

# Integration of Renewable Energy into Power Grids

## COURSE OVERVIEW

This course provides an in-depth understanding of the technical, regulatory, operational, and economic aspects of integrating renewable energy systems into both transmission and distribution networks. The course curriculum emphasizes power quality management, grid stability, frequency regulation, and voltage control, while addressing the challenges of intermittency, storage, and grid balancing. Participants will explore the fundamental principles of renewable power generation, grid interconnection requirements, and system planning for variable energy resources.

## WHO SHOULD ATTEND?

This course is designed for power system engineers, renewable energy specialists, grid operators, utility planners, energy policymakers, and project managers aiming to manage the complexities of renewable penetration and maintain grid reliability in a rapidly evolving energy landscape. It is equally valuable for electrical engineers, regulators, independent power producers (IPPs), consultants, technical inspectors, and sustainability officers seeking to strengthen their expertise in grid modernization, clean energy integration and hybrid power solutions.

## COURSE OUTCOMES

Delegates will gain the skills and knowledge to:

- Understand the key principles and technologies behind renewable energy generation.
- Analyze the challenges and opportunities of integrating variable renewable resources into existing grids.
- Design grid systems that accommodate intermittent energy while ensuring stability and reliability.
- Utilize energy storage systems and digital control mechanisms for grid balancing.
- Evaluate the role of smart grids and distributed energy resources (DERs) in grid modernization.
- Develop strategies for hybrid power systems combining conventional and renewable sources.

## KEY COURSE HIGHLIGHTS

At the end of the course, you will understand;

- The architecture and dynamics of modern power grids integrating renewable sources.
- Renewable energy technologies (solar PV, wind turbines, hydro, biomass, and hybrid systems) and their grid interfaces.
- How to address variability, intermittency, and dispatchability challenges using advanced control systems.
- Grid code compliance and interconnection standards for renewable integration.
- The role of energy storage (battery, pumped hydro, hydrogen, etc.) in enhancing system flexibility.
- Smart grid and microgrid frameworks that support decentralized energy systems.
- Forecasting, monitoring, and control technologies for renewable energy management.

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.