Construction Materials Testing Training Course

Professional Development Training Course Outline

Category	Construction Institute	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The Construction Materials Testing Training Course is designed to develop advanced skills in quality assurance, construction quality control, material inspection, laboratory testing, and infrastructure durability management. With the rapid growth of smart cities, sustainable infrastructure, and high-performance construction projects, professionals must understand modern testing standards for concrete, asphalt, soil, aggregates, steel, and other construction materials. This course equips learners with practical knowledge of ASTM standards, AASHTO procedures, ISO quality systems, non-destructive testing (NDT), digital construction technologies, and sustainable building practices to ensure safety, compliance, and long-term project performance.

The program integrates theoretical concepts, hands-on laboratory practices, field demonstrations, and real-world case studies to help participants master the complete lifecycle of construction material evaluation. Learners will gain expertise in material characterization, testing methodologies, failure analysis, data interpretation, and construction risk mitigation. Through modern training approaches involving case-based learning, simulation exercises, technology-driven inspection tools, and industry best practices, participants will be prepared to support high-quality construction projects across residential, commercial, transportation, and infrastructure sectors.

Programme Curriculum

Construction Materials Testing Training Course

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Course Objectives

By completing this **Construction Materials Testing Training Course**, participants will be able to:

1. Understand the fundamentals of construction materials science, engineering properties, and performance evaluation.
2. Develop expertise in quality assurance (QA) and quality control (QC) systems for construction projects.
3. Perform advanced concrete testing, mix evaluation, strength analysis, and durability assessment.
4. Apply modern soil testing and geotechnical investigation techniques for foundation reliability.
5. Master asphalt and pavement material testing methods for sustainable transportation infrastructure.
6. Interpret ASTM, AASHTO, BS, EN, and ISO testing standards used globally.
7. Conduct effective laboratory testing, field inspection, sampling, and documentation procedures.
8. Utilize non-destructive testing (NDT) technologies for structural health monitoring.
9. Analyze construction material failures using root cause analysis and forensic engineering techniques.
10. Implement digital construction quality management and smart inspection technologies.
11. Improve project outcomes through risk management, compliance monitoring, and performance optimization.
12. Understand sustainable construction practices including green materials, recycling, and circular economy concepts.
13. Build professional capability for advanced construction engineering, infrastructure resilience, and future-ready project management.

Target Audience

1. Civil Engineers and Structural Engineers
2. Construction Project Managers
3. Quality Control and Quality Assurance Professionals
4. Materials Testing Laboratory Technicians
5. Site Engineers and Supervisors
6. Geotechnical and Pavement Engineers
7. Contractors and Construction Consultants
8. Government Infrastructure and Inspection Officers

Course Modules

Module 1: Fundamentals of Construction Materials Testing

- Introduction to construction materials engineering and testing principles
- Classification and properties of construction materials
- Material sampling techniques and laboratory safety procedures
- Overview of ASTM, AASHTO, EN, and ISO testing standards
- Role of CMT in construction quality management
- Case Study: Analysis of a highway construction project where improper material testing resulted in pavement failure and increased maintenance costs.

Module 2: Concrete Materials Testing and Quality Control

- Concrete ingredients: cement, aggregates, water, and admixtures
- Concrete workability testing including slump and flow tests
- Compressive strength, tensile strength, and durability testing
- Concrete mix design optimization and performance monitoring
- Advanced concrete technologies including **high-performance concrete (HPC)**
- **Case Study:** Evaluation of concrete strength performance in a high-rise building project using laboratory and field testing results.

Module 3: Soil and Geotechnical Materials Testing

- Soil classification and engineering properties
- Moisture content, density, and compaction testing
- Atterberg limits and soil behavior analysis
- California Bearing Ratio (CBR) and foundation testing
- Geotechnical quality control for infrastructure projects
- **Case Study:** Investigation of foundation settlement issues in a commercial development project through soil testing analysis.

Module 4: Asphalt and Pavement Materials Testing

- Asphalt composition and pavement material properties
- Bitumen testing and aggregate evaluation
- Marshall stability and pavement performance testing
- Asphalt durability and sustainable pavement solutions
- Quality control procedures for road construction
- **Case Study:** Performance assessment of a highway pavement project using asphalt testing and failure analysis.

Module 5: Aggregates, Cement, Steel, and Building Materials Testing

- Aggregate grading, strength, and durability testing
- Cement quality evaluation and laboratory procedures
- Steel reinforcement testing and material verification
- Brick, block, and alternative building material testing
- Sustainable and recycled construction materials evaluation
- **Case Study:** Quality investigation of construction materials used in a major infrastructure development project.

Module 6: Non-Destructive Testing (NDT) and Advanced Inspection Technologies

- Principles of non-destructive evaluation techniques
- Ultrasonic Pulse Velocity (UPV) testing
- Rebound hammer testing methods
- Structural condition assessment techniques
- Digital inspection tools and smart construction monitoring
- **Case Study:** Assessment of an aging concrete bridge using NDT methods to determine structural integrity.

Module 7: Construction Quality Management and Material Failure Analysis

- Construction inspection and quality documentation
- Material defects identification and prevention
- Root cause analysis and corrective action planning
- Quality audits and compliance management
- Construction risk reduction strategies
- **Case Study:** Forensic investigation of cracking and deterioration in a commercial building structure.

Module 8: Sustainable Construction Materials and Future Technologies

- Green construction materials and environmental performance
- Recycled materials and circular construction practices
- Smart sensors and digital material monitoring
- Artificial intelligence (AI) applications in construction quality
- Future trends in resilient infrastructure development
- **Case Study:** Implementation of sustainable materials testing strategies in a smart city infrastructure project.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- 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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