Robotics in Mining Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The Robotics in Mining Training Course is a cutting-edge, industry-focused program designed to equip learners with advanced competencies in autonomous mining systems, AI-powered robotics, industrial automation, smart sensors, and digital mining transformation. As the global mining sector rapidly shifts toward Industry 4.0, smart mining, and zero-harm operations, robotics has become a core driver of efficiency, safety, and productivity. Robotics in Mining Training Course provides hands-on exposure to autonomous haulage systems (AHS), underground robotic drilling, drone-based surveying, and real-time IoT monitoring systems, enabling participants to understand and operate next-generation mining technologies.

With increasing demand for sustainable mining, predictive maintenance, machine learning in mining operations, and remote-controlled robotic equipment, this training bridges the gap between traditional mining engineering and modern digital automation. Learners will gain practical experience in robotics simulation platforms, AI-based decision systems, and real-world mining automation case studies. The course is structured to prepare professionals for high-impact roles in smart mining operations, robotics engineering, mine automation consultancy, and industrial AI deployment, ensuring alignment with global mining innovation standards.

Programme Curriculum

Robotics in Mining Training Course

Introduction

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Course Duration

10 Days

Course Objectives

1. Master autonomous mining robotics systems
2. Understand AI-driven mineral extraction technologies
3. Apply machine learning for predictive maintenance in mining
4. Operate underground robotic drilling systems
5. Implement IoT-based smart mining solutions
6. Analyze real-time mining data analytics dashboards
7. Develop skills in robotic fleet management systems
8. Understand digital twin technology in mining operations
9. Apply computer vision for mineral detection
10. Learn drone surveying and autonomous mapping
11. Optimize mining safety through robotics automation
12. Integrate cloud-based mining control systems
13. Prepare for careers in Industry 4.0 mining transformation

Target Audience

1. Mining Engineers
2. Robotics & Automation Engineers
3. Industrial Engineering Students
4. Geologists entering smart mining sector
5. Mechanical & Electrical Engineers
6. AI & IoT Technology Enthusiasts
7. Mining Operations Supervisors
8. Government & Mining Safety Inspectors

Course Modules

Module 1: Introduction to Smart Mining & Industry 4.0

- Evolution of mining automation
- Smart mining ecosystem overview
- Digital transformation in mining
- Robotics integration basics
- Data-driven mining operations

- **Case Study:** Rio Tinto autonomous mining operations in Australia

Module 2: Fundamentals of Mining Robotics

- Robotics components in mining
- Actuators, sensors, controllers
- Mining-grade robot design
- Safety systems in robotics
- Operational constraints underground
- **Case Study:** Caterpillar autonomous haul trucks

Module 3: Autonomous Haulage Systems (AHS)

- Self-driving haul trucks
- Route optimization algorithms
- Fleet coordination systems
- Obstacle detection systems
- Fuel efficiency automation
- **Case Study:** Komatsu autonomous haulage deployment

Module 4: Underground Robotic Drilling Systems

- Remote drilling technologies
- Precision control systems
- Hazard reduction automation
- Drill path optimization
- Maintenance automation
- **Case Study:** Sandvik automated drilling rigs

Module 5: IoT in Mining Operations

- Sensor networks in mines
- Real-time monitoring systems
- Data transmission protocols
- Equipment health tracking
- Environmental monitoring
- **Case Study:** Smart IoT mine monitoring in Chile

Module 6: AI & Machine Learning in Mining

- Predictive maintenance models
- Ore grade prediction
- AI decision systems
- Pattern recognition systems
- Mining optimization algorithms
- **Case Study:** AI-based ore sorting in Canada

Module 7: Computer Vision for Mineral Detection

- Image processing fundamentals
- Ore classification systems
- Conveyor belt vision systems

- AI-based mineral identification
- Real-time anomaly detection
- **Case Study:** Hyperspectral imaging in mining exploration

Module 8: Drone Technology in Mining

- Autonomous aerial surveying
- 3D mapping of mines
- Stockpile measurement systems
- Safety inspection drones
- GPS navigation systems
- **Case Study:** Drone surveying in Australian open-pit mines

Module 9: Robotic Fleet Management Systems

- Multi-robot coordination
- Traffic control algorithms
- Task allocation systems
- Remote command centers
- Fleet efficiency optimization
- **Case Study:** Centralized fleet control in iron ore mines

Module 10: Digital Twin Technology

- Virtual mine modeling
- Simulation environments
- Predictive scenario testing
- Real-time digital replication
- Operational optimization
- **Case Study:** Digital twin in Anglo American mining operations

Module 11: Mining Safety Automation Systems

- Hazard detection sensors
- Emergency shutdown systems
- Collision avoidance robotics
- Worker tracking systems
- Safety compliance automation
- **Case Study:** Automated safety systems in underground coal mines

Module 12: Remote Operations Centers (ROC)

- Centralized mine control
- Remote machinery operation
- Communication infrastructure
- Data visualization dashboards
- Decision support systems
- **Case Study:** Rio Tinto remote operations center

Module 13: Robotic Maintenance & Predictive Systems

- Predictive failure detection

- Automated repair systems
- Condition monitoring
- Maintenance scheduling AI
- Spare parts optimization
- **Case Study:** Predictive maintenance in South African platinum mines

Module 14: Sustainable & Green Mining Robotics

- Energy-efficient robotics
- Carbon reduction systems
- Waste reduction automation
- Water usage optimization
- ESG compliance technologies
- **Case Study:** Green mining initiatives in Scandinavian mines

Module 15: Future of Mining Automation

- Hyper-automation trends
- AI-first mining systems
- Fully autonomous mines
- Blockchain in mining supply chains
- Future workforce transformation
- **Case Study:** Fully autonomous mine concepts in China pilot projects

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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