



International Educators' Summit 2011

Architectural Lighting Fundamentals (ALF)

05 April 2011

Introduction

Lighting design as a profession combines the art and science of designing with daylight and electric light to support the creation of good quality living and working spaces for human beings. The human being, of whatever age, cultural background, state of health or occupation is the focus of all architectural lighting design. To be able to create the desired atmosphere and the right balance of light and shadow requires experience and sensitivity as well as insight and an understanding of the client's wishes, the users' needs and the three-dimensional space. Such skills take some years to acquire.

During the course and process of establishing the Lighting Design profession a number of education programmes and initiatives have been set up around the globe. Some of the schools and universities programmes involve practicing lighting designers with the above-mentioned skills, others do not. The results of a special working group formed from the PLDA Educators Network, which includes educators from many countries around the world are incorporated in this document entitled Architectural Lighting Fundamentals (ALF).

The **objective** of the ALF is to acknowledge a platform of basic skills and content required for young professionals worldwide to practice as architectural lighting designers. The ALF are suggested guidelines. They are not mandatory and they are not a curriculum. The six topics do not represent six equally balanced parts of a syllabus. The contents can be incorporated into any didactic approach. They can be taught as individual modules and/or woven into the teaching of lighting design methodology. The ALF can serve as a checklist for educators and students as well as young practicing lighting designers pursuing continual professional development.

1. HISTORY AND THEORY

- 1.1 History of architectural lighting design (ALD)
- 1.2 Current practice of ALD and the lighting design profession

2. PHYSIOLOGY AND PERCEPTION

- 2.1 The seeing process and visual perception
- 2.2 Health and human factors
- 2.3 Physiological and psychological effects of lighting

3. LIGHTING PHYSICS

- 3.1 Lighting metrics
- 3.2 Spectral radiation and color

4. LIGHT SOURCES

- 4.1 Daylight
- 4.2 Lamps

5. LIGHTING EQUIPMENT

- 5.1 Optical systems
- 5.2 Luminaires and lighting systems
- 5.3 Electronic controls
- 5.4 Daylight systems

6. PRACTICE

- 6.1 Lighting design criteria
- 6.2 Design concepts and luminaire layout
- 6.3 Detailed design and specification
- 6.4 Lighting calculations
- 6.5 Lighting presentation
- 6.6 Codes, standards and recommendations

The above **topics** serve as a guide and outline basic themes. The more detailed **content** below provides a general description of each topic, but is not intended as a curriculum. The content aims to highlight essentials. The author of a curriculum is free to extract appropriate elements from the "content" and weave them together to create the respective syllabus.

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1. HISTORY AND THEORY

- 1.1 History of architectural lighting design (ALD)
Content: An overview of the history of architectural lighting design.
- 1.2 Current practice of ALD and the lighting design profession
Content: Theory and current practice of ALD's (people, projects), historians, theorists and critics.

2. PHYSIOLOGY AND PERCEPTION

- 2.1 The seeing process and visual perception
Content: The physiological interaction of light and space; architecture and interiors, atmosphere, impact of finishes and materials; quality of light, brightness, colour and glare.
- 2.2 Health and human factors
Content: The impact of light on health and human behaviour.
- 2.3 Physiological and psychological effects of lighting
Content: The psychology of light and space.

3. LIGHTING PHYSICS

- 3.1 Lighting metrics
Content: Lighting terminology, units and relations (wattage, voltage, flux, efficacy, luminance, illuminance, lux/footcandles).
- 3.2 Spectral radiation and color
Content: Color temperature and color rendering index.

4. LIGHT SOURCES

- 4.1 Daylight
Content: Quantity, quality and cultural conditions.
- 4.2 Lamps
Content: Lamp types and characteristics; incandescent, fluorescent, discharge and solid state light sources.

5. LIGHTING EQUIPMENT

- 5.1 Optical systems
Content: Principles of controlling light (reflection/refraction) reflectors & lenses
- 5.2 Luminaires and lighting systems
Content: Luminaire evaluation, components, features and accessories
- 5.3 Electronic Controls
Content: Basic dimming/control logic and equipment.
- 5.4 Daylight systems
Content: Basic control of daylight and shading systems, use of fenestration, light shelves, types of glass, frit and film.

6. PRACTICE

- 6.1 Lighting design criteria and application principles
Content: Concepts and guidelines for general lighting, wallwashing, floodlighting, orientation lighting and beam angle studies for accent lighting.
- 6.2 Design concepts and luminaire layout
Content: Geographic and cultural context of a project, client program requirements; visualization, communication techniques (hand sketch, computer modelling and/or rendering), lighting simulations, mock-ups.
- 6.3 Detailed design and specification
Content: Basics of architectural drawings, lighting drawings, reflected ceiling plans, luminaire schedule, specifications and typical lighting details. The lighting specification process, various specification formats and written specifications.
- 6.4 Lighting calculations
Content: Light level calculations via basic formulas and computer simulation for electric lighting and daylighting; photometry and beam studies.
- 6.5 Lighting presentation
Content: Presentation and communication techniques, visual communications via images, renderings/ photoshop studies, modelling and written lighting design narratives.
- 6.6 Codes, standards and recommendations
Content: Light level guidelines, codes and standards of practice (e.g. IESNA Handbook, LEED, CIBSE, etc.); energy usage and sustainable design issues.

Please note:

- A. Working as an architectural lighting designer by nature suggests a working knowledge of 'AutoCAD' and an ability to read plans, sections and elevations, since these are routine and daily communications instruments.
- B. As with any design profession, practical training such as an internship, practical workshop experience (one or two practical "hands-on" workshops during the period of studies) or mentorship is beneficial to optimize academic learning.