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Wind Power Systems Engineering

View Course Details

COURSE DATES AND TIMES

April 21-22 , 2026

10:00 am - 4:30 pm ET

Wind-based electrical generation is the fastest growing renewable energy technology at present and is becoming a significant portion of the energy mix. This 12-hour (2-day) course gives an overview of wind power system technologies.

As the world pivots towards sustainable energy solutions, wind energy has emerged as a leading and rapidly-growing renewable technology. This intensive 12-hour course delves deep into the world of wind energy engineering, offering participants a comprehensive understanding of wind farm development, from initial site selection to integration into the electric grid. The course combines a mixture of technical and practical components, enabling students to gain insight into the intricacies of wind turbine systems, both onshore and offshore, and to explore the prospective challenges and opportunities within the wind energy sector.

Learning Outcomes:

- Grasp fundamental concepts of wind engineering and turbine technology.
- Dive deep into the mechanical and electrical components that make up wind turbines.
- Investigate the distinctions, challenges, and advantages of both onshore and offshore wind technologies.
- Acquaint oneself with prevalent electrical and mechanical challenges in wind turbine design and their subsequent solutions.

WHO SHOULD ATTEND

1. Renewable energy professionals looking to broaden their expertise.
2. Electrical and mechanical engineers interested in wind power system engineering.
3. Utility professionals keen on understanding wind power grid integration.
4. Energy consultants and analysts wanting to understand wind power projections and metrics.
5. Environmental professionals and advocates exploring sustainable energy solutions.
6. Policy-makers and urban planners considering wind power in regional planning.
7. Students and researchers in wind power-related fields.

STUDENTS RECEIVE

- FREE 100-Page Digital Handbook (Value $20)
- $100 Coupon Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.2 Continuing Education Unit (CEU) Credits (12 Professional Development Hours)
- FREE Magazine Subscription (Value $25.00)
- Course Materials In Paper Format

COURSE OUTLINE

Wind Power Engineering Course Schedule

Day 1

Wind Power Fundamentals (1 hour)

- The evolving role of wind power in sustainable energy.
- Wind resources in North America: A snapshot.
- Wind resource evaluation and site selection

Wind Power (2 hours)

- Mechanisms of wind energy conversion.
- Unpacking concepts: Annual Energy Production (AEP), capacity factor, and the power curve.
- An in-depth look into wind turbine components and structures.
- Designing optimal wind farm layouts.

Mechanical System (1 hour)

- Aerodynamics and design principles behind wind turbine blades.

- The role of pitch and yaw systems.
- Drive train and gearbox systems.

Electrical System (1hour)

- Wind turbine generators
- Direct drive generators
- Transformers
- Converter systems

Offshore wind (1 hour)

- Why offshore wind? The rationale, benefits, and challenges.
- Introduction to floating offshore wind systems.

Day 2:

Design for harsh environment (1 hour)

- Lightning protection system design
- Aerodynamic noise
- Converter systems and electrical noise
- Predictive maintenance systems
- The role of drones in wind blade inspection.

Grid Integration (2 hour)

- Unpacking collector systems and High Voltage Direct Current (HVDC) for offshore wind.
- Understanding IEEE Standards in grid integration.
- Techniques and technology: Fault Ride-Through, voltage and frequency ride-through, and the integration of energy storage systems.

Case Studies and Real-World Applications (2 hours)

- Calculating Annual Energy Production
- Power quality issues in small wind farms
- Lightning protection system, grounding, and bonding.
- Bearing issues caused by converter harmonics.
- Real-world applications of course concepts.

Final Assessment and Q&A Session (1 hour)

- Assessment to gauge knowledge gained from the course.
- Q&A session to clarify doubts and deepen understanding of topics covered.
- Key points from the course during the wrap-up session.
- Feedback on assessment performance and areas for improvement.

COURSE TIMETABLE:

Start: 10 a.m. Eastern Time
Finish: 4:30 p.m. Eastern Time

Contact us Today for a FREE quotation to deliver this course at your company's location.

Request Quote