

Jason Kliwinski, AIA, LEEDap

AIA-NJ President-Elect

USGBC-NJ Co-Founder

USGBC National LEED Faculty

Adjunct Professor in Sustainable Design, NJIT School of Architecture

Course Description

In a time when the United States has seen unprecedented unemployment, loss of manufacturing jobs, rising fuel prices, and pressing environmental issues, there is a glimmer of hope. The Green Economy is emerging quickly as a result of this perfect storm because it offers new and revolutionary manufacturing jobs, innovative products and design opportunities, energy independence, and environmental protection all at once.

The Federal government has rolled out the American Reinvestment and Recovery Act which promises to pump billions of dollars in the our economy, focused on energy efficiency and renewable energy projects. Are you ready to be part of the green economy? Do you have the knowledge and skills to position yourself in the emerging markets and building sectors?

This course is designed to help you re-tool, re-think, expand your knowledge and prepare to be a leader in the United States' quest to 'create a culture of sustainability'. We will cover topics from the broad issues of carbon neutrality and green house gas reduction strategies to the finite details of creating healthy indoor environments one room at a time, one building at a time.

This course will explore all aspects of sustainability, including green jobs, the triple bottom line of sustainability, federal and state incentives, and green building in depth. The US Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system will be used as a framework for discussing many aspects of sustainability. The LEED™ rating system has connected the often disparate elements of site planning, water efficiency, energy conservation, material and resource use, and indoor environmental quality to create a holistic building guide and rating system for the 21st Century.

Classes will be held in 3 eight hour blocks.

The following topics will be covered.

It is anticipated that up to 24 AIA (HSW and SD) & USGBC Continuing Education Credits will be offered

Session 1: Principles of Sustainable Design

8 hours

A. Climate Change and Natural Resources (1 hour)

The topic of climate change is often heard but not understood. This course will outline the environmental, economic, and social potential impacts. For those that do not understand carbon neutrality and why it has taken center stage in policy and design, this will provide the background and definitions.

B. Defining Green (2 hours)

There are 40 definitions of green or sustainable design if you 'Google™' it on the internet. This section will define the principles of sustainable design for buildings and communities in the 21st century and beyond. We will look at several green building rating systems in general and their similarities and differences.

- LEED™ Green Building Design & Construction
- ANSI Standard 700
- Living Building Challenge

Lunch Break (1 hour)

C. Green Building Design Process (1 hour)

Description: The process is often as important as the end products in green design. This course will review the sustainable design process, with a focus on integrated project team delivery. Class exercises will demonstrate how the charrette process works and importance goal setting and impact on design strategies carried from design to construction. While there are no points in the LEED™ rating system for following the integrated design process, it is almost impossible to create truly cost effective, holistic sustainable designs without it.

- Integrated design
- Charrette process
- Green Building Technology Integration

D. Green Building Characteristics (2 hours)

There are often commonalities among green buildings. Certain 'rules of thumb' in design and construction have emerged in the green building industry. We will review the more common characteristics of green buildings and best practices based on the categories below, focusing on new construction.

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Operation and Maintenance

E. Group Exercise and course review Q&A (1/2 hour)

Session 2: Tectonics of Sustainable Design, LEED™ Technical Review

8 hours

A. Sustainable Site Planning (1.5 hrs)

- Erosion & Sedimentation Control
- Sustainable Site Selection
- Development Density & Community Connectivity
- Brownfield Redevelopment
- Alternative Transportation
 - Mass Transit Opportunities & Challenges
 - Bicycle Integration
 - Low Emitting & Fuel Efficient Vehicle encouragement
- Sustainable Site Development
 - Habitat Protection & Restoration Measures
 - Open Space
- Storm Water as a resource
 - Quantity Control
 - Quality Improvement
- Heat Island Effect
 - Nonroof measures and impacts
 - Roof concerns and opportunities
- Light Pollution Reduction & Prevention

B. Water Efficient Design (45 minutes)

- Potable Water Use Reduction
 - Technologies & applications in the building & on site

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55 Valley Rd, Lambertville, NJ 08530

Phone 609-397-1350 Email designs4life.Jason@gmail.com

- Wastewater Technologies

Break (15 min.)

C. Energy & Atmosphere Conservation (3 hours)

- Commissioning
 - Fundamental & Enhanced benefits, costs, process and differences
- Optimizing Energy Performance
 - ASHRAE 90.1 2007
 - IEEC 2009
 - Holistic Design
 - o Orientation
 - o Building Envelope
 - o Passive & Active Solar Design & Daylighting
 - o Natural & Mechanical Ventilation
 - o Lighting Design
 - o Building controls and efficient operation
 - o Renewable Energy Systems design and integration
 - Energy Modeling
 - Green Power Purchasing
- Energy Incentives, Grants, and financing opportunities
- Refrigerant Management & green house gases

Lunch Break (1 hour)

D. Material & Resource Efficiency (1hr)

- Planning for building recycling efforts
- Building Reuse & preservation
- Construction Waste Management
- Material Reuse
- Working with recycled content products
- Finding regional materials
- Rapidly renewable products
- Sustainably harvested wood

E. Course Review & Practice Questions (1/2hr)

Session 3: Tectonics of Sustainable Design, LEED™ Technical Review (cont.)

8 hours

A. Course review & practice test questions (1hr)

B. Indoor Environmental Quality (2.5 hrs)

- Ventilation standards and requirements (ASHRAE 62.1)
- Tobacco Smoke
- Outdoor air delivery monitoring
- Increased Ventilation
- Maintaining IAQ during construction & prior to occupancy
- Low Emitting materials: adhesives, sealants, paints, flooring, & composite wood
- Indoor chemical & pollution control
- Controlability of Systems: Lighting & Thermal Comfort
- Thermal Comfort Design & Verification
- Daylighting Design & Views

Lunch Break (1 hour)

C. Innovation in Design & Regional Priorities (1/2 hr)

- Defining innovation and documentation requirements
- Examples of innovative designs
- Value of LEED Accredited Professionals
- Regional priorities

D. Greening of existing buildings (1 hr)

One of the more sustainable things we can do is renovate instead of building new. We can never make up for the embodied energy of our existing building stock by tearing them down and trying to build less bad new buildings. However, existing buildings are often more challenging than new construction to bring up to the same green standards. Each building type presents its own challenges as well. Using case studies, we will examine the challenges and opportunities to create green existing buildings.

- Purchasing
- Cleaning
- Maintenance
- Physical Improvements
- Carbon Impacts

E. LEED Online & Certification Process Review (1/2hr)

F. Course Review, sample test questions, and group exercise (1.5hrs)