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Course Name

Knowledge of Materials, Composite Materials, and Testing Equipment

Sector Name

Oil, Gas and Chemical

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Knowledge of Materials, Composite Materials, and Testing Equipment

Course Introduction

This course is designed to provide participants with a comprehensive understanding of materials used in construction, with a specific focus on composite materials and the testing equipment necessary to evaluate them. The course covers the functions, properties, and performance of various construction materials such as concrete and composite materials, along with the relevant standards and technical requirements. Participants will also gain hands-on experience in testing methods, using modern testing equipment to assess material strength, durability, and suitability for different applications.

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Target Audience

- ✓ Civil engineers, materials engineers, and construction professionals.
- ✓ Quality control/quality assurance professionals involved in material testing.
- ✓ Technicians working with composite materials and testing equipment.

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Learning Objectives

- ✓ Understand the role and importance of different materials in construction.
- ✓ Identify the types of concrete and their applications.
- ✓ Implement testing procedures for composite materials and concrete.
- ✓ Operate and differentiate between various testing equipment, including tension and compression testing devices.
- ✓ Analyze test results to evaluate material performance in construction projects.

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Course Outline

✓ 01 Day One

Introduction to Construction Materials and Technical Requirements

Session 1: Overview of Construction Materials

- ✓ Types of materials used in construction (concrete, metals, polymers, composites, etc.).
- ✓ Key properties of materials: strength, durability, elasticity, etc.
- ✓ Factors influencing material selection in construction projects.

Session 2: Functions of Concrete in Construction

- ✓ Composition and properties of concrete.
- ✓ Different types of concrete (ordinary, high-strength, lightweight, etc.).
- ✓ Technical standards and requirements for concrete materials in construction.

Session 3: Concrete Applications and Construction Methods

- ✓ Overview of construction methods using concrete (casting, curing, finishing).
- ✓ Common applications of different concrete types in various structures.
- ✓ Environmental and sustainability considerations in concrete construction.

Session 4: Case Study: Application of Materials in Major Construction

Projects

- ✓ Group discussion on the use of materials in real-world construction projects.
- ✓ Practical examples of material challenges and solutions.

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Course Outline

✓ 02 Day Two

Introduction to Composite Materials

Session 1: Introduction to Composite Materials

- ✓ Definition and characteristics of composite materials.
- ✓ Common types of composites used in construction (fiber-reinforced composites, concrete composites, etc.).
- ✓ Benefits and limitations of composite materials in construction.

Session 2: Mechanics of Composite Materials

- ✓ Principles of composite material behavior under load.
- ✓ Stress-strain analysis in composite materials.
- ✓ Performance factors influencing composite durability and strength.

Session 3: Applications of Composite Materials in Construction

- ✓ Uses of composite materials in bridges, buildings, and other structures.
- ✓ Innovations in composite material technology.
- ✓ Case studies on the successful implementation of composite materials in major projects.

Session 4: Workshop: Sample Analysis of Composite Materials

- ✓ Hands-on session where participants examine different composite materials and their properties.
- ✓ Discussion on the advantages of composites over traditional materials

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Course Outline

✓ 03 Day Three

Testing of Concrete and Composite Materials

Session 1: Sample Cement Testing

- ✓ Overview of cement types (OPC, RHPC, LHPC, SRPC).
- ✓ Standard cement tests: strength, setting time, fineness, consistency.
- ✓ Explanation of testing procedures and equipment used.

Session 2: Compression and Tension Testing

- ✓ Understanding compression and tension forces in construction materials.
- ✓ Differences between compression and tension testing methods.
- ✓ Equipment used for compression and tension testing (UTMs, hydraulic presses, etc.).

Session 3: Testing Standards and Procedures

- ✓ International testing standards (ASTM, BS, ISO).
- ✓ Calibration and maintenance of testing equipment.
- ✓ Interpretation of test results and understanding material behavior under stress.

Session 4: Workshop: Practical Testing Session

- ✓ Participants will perform cement and composite material tests using compression and tension testing equipment.
- ✓ Data collection and analysis of test results.

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Course Outline

✓ 04 Day Four

Advanced Material Testing Techniques and Best Practices

Session 1: Advanced Testing Methods for Composite Materials

- ✓ Non-destructive testing (NDT) techniques for composite materials.
- ✓ Thermal analysis, ultrasonic testing, and fatigue testing methods.
- ✓ Applications of advanced testing methods in quality control.

Session 2: Challenges in Material Testing

- ✓ Common issues encountered during testing (sample preparation, equipment calibration, etc.).
- ✓ Troubleshooting testing procedures and ensuring accuracy in results.
- ✓ Case studies on testing failures and their impact on construction projects.

Session 3: Analysis of Test Results

- ✓ Interpreting material test data for quality control and assurance.
- ✓ Making informed decisions based on testing outcomes.
- ✓ Optimizing material performance through testing insights.

Session 4: Wrap-up and Final Discussion

- ✓ Review of key concepts covered throughout the course.
- ✓ Group discussion on the future of materials testing and innovations in the field.
- ✓ Final Q&A and course wrap-up.

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 5, 2027	April 8, 2027	4 days	4250.00 $	UAE , Abu Dhabi
May 23, 2027	May 26, 2027	4 days	4250.00 $	KSA , Riyadh
Sept. 6, 2027	Sept. 9, 2027	4 days	4250.00 $	UAE , Dubai
Nov. 9, 2026	Nov. 12, 2026	4 days	5950.00 $	switzerland , Geneva

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