Wind Power Management

This 12-credit graduate certificate program will be composed of four courses focusing on wind plant economics and management. Students in this certificate program will acquire knowledge required to manage, coordinate, plan and direct activities for operating offshore wind plants. They will learn how to ensure that production stays on schedule and within budget while meeting state and federal regulations. The program will discuss energy law and policy issues that can facilitate a transition from the traditional fossil-fuel model of energy policy to a clean energy economy. The certificate will also train students in using data science and machine learning techniques in efforts to carry out predictive maintenance and fault diagnosis towards reducing the downtime, optimizing the maintenance schedule, and maximizing the productivity of the wind plant. It will equip students with knowledge related to business operating strategy, project administration, business forecasting and risk management in the framework of offshore wind farms. Senior management, such as CEO, CTO, Chief Engineer from related industries and senior government officials, will be invited as well to present seminars, sharing their leadership and management insights in the offshore wind industry.

Who would be suited to take this program?

Students and professionals interested in a career in the offshore wind industry could enroll in this program to receive competitive training for success in the offshore wind industry. According to the report "*New York State and the Jobs of Offshore Wind Energy*" published in 2017 by the Workforce Development Institute, professional education beyond a bachelor degree is required for many occupations in the offshore wind industry; examples include engineering manager, chief engineer and operation manager. The report "*U. S. Offshore Wind Workforce Assessment*" published by the National Renewable Energy Laboratory in October 2022, points out that offshore wind occupations like finance managers, engineers, researchers, developers, safety officers, information technologists, permitting coordinators, etc., will need education that will be offered by universities. According to the U. S. Department of Energy's "*Wind Vision: A New Era for Wind Power in the United States"* report (https://www.energy.gov/eere/wind/wind-vision) and an article published in the journal *Wind Engineering* ("Graduate and Undergraduate University Programs in Wind Energy in the United States", vol. 43, pages 35-46, 2019), the United States may need more than 50,000 university-educated professionals with advanced degrees to support wind energy development by 2030.

What are the prerequisites?

Students with backgrounds in electrical engineering, physical sciences, or engineering technology are well suited to enroll in this program to acquire the technical and management knowledge to transition into the booming offshore wind industry.

What will I learn?

This certificate program will provide an introduction to US offshore wind energy policy. It will examine the statutory and regulatory frameworks that govern offshore renewable energy leases, and permit requirements associated with project development and construction. Students will gain an understanding of the permitting framework for offshore wind projects and the potential legal challenges associated with their development, construction, and finance. It will also examine the key elements of renewable energy project finance and development, and how renewable energy projects are financed and built. Students will gain an understanding of renewable energy development, project finance, and how related project finance differs from other types of finance. It will also cover the topics of allocations and structures for equity, tax equity, and debt financing. Real-world examples from areas such as onshore wind, offshore wind, and photovoltaic solar will be used throughout the class. Data mining will be discussed in reference to extracting useful information in business and operation. Students will learn how to discover patterns and relationships in big data, and to dissect large complex data sets, including those in very large databases of sensor-acquired or utility data. They can provide real-time insight into power plant performance for minimizing supply disruption and outages. Through a series of guest lectures from senior managers in industry and top government officials, students will learn successful approaches from influential offshore wind leaders in the United States and Europe.

Why study offshore wind at NJIT?

As the first program of its kind in New Jersey, this graduate certificate program in Wind Power Management uniquely tailors to address the emerging demands of the offshore wind industry. This certificate equips students with specialized knowledge in offshore wind power management. Leveraging NJIT's strong ties with the New Jersey State Government, offshore wind developers, transmission companies, and the offshore supply chain, students gain a strategic advantage in preparing for dynamic careers in this burgeoning sector. The program emphasizes practical industry relevance by establishing an advisory board comprising government officials, industry leaders, and academic experts. Additionally, students benefit from engaging with the vibrant offshore wind community through NJIT's thoughtfully curated events, including the annual 2-day offshore wind bootcamp training, offshore wind technology conference, and offshore wind career exhibition. These opportunities allow participants to connect with industry experts, interact with project managers, and forge valuable networks within the offshore wind landscape.

Potential employment:

Wind energy project manager

Wind research analyst

Industrial Production Managers

Project Managers

Senior wind developer

Code	Title	Credits
Core Course		
Select two of the following		
ECE 671	Wind Plant Project Development	3
ECE 654	US Offshore Renewable Energy Policy	3
ECE 670	Management Strategies in the Offshore Wind Industry	3
Elective Courses		
Select two of the following		
ECE 610	Power System Steady-State Analysis	3
ECE 611	Transients in Power Systems	3
ECE 613	Protection of Power Systems	3
ECE 616	Power Electronics	3
ECE 617	Economic Control of Interconnected Power Systems	3
ECE 618	Photovoltaic Semiconductors and Renewable Energy	3
ECE 619	Intelligent Sensing for Smart Grid and Smart City	3
ECE 637	Internet Protocols and their Evolution with Artificial Intelligence	3
ECE 656	Power System Dynamics	3
ECE 670	Management Strategies in the Offshore Wind Industry	3
ECE 698	Selected Topics in Electrical and Computer Engineering	3
ME 607	Advanced Thermodynamics	3
CHE 611	Thermodynamics	3
ENE 671	Environmental Impact Analysis	3
IE 614	Safety Engineering Methods	3
MGMT 620	Strategic Management of Technological Innovation	3
MGMT 692	Strategic Management	3
ECE 725	Independent Study I (for doing a technical project jointly identified by NJIT and offshore wind industry partners)	3
MGMT 635	Data Mining and Analysis	3
or CS 644	Introduction to Big Data	