



## Enterprise Learning at Polytechnic Institute of NYU

**NYU·poly**

POLYTECHNIC INSTITUTE OF NYU

**FOR MORE INFORMATION  
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Polytechnic Institute of NYU  
Six MetroTech Center  
Brooklyn, New York 11201

## Clean Energy Leadership Certificate

If your company or government agency is looking to train professionals qualified to promote, design, specify, market and manage clean energy products and systems, this 5-module certificate offers a unique and comprehensive approach.

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### Clean Energy Leadership Certificate

In this 5-module certificate, your employees receive a set of technologically advanced modules that build a professional team trained in clean-energy technologies to meet state renewable energy requirements. Your staff emerges as technically proficient, up-to-date on current practice, ensuring that installers are qualified and perform to standard.

Participants are exposed to graduate-level courses in power, green building, and alternative energy technologies, gaining the skills and mindset of clean-energy experts with the required knowledge to design and manage specification, construction, and management of clean energy, alternative energy, photovoltaic, tidal, hydroelectric, nuclear, and wind-powered generation systems. Focused on training engineers and managers, rather than technicians, the certificate is designed for engineers, R&D staff, product developers, and technical managers who influence installations and specifications.

The certificate is available as an overview for delivery to senior managers or for technical personnel in more depth. A version with graduate credit is also available. It can be delivered at your company site, online, in blended mode—partly online and partly in classrooms—or at NYU Poly satellite campuses everywhere.

### 5-Module Clean Energy Leadership Certificate

- \* Power Systems Economics and Planning
- \* Distributed Generation Systems
- \* Physics of Alternative Energy
- \* Infrastructure Planning, Engineering and Economics
- \* Capstone Project in Clean Energy Systems Design, Generation and Use

### COURSE DESCRIPTIONS

#### Module 1. Power Systems Economics and Planning

Your staff learns about power system economics, revenue requirements, load duration and reserve requirements. They will investigate load forecasting, including econometric methods. Participants explore optimal expansion planning and methodologies, including optimal generation expansion computer modeling, and decision-analysis techniques. They will also explore the deregulation of the electric power industry. Your employees learn the efficient use of energy and energy-use analysis to reduce energy consumption and carbon footprint. Upon completion, participants should be able to obtain a Certified Energy Management certificate.





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### COURSE DESCRIPTIONS (continued)

#### Module 2. Distributed Generation Systems

Gives your employees insight into the benefits and limitations of distributed generating systems. They review classification of small generating systems and understand the principles of operation and electrical equivalent circuits of fuel and solar cells, micro-turbines, reciprocating engines, wind turbines and gas turbines. Participants appreciate fault conditions, reactive power support, and power quality. They learn about the engineering, marketing, public communications and policy issues involved with grid-connected alternative and renewable systems, such as photovoltaic arrays and wind-powered electric generators.

#### Module 3. Physics of Alternative Energy

Introduces the physics of non-petroleum sources of energy—photovoltaic cells, photocatalytic generators of hydrogen from water, and nuclear fusion reactors. Your staff learns about semiconductor junctions, optical absorption in semiconductors, and the photovoltaic effect. They understand energy conversion efficiency of silicon solar cells and of single crystal, polycrystalline, and thin-film solar cells. Participants explore the nature of excitons in bulk and in confined geometries as well as excitons in energy transport in an absorbing structure. They learn about methods of making photocatalytic surfaces and structures for water splitting as well as conditions for nuclear fusion, plasmas and plasma compression. Employees are exposed to toroidal chamber with magnetic coils, nuclear fusion by laser compression (inertial fusion), as well as small-scale exploratory approaches to fusion based on liquid compression and electric field ionization of deuterium gas. Engineers and technical managers are steeped in the options available in specifying and designing with alternative systems. Prepares professionals to understand new alternatives as they come into the market, allowing them to go beyond what is now available.

#### Module 4. Infrastructure Planning, Engineering and Economics

Covers methods for the identification, formulation, preliminary appraisal and detailed analysis of projects and systems in civil engineering. Offers various approaches appropriate for government agencies, public utilities, industry, and private entrepreneurs. Your team learns how to plan projects that satisfy single and multiple purposes and objectives that also meet local and regional needs. Provides financial and economic analyses, including sensitivity and risk analysis. Presents mathematical models to evaluate alternatives as well as optimization. Explores the impacts of projects, including environmental, social, regional economic growth, legal and institutional and public involvement. Introduces employees to technologies and economics of clean buildings, zero-energy buildings and LEEDs practice in building planning and construction. Following this course, your staff should be able to become LEED certified professionals.

#### Module 5. Capstone Project in Clean Energy Generation and Use

Introduces your staff to theoretical and experimental projects in electrical and computer engineering. Projects are assigned based on your company's specialized interest. The capstone module is a "hands on" practical application of materials covered in previous modules. It encourages participants to delve more deeply into actual situations that they will face as they implement and integrate clean energy projects, products and services into your company's business. In the end, your employees' work is presented before a review board of industry executives, providing a high-level internship.

