



Applied Geostatistics for Reservoir Property Modeling Training Course

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Overview

Applied Geostatistics for Reservoir Property Modeling Training Course is a five-day advanced course for reservoir engineering, geoscience, geomodeling, petrophysics, and subsurface analysis functions who leave with a Reservoir Geostatistics Modeling and Uncertainty Pack. Participants connect spatial data conditioning, variograms, kriging, facies modeling, property simulation, uncertainty ranking, validation, volumetric implications, and decision evidence. Agile Leaders Training Center develops practical applied reservoir geostatistics and property modeling capability.

Who Should Attend

- Reservoir engineering functions responsible for static-model inputs and uncertainty decisions
- Geoscience functions responsible for spatial interpretation and depositional context
- Geomodeling functions responsible for facies and petrophysical property realizations
- Petrophysics functions responsible for conditioned well-log properties and cutoffs
- Subsurface analysis functions responsible for model validation and decision evidence

The course assumes participants can interpret well logs, maps, basic statistics, reservoir units, and three-dimensional grids, and leaves out introductory geology, seismic processing, dynamic simulation, software certification, and reserves classification.

Departments and Industries

The course supports departments and industries that characterize subsurface spatial variability.

- Oil and gas reservoir characterization
- Energy subsurface development planning
- Carbon storage site modeling
- Groundwater aquifer characterization
- Mining resource estimation support

Learning Objectives

By the end of this course, participants will be able to:



- Analyze spatial distributions and data conditioning choices
- Build and interpret directional variogram models
- Apply kriging estimation and diagnostic methods
- Build facies and property simulation workflows
- Evaluate realizations, uncertainty, and validation evidence
- Build a reservoir geostatistics decision pack

Course Agenda

Day 1: Condition Spatial Reservoir Data

- Reservoir Modeling Objective and Scale Map
- Well Data Quality and Support Review
- Univariate Distribution and Outlier Profile
- Declustering and Sampling Bias Assessment
- Coordinate, Zone, and Grid Alignment Checklist

Day 2: Model Spatial Continuity

- Experimental Variogram Calculation Workflow
- Directional Anisotropy Analysis Map
- Nugget, Sill, and Range Interpretation Guide
- Nested Variogram Model Fitting Sheet
- Geological Continuity Consistency Review

Day 3: Estimate Reservoir Properties

- Neighborhood Search and Sample Selection Plan
- Ordinary Kriging Estimation System
- Indicator Kriging Probability Model
- Kriging Variance and Diagnostic Map
- Cross-Validation Error and Bias Report

Day 4: Simulate Facies and Properties

- Facies Proportion and Trend Model
- Sequential Indicator Simulation Workflow
- Sequential Gaussian Simulation Workflow
- Property Transform and Back-Transform Control
- Realization Ranking and Uncertainty Dashboard



Day 5: Practice Model Validation

- Exercise: Condition and Declutter Well Data
- Exercise: Fit a Directional Variogram
- Exercise: Compare Kriging and Simulation Results
- Exercise: Validate Facies and Property Realizations
- Capstone: Reservoir Geostatistics Modeling and Uncertainty Pack

Practical Exercises

The course uses suggested activities based on petroleum reservoirs, carbon storage, groundwater, and mineral-resource datasets.

- Suggested activity: condition spatial samples and document scale, support, declustering, and grid decisions.
- Suggested activity: calculate directional variograms and fit geologically consistent nested models.
- Suggested activity: compare kriging estimates with stochastic facies and property realizations.
- Suggested activity: assemble validation, ranking, uncertainty, and decision evidence into the final pack.

FAQs

Who suits applied reservoir geostatistics training, and what does it assume?

Reservoir engineering, geoscience, geomodeling, petrophysics, and subsurface analysis functions suit the training; it assumes experience with well logs, maps, basic statistics, reservoir units, and three-dimensional grids.

How does reservoir geostatistics differ from general statistical analysis?

Reservoir geostatistics models spatial dependence, direction, scale, neighborhood, estimation, simulation, and geological continuity, while general statistical analysis may summarize distributions without representing spatial location and connectivity.

Why is variogram modeling important for reservoir properties?

Variogram modeling describes how similarity changes with distance and direction, supplying continuity parameters for kriging and simulation while allowing geological anisotropy and short-scale variability to be represented.

When should reservoir teams use kriging or stochastic simulation?

Kriging supports a locally weighted estimate, while stochastic simulation produces multiple spatially plausible realizations; teams choose according to whether the decision needs a single estimate or uncertainty distributions and connectivity alternatives.



How are reservoir property realizations validated?

Realizations are validated against input distributions, variograms, facies proportions, trends, well conditioning, cross-validation evidence, geological concepts, volumetric ranges, and decision-relevant uncertainty measures.

Conclusion

Participants take back a Reservoir Geostatistics Modeling and Uncertainty Pack linking conditioned data, spatial continuity, kriging, facies simulation, property simulation, validation, ranking, and decision evidence. It changes isolated spatial calculations into a traceable reservoir-model workflow. The pack supports coordinated work across geoscience, petrophysics, geomodeling, reservoir engineering, and development planning.



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