Learning Objectives:

• Participants will learn the fundamentals of low voltage lighting design. Discussions will include fixture types and applications as well as how to identify site lighting opportunities.

• Participants will learn the basic principles of low-voltage lighting engineering and how to implement wiring schematics into lighting designs to maintain quality control.

• Participants will discuss the latest advancements in low voltage controlling and switching technology to maximize energy efficiency, aesthetics and safety.

• Participants will learn how to budget for low-voltage lighting, including energy use analysis (LED vs Incandescent), installation costs, material types and maintenance costs.

Presentation Outline:

I. Introduction- Defining low-voltage accent lighting and its various applications in the landscape as well as on architectural features.
   a. Low-Voltage vs. Line voltage
   b. Overview of National Electrical Code as it pertains to Low Voltage Lighting
   c. Discuss the scope of accent lighting in Residential, Commercial, Retail and Hospitality.

II. Design/Engineering Standards- Applying the fundamentals of low voltage lighting design & engineering to landscape construction documents
   a. Determining fixture types and applications for accent lighting
   b. Identifying vantage points, focal points, transition areas.
   c. Relationship between Interior/Exterior lighting and how it enhances overall design
   d. Understanding fixture layout plans, specifications and details
   e. Creating outdoor living spaces

III. Advanced Controlling Options- Discuss latest advancements in automation and controlling technology for outdoor lighting systems.
   a. Creating various lighting effects to meet demands of outdoor spaces with multiple uses
   b. Controlling multiple lighting zones at various times to maximize safety and energy efficiency on a system
   c. Operating systems based on astronomical & location settings

IV. Cost Estimating & Budgeting- Discuss cost analysis based on material, labor and energy-use of low voltage systems in a residential or commercial scope.
   a. Energy Use Analysis (LED vs Halogen)
   b. LED lighting for Landscape Lighting – benefits over conventional lighting
   c. How do material types and installation applications affect cost
   d. Staying in budget without compromising safety and overall design effect