Ground Support Systems 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

Ground Support Systems Training Course on modern ground stabilization techniques, excavation safety, tunnel support systems, and risk mitigation strategies used in high-risk mining and civil engineering environments. With increasing global demand for safe underground operations, infrastructure resilience, and mining productivity optimization, this training ensures participants develop practical and technical expertise aligned with international safety and engineering standards.

In today’s fast-evolving mining and tunneling industries, effective ground support is critical to preventing collapses, rockfalls, and structural failures. This program integrates real-world case studies, simulation-based learning, and field-oriented applications to strengthen decision-making in dynamic underground conditions. Learners will gain mastery in rock bolting, shotcrete application, mesh installation, ground behavior analysis, and support design optimization, making them highly competent in both operational and supervisory roles within mining, construction, and geotechnical sectors.

Programme Curriculum

Ground Support Systems Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Master geotechnical risk assessment and ground stability analysis
2. Apply advanced underground excavation support techniques
3. Understand rock mechanics and strata control principles
4. Implement rock bolting and anchoring systems effectively
5. Optimize shotcrete application and reinforcement methods
6. Enhance mine safety compliance and hazard prevention systems
7. Develop skills in tunnel support design and load distribution
8. Perform ground failure prediction and monitoring techniques
9. Integrate modern mining engineering safety protocols
10. Strengthen geological mapping and site interpretation skills
11. Apply digital ground monitoring and instrumentation tools
12. Improve workplace safety culture in underground environments
13. Execute sustainable and cost-efficient ground support solutions

Target Audience

1. Mining engineers and underground mining professionals
2. Geotechnical engineers and civil engineering specialists
3. Tunnel construction and infrastructure development teams
4. Rock mechanics and strata control practitioners
5. Health and safety officers in mining operations
6. Drill and blast supervisors in excavation projects
7. Site managers and project engineers in construction
8. Technical trainees entering mining and tunneling industries

Course Modules

Module 1: Fundamentals of Ground Support Systems

- Introduction to ground stability and rock mass behavior
- Overview of support systems in mining and tunneling
- Types of ground failures and collapse mechanisms
- Basic principles of load transfer and reinforcement
- Safety frameworks in underground excavation environments
- Case Study: Analysis of a mine roof collapse due to inadequate support design and corrective reinforcement implementation.

Module 2: Rock Mechanics and Strata Control

- Rock classification and mass rating systems (RMR, Q-system)
- Stress distribution in underground excavations
- Fracture mechanics and fault zone behavior

- Strata movement prediction and deformation monitoring
- Influence of geological structures on support design
- Case Study: Strata failure mitigation in a deep-level gold mining operation.

Module 3: Rock Bolting and Anchoring Systems

- Types of rock bolts and anchorage methods
- Installation techniques and load-bearing mechanisms
- Resin, mechanical, and cable bolt systems
- Bolt testing and quality assurance methods
- Maintenance and inspection of support integrity systems
- Case Study: Successful stabilization of a high-stress tunnel using cable bolt reinforcement.

Module 4: Shotcrete and Surface Support Technologies

- Properties and application of shotcrete in underground environments
- Wet-mix vs dry-mix shotcrete systems
- Reinforcement using steel fibers and mesh integration
- Curing processes and strength development monitoring
- Quality control in spray concrete application
- Case Study: Tunnel lining stabilization using fiber-reinforced shotcrete in weak rock zones.

Module 5: Ground Monitoring and Instrumentation

- Use of extensometers, stress cells, and convergence meters
- Real-time monitoring of rock mass deformation
- Data interpretation for predictive ground control
- Digital monitoring systems and IoT-based mining solutions
- Alarm systems for ground failure detection
- Case Study: Early detection of tunnel convergence preventing major structural failure.

Module 6: Excavation and Tunnel Support Design

- Principles of tunnel engineering design
- Support selection based on ground classification
- Numerical modeling and simulation tools
- Load distribution and support optimization techniques
- Integration of safety factors in design engineering
- Case Study: Optimization of support systems in a metro tunnel reducing construction delays.

Module 7: Ground Failure Prevention and Risk Management

- Identification of hazard zones in underground operations
- Risk assessment methodologies in mining environments
- Emergency response planning for ground collapses
- Preventive maintenance of support structures
- Safety audits and compliance enforcement
- Case Study: Risk mitigation strategy that prevented rockburst incidents in a deep mine.

Module 8: Advanced Ground Support Innovations

- Smart materials in ground reinforcement systems

- Automation in support installation processes
- AI-based predictive geotechnical analytics
- Sustainable mining and eco-friendly support materials
- Future trends in underground infrastructure engineering
- Case Study: Implementation of AI-driven monitoring system improving mine safety performance.

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

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