
1-day workshop plan on “AI Applications in Geometallurgy” — designed for mining engineers, metallurgists, data scientists, and researchers interested in applying artificial intelligence to ore characterization, process optimization, and metallurgical performance prediction.

1 Day (8 Hours)

Workshop Objectives:

By the end of the workshop, participants will:

- Understand the fundamentals of **geometallurgy and data-driven mineral processing**.
- Learn how **AI and ML models** can predict **ore behavior, recovery rates, and plant performance**.
- Gain hands-on experience with **data analytics tools** (Python, Scikit-learn, etc.) using sample geometallurgical datasets.
- Explore **real-world case studies** integrating geology, mineralogy, and metallurgical data.

Workshop Agenda

Session 1: Introduction to Geometallurgy (1 Hour)

- What is geometallurgy?
- Key components: geology, mineralogy, metallurgy, mining, and environmental data.
- Importance of integrated data in decision-making.
- Overview of traditional vs. AI-driven geometallurgical workflows.

Session 2: AI & Data Analytics in Geometallurgy (1.5 Hours)

- Role of Machine Learning in ore classification and recovery prediction.
- Data requirements and preprocessing (assays, mineralogy, grind size, process data).
- Feature selection for geometallurgical modeling.
- AI algorithms used: Regression, Random Forest, Gradient Boosting, Neural Networks.

✳️ **Mini Exercise:** Explore a sample dataset and visualize relationships between ore properties and recovery.

Session 3: Case Study – Predicting Metallurgical Recovery (1.5 Hours)

- Building an ML model to predict flotation recovery using historical data.
- Data preparation and model training (hands-on demo using Python).
- Model performance evaluation (R^2 , RMSE, feature importance).
- Discussion on uncertainty and validation techniques.

Outcome: Participants understand end-to-end AI modeling workflow.

Session 4: Integrating AI Models into Geometallurgical Frameworks (1 Hour)

- Linking AI models with block models and mine planning tools.
- Using predictive models for scenario analysis and decision support.
- Visualization dashboards for metallurgical prediction.

Session 5: Industry Trends & Case Studies (1 Hour)

- Global examples of AI in geometallurgy (Rio Tinto, BHP, Anglo American).
- Use of hyperspectral, mineralogical, and process data integration.
- Challenges and data governance in mining AI projects.

Session6: Group Exercise & Discussion (1 Hour)

- Small group exercise: Define an AI use case for a hypothetical mine site.
- Pre presentation of solutions and discussion on feasibility, challenges, and ROI.

Session 7: Wrap-up & Future Directions (30 min)

- Summary of key learnings.
- Emerging technologies (digital twins, geostatistical ML, automated characterization).
- Q&A and feedback.

Tools & Resources

- Python (Scikit-learn, Pandas, Matplotlib)
- Jupyter Notebook
- Sample datasets (ore characterization and recovery data)
- Presentation slides and reading materials

Target Audience

- Mining and Metallurgical Engineers
- Geologists & Geometallurgists
- Data Scientists in Mining
- Academic Researchers & Students

Instructor: Mr Suresh Tripathi is a founder of Geosun Pty Ltd an Australian company registered in year 2000 to provide AI corporate training, data center solutions and data pipeline end-to-end cloud platform. He has nearly 25+ years of work experience in digital data analytics integrated with AI and tech platforms. His education qualifications include master degree in Statistics from India, master degree in Geostatistics from Australia and master degree in Geoscience from Australia. He completed his AI certificate courses from Stanford Business School from California and High Impact Leadership from Cambridge University, UK. He has worked in Australia and US focusing his career on data strategy, tech platforms, and developing in-house training. He has worked with range of industries in Australia and US that include Deloitte, Flybuys, Ambulance Victoria, CFA (Emergencies Services), Avexa, Covance, Avance Clinical (Pharmaceuticals), Intelligen, Commonwealth Bank, Hackett Group (US), Health and Safety Sphera Solutions(US), Vic Government (Environment, water and energy), Waste Management (US), Outfront Media (US), Adani Mining (Australia) and Fura Gems Industries (Dubai).

Fee: Rs 25,000 per participant plus GST payable to GeosunAI Tech Cloud Pvt Ltd. RTGS/Cheque/ PhonePe via below link form.

Bank: Punjab National Bank

Account Name: NB, GeosunAI Tech Cloud Pvt Ltd

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