Statistical Quality Control in Mining 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

Statistical Quality Control (SQC) in Mining Training Course is designed to equip mining professionals with advanced competencies in data-driven quality management, process optimization, predictive analytics, operational excellence, mineral grade control, and continuous improvement systems. In today's highly competitive mining environment, organizations are increasingly leveraging Artificial Intelligence (AI), Big Data Analytics, Lean Six Sigma, Statistical Process Control (SPC), automation technologies, digital transformation, ESG compliance, and smart mining systems to improve operational efficiency, reduce production variability, and ensure sustainable profitability. This training empowers participants with practical tools and globally recognized methodologies to monitor, analyze, and improve mining operations using statistical techniques and quality control frameworks.

The course integrates real-world mining applications with modern statistical tools to address challenges in ore quality consistency, production performance, equipment reliability, metallurgical recovery, risk mitigation, process capability analysis, and compliance management. Participants will gain hands-on experience in applying control charts, sampling techniques, root cause analysis, process capability indices, predictive maintenance analytics, statistical modeling, and quality assurance systems across the mining value chain. Through practical case studies, simulations, and industry benchmarking exercises, the program enables mining professionals to make informed operational decisions, improve productivity, minimize waste, and drive sustainable mining excellence in line with global best practices and Industry 4.0 standards.

Programme Curriculum

Statistical Quality Control in Mining Training Course

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5 days

Course Objectives

1. Develop competencies in Statistical Process Control (SPC) for mining operations.
2. Apply Data Analytics and Predictive Quality Management in mineral processing.
3. Enhance operational efficiency using Lean Six Sigma methodologies.
4. Implement Artificial Intelligence and Machine Learning applications in mining quality systems.
5. Improve Ore Grade Control and Quality Assurance strategies.
6. Analyze mining process variability using advanced statistical tools.
7. Strengthen risk-based quality management frameworks in mining environments.
8. Optimize production through real-time monitoring and digital dashboards.
9. Utilize Big Data and Industrial IoT technologies for process improvement.
10. Conduct effective Root Cause Analysis and Failure Prevention.
11. Improve metallurgical performance using process capability analysis techniques.
12. Develop sustainable mining systems aligned with ESG and compliance standards.
13. Enhance decision-making using business intelligence and operational analytics.

Target Audience

1. Mining Engineers
2. Mineral Processing Engineers
3. Quality Assurance and Quality Control Personnel
4. Production Supervisors and Operations Managers
5. Metallurgists and Laboratory Analysts
6. Continuous Improvement and Lean Six Sigma Professionals
7. Health, Safety, Environment, and Compliance Officers
8. Data Analysts and Digital Transformation Specialists in Mining

Course Modules

Module 1: Fundamentals of Statistical Quality Control in Mining

- Principles of Statistical Quality Control (SQC)
- Quality management systems in mining operations
- Introduction to Statistical Process Control (SPC)
- Mining operational variability and process stability
- International quality standards and compliance frameworks

Case Study

Analysis of quality variability in open-pit ore extraction operations.

Module 2: Statistical Tools and Data Analysis Techniques

- Descriptive and inferential statistics in mining
- Probability distributions and sampling techniques
- Hypothesis testing and confidence intervals
- Correlation and regression analysis
- Data visualization and reporting dashboards
- **Case Study:** Application of regression analysis to optimize ore recovery rates.

Module 3: Statistical Process Control (SPC) Applications

- Control charts for mining operations
- Process capability analysis
- Monitoring crushing and grinding performance
- Variability reduction strategies
- Real-time quality monitoring systems
- **Case Study:** Implementation of SPC to reduce mineral processing defects.

Module 4: Lean Six Sigma and Continuous Improvement

- Lean mining concepts and waste reduction
- DMAIC methodology in mining operations
- Root Cause Analysis (RCA) techniques
- Kaizen and operational excellence strategies
- Continuous improvement culture development
- **Case Study:** Lean Six Sigma project for reducing downtime in mining equipment.

Module 5: Predictive Analytics and Digital Mining Technologies

- Artificial Intelligence in mining quality control
- Predictive maintenance analytics
- Big Data applications in mining operations
- Industrial Internet of Things (IIoT) integration
- Smart mining and automation technologies
- **Case Study:** Predictive analytics for conveyor belt failure prevention.

Module 6: Ore Grade Control and Metallurgical Quality

- Ore blending and grade control strategies
- Sampling accuracy and laboratory quality assurance

- Metallurgical accounting systems
- Process optimization in mineral recovery
- Quality assurance in refining operations
- **Case Study:** Optimization of ore blending to improve plant recovery performance.

Module 7: Risk Management and Compliance Systems

- Risk-based quality management approaches
- ESG compliance and sustainability standards
- Quality auditing techniques
- Incident investigation and corrective actions
- Governance and regulatory compliance in mining
- **Case Study:** Risk assessment framework for tailings quality management.

Module 8: Advanced Quality Improvement Strategies

- Benchmarking and performance measurement
- Digital transformation and smart quality systems
- KPI development and operational analytics
- Innovation strategies for mining competitiveness
- Strategic quality leadership in mining organizations
- **Case Study:** Digital quality transformation initiative in an underground mining operation.

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