Power Systems Engineering

The objective of the certificate in Power Systems Engineering is to provide students with the knowledge to be involved with the technology advancements and future developments in power generation, controls, and management as well as with alternate and new energy resources. This program will prepare engineers to work in the power and energy industry. Academic programs in energy technology and management are needed to prepare the future workforce for the energy and power industry as more than fifty percent of the workforce in the power industry is retiring during this decade. At the same time, developing new, clean, and more efficient energy resources and technologies is of global significance.

Who is suited for this program?

Power Systems Engineering is ideal for preparing future engineers in the power and energy industry. Additionally, it fits students who are interested in technology advancements and future developments in the power generation, control, and management as well as alternate and new resources.

What will I learn?

- Power System Analysis and Dynamics: Understand the steady-state and transient behaviors of power systems, including real and reactive power flows, fault analysis, switching transients, harmonic oscillations, and the dynamic performance of synchronous machines.
- Power System Protection and Control: Learn the principles of power system protection, fault detection, and relay coordination. Explore economic control and optimization strategies for interconnected power systems, focusing on energy accounting and optimal dispatch of generation resources.
- Power Electronics and HVDC Systems: Gain expertise in power electronics and HVDC technology, including their design, operation, and maintenance. Understand their critical role in renewable energy integration and long-distance power transmission.
- Renewable Energy Integration and Policy: Study the integration of renewable energy sources like wind and solar into the grid. Explore offshore wind farm development, project management, and the U.S. renewable energy policy framework.
- Smart Grids and Power Grid Modernization: Discover how intelligent sensing and advanced grid technologies enhance grid resilience and efficiency. Learn about smart grid components, energy storage systems, virtual power plants, and strategies for modernizing aging infrastructure to meet future energy demands.
- Power System Modeling and Simulation: Develop skills in modeling and simulating power systems to predict and optimize their performance under various operating conditions. Utilize advanced computational tools to analyze complex power system components and ensure reliable grid operation.

Why study Power Systems Engineering at NJIT?

Energy resources and technology has become a key thrust area of significant importance at several leading institutions. With the synergy in nanotechnology, solar cells and other related sciences at NJIT, an advanced energy technology initiative was formulated to offer an academic and research program in energy resources, technology management, and alternate energy research.

Academic programs in energy technology and management are much needed to prepare the future workforce for the energy and power industry as more than 50% of the workforce in the power industry is retiring in this decade. At the same time, developing new, clean and more efficient energy resources and technologies is of global significance.

Prerequisites

Applicants are expected to have undergraduate backgrounds in physics, mathematics (through differential equations and vector analysis), electrical networks and devices, electronics, analysis and design methods, transients, electromagnetic fields, and appropriate laboratory work in some of these areas. Completion of a Bachelor’s degree with a overall cumulative Grade Point Average of 2.8 or higher on a 4.0 scale.

Related Degree Programs

All credits for the Power Systems Engineering Certificate relates in its entirety to either MS in Electrical Engineering (http://catalog.njit.edu/graduate/newark-college-engineering/electrical-computer/electrical-ms/) or MS in Power and Energy Systems (http://catalog.njit.edu/graduate/newark-college-engineering/electrical-computer/power-energy-systems-ms/).

Gainful Employment Disclosure

Click here (http://www.njit.edu/graduatestudies/sites/graduatestudies/files/gainfulemployment/power-systems-engineering-cert-gainful-employment.html) for the Gainful Employment Disclosure for this program

Code	Title	Credits
Core Courses		
ECE 610	Power System Steady-State Analysis	3
ECE 611	Transients in Power Systems	3
Elective Courses (Select two of the following)		
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 651	Wind Power Transmission and Grid Interconnection	3
ECE 652	HVDC Design, Operation and Maintenance	3
ECE 654	US Offshore Renewable Energy Policy	3
ECE 656	Power System Dynamics	3
ECE 670	Management Strategies in the Offshore Wind Industry	3
ECE 671	Wind Plant Project Development	3
ECE 698	Selected Topics in Electrical and Computer Engineering	3