

Thermal Power Plant Optimization Using Digital Twins

COURSE OVERVIEW

This course provides an exploration of how emerging digital twin technology is transforming the efficiency and reliability of thermal power plants. The curriculum further elaborates on how leading energy companies are leveraging digital twins to achieve higher operational transparency, reduce emissions, and drive sustainable plant performance. Participants will learn how digital twins can be applied to optimize combustion performance, monitor equipment degradation, enhance maintenance planning, and forecast plant efficiency under different load conditions.

WHO SHOULD ATTEND?

This program is designed for plant engineers, operations managers, mechanical and electrical maintenance specialists, control and instrumentation engineers, reliability engineers, process analysts, and data engineers. It is equally valuable for senior leaders, project managers, and digital transformation executives in the energy sector aiming to understand how digital twins can enhance operational efficiency, predictive maintenance, and sustainability.

COURSE OUTCOMES

Delegates will gain the skills and knowledge to:

- Understand the principles and components of digital twin technology in thermal power generation.
- Develop and implement digital twin models for critical plant systems such as boilers and turbines.
- Integrate real-time plant data and IoT systems into digital twin platforms.
- Utilize digital twins for condition-based maintenance and reliability improvement.
- Analyze operational data to enhance combustion efficiency and energy output.
- Evaluate system health, predict equipment degradation, and reduce unplanned outages.

KEY COURSE HIGHLIGHTS

At the end of the course, you will understand;

- The architecture, components, and workflow of digital twin systems for thermal power applications.
- How real-time data streams and IoT integration enable live plant monitoring and optimization.
- Simulation and modeling techniques used to replicate complex thermal plant processes.
- The use of predictive analytics and AI in enhancing plant performance and reliability.
- How digital twins support combustion control, turbine optimization, and boiler efficiency improvement.
- Strategies for integrating digital twins into existing SCADA, DCS, and asset management systems.
- Practical methods to reduce energy losses, improve heat rate, and optimize fuel consumption.

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.