade estimation, mineral reserve classification, and uncertainty quantification are critical for optimizing project value and reducing operational risk. This training integrates modern geostatistical methods, machine learning integration, variography, kriging techniques, and 3D geological modeling to support decision-making in exploration and mining projects.

Participants will gain hands-on expertise in applying Ordinary Kriging, Indicator Kriging, Sequential Gaussian Simulation, spatial interpolation, and resource classification standards. The course is tailored to bridge theory and practice using real mining datasets, ensuring professionals can confidently deliver high-precision resource models, grade control strategies, and mine planning inputs. With a strong focus on industry applications, this program empowers geologists, mining engineers, and data scientists to improve resource confidence levels, optimize drilling strategies, and enhance economic valuation of mineral deposits.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. Master geostatistical theory and spatial data analysis
2. Apply variogram modeling and structural analysis
3. Perform ordinary and universal kriging for resource estimation
4. Implement indicator kriging for ore/waste classification
5. Develop 3D geological and block models
6. Conduct grade estimation and mineral resource modeling
7. Understand uncertainty quantification in mining datasets
8. Apply conditional simulation techniques
9. Interpret drillhole data and compositing methods
10. Integrate mining software workflows
11. Ensure compliance with JORC and NI 43-101 reporting standards
12. Optimize drill spacing and sampling strategies
13. Build capability in data-driven mine planning and decision support systems

Target Audience

1. Exploration geologists
2. Mining engineers
3. Resource geologists
4. Geostatisticians and data scientists
5. Mine planning engineers
6. Geological modelers
7. Metallurgists involved in grade control
8. Graduate students in mining and earth sciences

Course Modules

Module 1: Foundations of Geostatistics in Mining

- Introduction to spatial statistics and mining datasets
- Random variables and spatial continuity
- Sampling theory and support effect
- Data distribution and transformation techniques
- Introduction to mining data structures
- **Case Study:** Iron ore deposit sampling variability analysis and spatial trend interpretation.

Module 2: Exploratory Data Analysis (EDA) & Data Conditioning

- Drillhole data validation and cleaning
- Compositing techniques and declustering
- Statistical summaries and outlier detection
- Grade population analysis
- Data domaining and geological control
- **Case Study:** Gold deposit drillhole dataset cleaning and compositing for estimation readiness.

Module 3: Variography & Spatial Structure Modeling

- Experimental variogram construction
- Nugget, sill, and range interpretation
- Anisotropy modeling in ore deposits
- Variogram fitting techniques
- Nested structures in mineralization
- **Case Study:** Copper porphyry deposit variogram modeling for directional continuity.

Module 4: Kriging Techniques for Resource Estimation

- Ordinary Kriging fundamentals
- Block Kriging and point estimation
- Kriging efficiency and validation
- Search ellipsoid design
- Neighborhood parameters optimization
- **Case Study:** Nickel laterite deposit estimation using Ordinary Kriging.

Module 5: Advanced Geostatistical Simulation

- Sequential Gaussian Simulation (SGS)
- Conditional simulation principles
- Indicator simulation for categorical data
- Uncertainty modeling in ore grades
- Multiple realization analysis
- **Case Study:** Diamond deposit grade uncertainty modeling using SGS.

Module 6: 3D Geological Modeling & Resource Classification

- Wireframing and geological domains
- Block model construction
- Density and tonnage calculations
- Resource classification
- Reporting standards compliance
- **Case Study:** Platinum group metals (PGM) resource classification for JORC reporting.

Module 7: Mine Planning Integration & Optimization

- Linking resource models to mine planning
- Cut-off grade optimization
- Production scheduling inputs
- Grade control strategies
- Economic evaluation of ore bodies

- **Case Study:** Open-pit coal mine optimization using block model outputs.

Module 8: Industry Applications & Digital Mining Transformation

- Machine learning in geostatistics
- Automation in resource estimation
- GIS and spatial analytics integration
- Cloud-based geological modeling
- Real-time mine data integration
- **Case Study:** Smart mining project integrating geostatistics with AI-driven ore prediction.

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

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
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

Ready to enroll or request a customized program? Book online or contact us:

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Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com