



Lighting Design Course: Photometric Calculations, LED Luminaires and Lighting Controls



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Introduction:

Lighting design with photometric calculations, LED luminaires and lighting controls is a 5-day course for electrical, building services, architectural and facility engineering teams that ends with a Lighting Design and Controls Scheme for a case building and car park. Organisations face glare complaints, dark or patchy work areas, failed emergency lighting tests and lighting loads above energy limits when luminaires are chosen from catalogues without calculation or a control strategy. Nominees already prepare or review lighting layouts and learn through modelling builds of lux grids and control schedules. CoreConcept Training Center delivers this lighting design course.

Course Objectives:

- Set illuminance, uniformity, glare, colour temperature and colour rendering criteria for offices, circulation routes, plant rooms and exterior areas
- Evaluate LED luminaire photometric data, drivers and dimming interfaces when selecting luminaires for a project
- Calculate interior lighting with the lumen method, maintenance factors and point-by-point grids in free lighting calculation software
- Design road, car park, facade and emergency lighting layouts that meet uniformity and escape route coverage targets
- Specify occupancy, daylight and DALI control zones that cut lighting power density while keeping visual comfort
- Prepare a lighting design and controls scheme with calculations, a control schedule and a commissioning checklist for a case building and car park

Target Audience:

- Electrical and building services design teams responsible for lighting layouts, calculations and specifications
 - Architectural and interior design teams responsible for lit effect, ceiling coordination and facade appearance
 - Facility engineering teams responsible for lighting maintenance, LED retrofits and emergency lighting tests
 - Consultant and contractor review teams responsible for checking lighting submittals and shop drawings
 - Infrastructure and municipal engineering teams responsible for road, car park and public area lighting
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Course Outline:

Day 1: Light, Photometry and Lighting Criteria for Spaces

- Photometric Quantities Covering Lumens, Candela, Lux and Luminance
- Inverse Square and Cosine Laws for Point Illuminance
- Illuminance and Uniformity Targets by Task and Space Type
- Correlated Colour Temperature and Colour Rendering Index Selection
- Existing Lighting Survey with Lux Meter Readings and Photographs

Day 2: Glare Metrics, LED Technology and Calculation Methods

- Unified Glare Rating Calculation and Luminaire Shielding Angles
- LED Luminaire Photometric Data Files and Polar Curves
- LED Driver Types, Dimming Interfaces and Flicker Behaviour
- Lumen Method with Room Index and Utilisation Factor
- Maintenance Factor from Lumen Depreciation and Dirt Losses

Day 3: Interior Lighting Calculations and Luminaire Layout

- Free Lighting Calculation Software Model of an Office Floor
- Point-by-Point Calculation Grids for Working Planes and Walls
- Luminaire Spacing-to-Height Ratio and Layout Optimisation
- Daylight Glare Probability Check Near Glazed Facades
- Lighting Power Density and Luminaire Efficacy Check

Day 4: Exterior, Emergency Lighting and Lighting Control Strategies

- Road and Car Park Lighting Pole Spacing and Uniformity
- Facade Floodlighting and Obtrusive Light Control Measures
- Emergency Escape Route, Open Area and High-Risk Task Lighting
- DALI Addressing, Groups and Scenes per IEC 62386
- Occupancy Sensing and Daylight Dimming Zone Design

Day 5: Modelling Build of the Lighting Design and Controls Scheme

- Case Office Building Lux Grid and Glare Model
 - Case Car Park Lighting Layout and Emergency Coverage
 - DALI Control Schedule with Sensor and Scene Allocation
 - Commissioning Checklist with Lux Verification and Emergency Duration Test
 - Lighting Design and Controls Scheme Completion and Peer Defence
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Skills You Will Gain:

- Photometric Data Interpretation
- Lux Level Calculation
- Glare Assessment
- Luminaire Layout Optimisation
- Exterior Lighting Design
- Emergency Lighting Planning
- Lighting Control Zoning
- Lighting Installation Verification

Why Attend This Course:

- Deliver a Lighting Design and Controls Scheme for a case building and car park to the design manager or facility director for review
- Decide between luminaire options, spacing and control strategies using calculated lux grids, glare values and power density figures
- Avoid rework, glare complaints, failed emergency lighting tests and excess lighting energy caused by uncalculated luminaire choices
- Pass on calculation templates, survey sheets and DALI control schedules to electrical, architectural and facility colleagues

Conclusion:

Back at work, the participant gives the design manager, project engineer or facility director a Lighting Design and Controls Scheme with lux grids, glare values, maintenance factors, emergency coverage, a DALI control schedule and a commissioning checklist. The organisation uses it to approve luminaire selections, check consultant and contractor lighting submittals and plan LED retrofits for existing buildings and car parks. After the first installation or retrofit, the unit should review measured lux levels, occupant glare feedback, emergency test records and lighting energy against the calculated values.

Frequently Asked Questions FAQ:

What should participants know before a lighting design course on photometric calculations, LED luminaires and lighting controls?

Participants should already prepare, review or maintain lighting installations in buildings or exterior areas. Basic electrical knowledge and comfort with spreadsheets are enough. Bringing a floor plan, a car park layout or a recent lighting submittal helps participants apply the calculations to their own projects.

How does a lighting design course with photometric calculations differ from an energy management or green building course?

It teaches how to calculate and lay out the lighting itself: lux levels, uniformity, glare, luminaire choice, emergency coverage and control zoning. Energy management courses audit whole-site consumption, and green building courses plan passive design and rating credits, touching lighting only briefly.

Why does lighting design use maintenance factors in photometric calculations?

Maintenance factors allow for lumen depreciation of LED sources and dirt on luminaires and room surfaces over time. Designing with them keeps illuminance above the target until the next cleaning or replacement, rather than meeting it only on the day the installation is handed over.

What do participants take back from the lighting design course on LED luminaires and lighting controls?

Participants take back a Lighting Design and Controls Scheme for a case building and car park, with lux grids, glare checks, maintenance factors, emergency lighting coverage, a DALI control schedule and a commissioning checklist they can adapt to their own projects.
