



Certified Lighting Efficiency Professional™ Training Program

This training program is designed to provide attendees with an understanding of industry best practices for evaluating lighting retrofit projects and upgrading to the most current lighting technologies. Over three days, our professional instructor will guide you through advanced lighting applications, systems, and technology innovations and show you the principles and practices of greatest relevance and practical value.

What Will You Learn?

- Learn how to measure, verify and evaluate metrics for lighting efficiency projects, including available technologies, financial incentives and human-factor implications of a project.
- Learn how to reduce lighting related energy consumption in a building, facility, or outdoor environment.
- Learn how to document a project, the potential ROI, and compare savings against other energy efficiency projects.
- Learn how to assess technologies for a given application.

At-a-Glance

- » This training program prepares attendees to take the Certified Lighting Efficiency Professional™ (CLEP™) exam.
- » This program is held over 3 days.
- » You earn 1.8 CEU | 18 PDH | 3.6 AEE Credits for completing this program.

Key Takeaways

- » Work through practical examples to demonstrate the topics and procedures covered.
- » Review the various areas of the Body of Knowledge associated with AEE's certification exam.
- » Discuss how to apply what you have learned to your business and applications.
- » Leave with a course workbook that will become an invaluable desk reference.

Registration

Candidates should contact their local AEE approved training provider for information about available training programs, the certification application process, exam registration, and associated fees. To find your local training provider visit

aeecenter.org/training

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Who Should Attend

The program is of the highest value to those undertaking or assessing lighting energy projects or lighting retrofit projects. Obtaining AEE's CLEP™ certification provides international credibility among energy management communities. Attendees of this program have included existing energy professionals, energy auditors, energy engineers, energy managers, maintenance managers, manufacturing and facilities managers, and energy consultants.

Course Outline

- Introduction to Alternative Energy
- Fundamentals of EEL
- Traditional Light Sources
- Ballasts & Drivers
- Solid State Lighting (LED)
- Luminaires & Fixtures (L&F)
- Lighting Quality
- Lighting Systems Improvements
- Lighting Calculations
- Evaluating Lighting Systems
- Maintaining Lighting Systems
- Environmental Concerns
- Lighting Control Strategies
- DLC & Utility Rebates
- Energy Legislation & Codes
- Lighting Financial Metrics
- Glossary of Lighting Terms Provided

Our Instructors

Over three days, one of our professional instructors will guide you through lighting efficiency. Their teaching and industry experience allows them to deliver information that is of the most relevance and practical value to attendees.

Certification Eligibility

The prerequisites to qualify for the certification process take into account the diverse education and experience applicants may have. Each candidate must meet the required criteria at

aeecenter.org/clep

Global Training Programs

For a complete list of AEE training programs delivered globally visit

education.aeecenter.org/global

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Full Agenda

Fundamentals of EEL

- Terminology & Definitions
- Human Visual System (Light Perception)
- Visibility Factors

Traditional Light Sources

- Lamps Terminology
- Types of Lamps & Use Analysis

Ballasts & Drivers

- Fluorescent Ballasts
- Ballast Factor
- Misuse and Recommendations
- Fluorescent Sockets
- Power Quality Issues (Power Factor)
- LED / SSL Drivers
- Constant Voltage vs. Constant Current LED Arrays

Solid State Lighting (LED)

- LED Overview & Terminology
- IES LM-79 & LM-80 Tests
- Color Rendering Index (CRI)
- Correlated Color Temperature (CCT)
- Energy Star & DLC
- Lamp Replacements (Rewiring & Retrofits)

Luminaires & Fixtures (L&F)

- L&F Comparison
- Luminaire Efficiency Factor
- Luminaire Efficacy Rating (LER)
- Coefficient of Utilization (Cu) & RCR
- Spacing Criteria
- Fixture Wiring

Lighting Quality

- Lighting Quality Attributes
- Illuminance (IES Recommended Practices)
- Balanced Lighting

Lighting Systems Improvements

- Benefit Overview
- Increasing Space Efficiency
- Spectrally-Enhanced Lighting
- Human Centric Lighting
- Circadian Wellness Lighting
- Tunable White LED Applications
- Retrofit vs. Re-lighting

Lighting Calculations

- Point Method
- Lumen Method
- Zonal Cavity Method
- Room Cavity Ratio (RCR)
- Maintained Illuminance
- Light Loss
- Sample Solutions
- Lighting Calculations Quick Homework

Evaluating Lighting Systems

- Lighting Audit Components & Tools
- Inventory
- Lighting Power Density
- Average Light Level
- Identifying Improvement Opportunities
- Calculating LPD
- Helpful Tools

Maintaining Lighting Systems

- Lighting Maintenance Principles
- Recoverable Light Loss Factors
- Lamp Lumen Depreciation
- Group Re-Lamping Interval
- Developing a Maintenance Plan
- Common Mistakes

Environmental Concerns

- Mercury (Fluorescent Lamps)
- TLCP Compliance
- Lamp Disposal & Recycling
- Ballast Disposal (PCBs & DEHP)
- LED Issues
- Sustainable Manufacturing

Lighting Control Strategies

- Reducing Hours of Use
- Switching Controls
- Sensor Technologies
- Commissioning
- Reducing Power (Dimming)
- Energy Savings Study
- Flicker (PWM vs. CCR)

DLC & Utility Rebates

- DLC Requirements & Testing
- Types of Utility Rebates

Energy Legislation & Codes

- EPA Act of 192
- EPA Act of 2005
- EISA
- DOE 2009 Ruling
- Energy Codes & Standards (Compliance)

Lighting Financial Metrics

- Helpful Cost & Cost Savings Calculations
- NPV vs. Lifecycle Costs
- Lighting Financials Quick Homework

Glossary of Lighting Terms