GTC Transforming Emerging Economies

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Refinery 4.0: Digital Transformation and Smart Plant Operations

COURSE OVERVIEW

This course is designed to explore how emerging digital technologies are reshaping refinery operations, decision making and business models. The course highlights the integration of Industry 4.0 principles, including IoT, AI, advanced analytics, robotics and digital twins, to optimize efficiency, safety and sustainability. Participants will gain insights into building a smart refinery ecosystem that leverages real time data, predictive maintenance and automated workflows to enhance operational reliability and competitiveness in a fast-evolving energy landscape.

WHO SHOULD ATTEND?

This course is ideal for refinery managers, operations and maintenance professionals, process engineers, digital transformation leaders, IT/OT specialists and decision makers responsible for driving innovation and operational excellence in downstream oil and gas. It is also relevant for consultants, technology providers and business strategists interested in the future of refinery digitalization.

COURSE OUTCOMES

Delegates will gain the skills and knowledge to:

- Understand the principles and framework of Refinery 4.0 and smart plant operations.
- Learn how to apply digital tools such as IoT, AI, and digital twins to refinery processes.
- Evaluate opportunities and challenges of digital transformation in downstream operations.
- Develop strategies for predictive maintenance, energy efficiency, and sustainability.
- Lead or support digital transformation projects in refinery environments.
- Use real-time data and analytics to optimize operations and decisions.

KEY COURSE HIGHLIGHTS

At the end of the course, you will understand;

- The core principles and goals of Refinery 4.0 in digital transformation.
- The importance of data-driven approaches for safety, compliance, and operational excellence.
- How integrated data analytics and IoT enable real-time monitoring and decision-making.
- Strategies to increase efficiency, reduce costs, and ensure sustainability.
- The role of digital twins in simulating and optimizing plant operations.
- Techniques for predictive maintenance to enhance reliability and safety.

All our courses are dual-certificate courses. At the end of the training, the delegates will receive two certificates.
1. A GTC end-of-course certificate
2. Continuing Professional Development (CPD) Certificate of completion with earned credits awarded