AI+ Mining™

Duration: 08 hours

Course Overview

The AI+ Mining course explores how artificial intelligence is transforming the mining industry. It covers AI fundamentals, machine learning, and deep learning applications in exploration, operations, predictive maintenance, and workforce development. The course emphasizes ethical AI, regulatory compliance, and AI-powered AR/VR training for workforce upskilling. It also highlights strategic decision-making, risk management, and supply chain optimization. Real-world case studies from leaders like Vale and Anglo-American illustrate practical AI benefits. This course prepares mining professionals to harness AI for safer, more efficient, and sustainable mining operations in today's competitive landscape.

Course Prerequisites

- Basic understanding of mining industry operations and terminology
- Familiarity with fundamental concepts of data analytics and statistics
- No prior coding experience required (coding templates provided)
- Prior exposure to GIS, geospatial data, or industrial automation is a plus but not mandatory

Course Agenda

Module 1: Introduction to AI in Mining

- Overview of AI, ML & Deep Learning in Mining
- Use Cases
- Activity: Group Discussion – How is AI changing the mining industry

Module 2: Machine Learning & Deep Learning for Mining

- Introduction to ML & Deep Learning
- Use Cases
- Case Study: AI-Powered Geophysical Analysis
- Hands-On Exercise
- Activity: Group Discussion – Will AI Replace Traditional Geologists and Mining Engineers

Module 3: AI in Mineral Exploration & Resource Modeling

- AI for Smart Exploration & Orebody Modeling
- Use Cases
- Case Study
- Hands-On Exercises

- Activity: Group Discussion – Present an AI-powered Exploration Plan to a Mining Board

Module 4: AI for Equipment Automation & Fleet Optimization

- AI in Autonomous Vehicles & Robotics
- Use Cases
- Case Study
- Hands-On Exercises
- Activity: Group Discussion – Is mining ready for full automation

Module 5: AI in Predictive Maintenance & Asset Management

- AI in Equipment Health Monitoring
- Use Cases
- Case Study: AI in Predictive Equipment Failure – Reducing Unplanned Downtime in Mining Operations
- Hands-On Exercise: AI for Equipment Monitoring – AI-Powered Sensor Data Analysis Using Orange Data Mining
- Activity: Group Discussion – Should AI Decide When Machines Need Maintenance?

Module 6: AI for Environmental Compliance & Sustainability

- AI-Powered Environmental Monitoring
- Use Cases
- Case Study
- Hands-On Exercises
- Activity: Group Exercise

Module 7: AI for Workforce Transformation & Ethical AI

- Ethical AI, Workforce Augmentation & AI Regulations
- Use Cases
- Case Study
- Hands-On Exercises

Module 8: AI in Mining Strategy & Implementation

- AI-Driven Decision-Making in Mining
- Use Cases
- Case Study: Vale's AI-Driven Supply Chain Optimization Strategy