

## **Assignment 02 – Interior Lighting Design**

*Lighting design* is the process of creativity using the qualities and functions of light to affect people, objects and space. The qualities of lighting are intensity, form, colour and movement. The functions of lighting are visibility, mood (atmosphere), composition and motivation. Lighting designers often use personal observations and computer software tools to evaluate the design options and system performance.

### **Objective**

To develop a better understanding of the basic principles of interior lighting design and appreciate the skills of using lighting computer software tool.

### **Methodology**

This assignment is intended to strengthen what you have learned during the lectures, by relating your learning to practical situations and by applying computer software tool to examine real-life visual environment. Each student should choose one room in a building (e.g. a classroom, an office, a function room) that you can get access to collect information about the interior lighting system. By using personal observations and onsite examination, you shall evaluate the characteristics of the visual environment and the major design factors of the lighting system. The space being investigated may have both natural and artificial light sources, or only one of them.

By using the following online interior lighting design tool, you should try to represent the lighting system (usually in the ceiling) and evaluate its performance. You can make some assumptions for the room characteristics and luminaire features if the information is not available. The design tool has a library of common lighting products for you to select and apply in your technical analysis (see Appendix for brief overview).

- Visual Interior Lighting Design Tool (online), <http://www.visual-3d.com/tools/interior/>

### **Report Submission**

Each student shall prepare a study report of not more than ten (10) A4 pages to explain the findings of the investigation in a systematic and logical manner. The contents of the report shall address the following aspects. Other important issues may also be included.

- Basic information of the building space and appreciation of its lighting system(s)
- Characteristics of the visual environment
- Major design factors of the lighting system(s)
- Results of analysis using the online interior lighting design tool

Detailed calculations are not required, but essential data, diagrams and photos are useful to enhance understanding. If appropriate, a list of references should be provided at the end of the report. The report shall be submitted in electronic format to the Moodle platform.

## Appendix

Visual Design Tools (online), <http://www.visual-3d.com/software/designtools.aspx>

The Visual Design Tools are a set of web based tools that allow users to analyze many common lighting scenarios and view photometric files. The Design Tools can be used to quickly calculate scenarios with simple geometries where interreflected light will not significantly effect the resulting illuminance. This is true for many outdoor lighting scenarios eg Parking Lots and Exterior Facade Floodlighting. Complex lighting designs and geometries should be studied in the PC based Visual software.

- Interior Tool
- Roadway Tool
- Photometric Tool
- Floodlight Tool
- Area Tool
- Economic Tool
- Wallwash Tool
- Template Tool
- Simple Economic Tool

Visual Interior Lighting Design Tool (online), <http://www.visual-3d.com/tools/interior/>  
 Training video (4:00), <http://www.visual-3d.com/tools/interior/helpvideos/video.html>

**Settings**  
 Units: Meters - Lux

**Room Dimensions**  
 Length [X]: 30 m  
 Width [Y]: 20 m  
 Height [Z]: 12 m  
 Workplane: 2.5 m  
 Ceiling Type: Open

**Room Reflectances**  
 Ceiling: 80 %  
 Walls: 50 %  
 Floor: 20 %

**Criteria**  
 Illuminance: 500 lux  
 Power Density: W/m<sup>2</sup>  
 Quantity:

**Constraints**  
 Spacing X [SC=15.6]: m  
 Spacing Y [SC=15.1]: m  
 Rows:  
 Columns:

**Calculation Results [ A ]**  
 Illuminance: 498 lux  
 Power Density: 11.89 W/m<sup>2</sup>  
 Quantity: 63

**Spacing Results [ A ]**  
 Spacing: 3.3 x 2.8 m  
 Arrangement: 9 x 7  
 Outside Spacing X: 1.51 m  
 Outside Spacing Y: 1.01 m

**Display**  
 Dimensions: Room  Layout   
 Hide Zonal Cavity Info [-]:  
 Coefficient of Utilization: 0.53

**Floor Cavity**  
 Height: 2.5 m  
 Cavity Ratio: 1.04  
 Form Factor: 0.82  
 Effective Reflectance: 19.2 %

**Room Cavity**  
 Height: 9.5 m  
 Cavity Ratio: 3.96  
 Form Factor: 0.49

**Ceiling Cavity**  
 Height: 0 m  
 Cavity Ratio: 0  
 Form Factor: 1  
 Effective Reflectance: 80 %

**Project Information**

**Lithonia Lighting**  
 [ A ] - 2AV 2 54T5HO ADP  
 Light Loss Factor: 1  
 Suspension Length: 0  
 Orientation: 0  
 Symbol Shape: Rectangular  
 Symbol Length: .59  
 Symbol Width: 1.19  
 Lamp Quantity: 2  
 Lumens Per Lamp: 4450  
 Wattage: 113.2

2AV 2 54T5HO ADP

■ - 0° H ■ - 90° H  
 ■ - Max Cd: 45° H