

## Liverpool John Moores University

Title: LIGHTING APPLICATIONS  
Status: Definitive  
Code: **4510BEFD** (108448)  
Version Start Date: 01-08-2011

Owning School/Faculty: Built Environment  
Teaching School/Faculty: Liverpool Community College

Team	Leader
Derek King	Y

**Academic Level:** FHEQ4  
**Credit Value:** 12.00  
**Total Delivered Hours:** 64.00  
**Total Learning Hours:** 120  
**Private Study:** 56

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	42.000
Tutorial	12.000
Workshop	7.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Open book controlled assignment under exam conditions	50.0	3.00
Report	AS2	Project based assignment	40.0	
Portfolio	AS3	Practical based assignment	10.0	

### Aims

*To develop the learner's understanding of the underlying principles of light and the practices of incorporating lighting into buildings. The module deals with the design, installation and operation of artificial lighting installations.*

*To enable the student to evaluate the interior, exterior and emergency lighting needs of buildings and provides an opportunity to experience the process of completing*

*lighting designs in complex non-domestic applications.*

*To allow the students to explore the effectiveness of natural lighting schemes, the integration of artificial lighting with natural daylighting and various other methods of producing energy efficient lighting designs.*

## **Learning Outcomes**

After completing the module the student should be able to:

- 1 Analyse buildings, identify their lighting needs and establish design parameters.
- 2 Analyse daylight levels and distribution within buildings.
- 3 Investigate lighting equipment and the visual effects of lighting.
- 4 Evaluate alternative lighting proposals and strategies to establish feasible design solutions.
- 5 Produce designs for lighting schemes for the interior and exterior of complex buildings.
- 6 Investigate the design and operation of emergency lighting systems.

## **Learning Outcomes of Assessments**

The assessment item list is assessed via the learning outcomes listed:

EXAM	2	4	5	6		
REPORT	1	2	3	4	5	6
PORTFOLIO	3					

## **Outline Syllabus**

*Fundamentals of lighting: terminology and units of light, inverse square law, cosine law, colour temperature.*

*Visual effects of lighting: lighting levels, glare, illumination for task performance, appearance, colour rendering, revealing form, display lighting, light modulation.*

*Specification and requirements: analysis of client and building requirements, balance between client, commercial, aesthetic and energy efficiency considerations.*

*Requirements of specialised lighting situations Interpretation and application of lighting design standards, publications for complex public sector commercial and industrial buildings. Co-ordination of lighting with other mechanical and electrical services.*

*Daylighting: Features, significance, advantages & disadvantages of daylight in buildings. Components of the daylight factor. Sunlight admission. Impact of different forms, shapes, proportion and location of window and rooflights. Effect of glass type, widow bars etc.. Daylight in buildings with atria, advantages and disadvantages.*

*Effect of daylighting on VDU equipment. Techniques for increasing daylight levels and penetration into buildings. No-sky lines, light obstruction and visible sky angles. Day light requirements. Average daylight factors. Manual and Computer calculation/modeling of distribution of daylight in buildings.*

*Light sources: natural daylight, lamp types and classifications, identification codes,*

*lamp characteristics, luminous efficacy, lamp life and luminous flux maintenance, lamp control gear.*

*Luminaires: standards and markings, luminaire characteristics, luminaires for hostile and hazardous environments, polar curves and other photometric data, use of illuminance ratio charts, switching and dimming, maintenance. Methods of control. Design of general lighting systems: for complex and specialised buildings. Layout, specification and control of interior lighting. Exterior lighting, car parks and walkway lighting, integration of lighting with other services installations, integration of artificial lighting with natural day-lighting.*

*Design of specialised lighting systems: general for complex buildings requiring specialised lighting solutions. eg laboratories, art galleries, museums, hospitals and operating theatres, retail display, theatre, concert hall and conference lighting etc. Specialised lighting fittings, colour correction and enhancement lighting, integration of artificial lighting with natural lighting etc. Control of lighting levels and lighting systems. Point-to-point illuminance level calculations and computer aided lighting design modeling software.*

*Evaluation: evaluation of viability, performance and appropriateness of proposed schemes for meeting building needs.*

*Emergency lighting specification and requirements: identification of current legislation and standards for emergency lighting.*

*Design of emergency lighting schemes: escape lighting, standby lighting, lighting levels and locations, speed of operation, maintenance and testing requirements, external escape lighting.*

*Control of emergency lighting: co-ordination of emergency lighting schemes with other services and emergency systems.*

## Learning Activities

Lectures, tutorials, case studies, site visits.

## References

<b>Course Material</b>	Book
<b>Author</b>	Steffy, G.R.
<b>Publishing Year</b>	2001
<b>Title</b>	Architectural Lighting Design
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	John Wiley & Sons
<b>ISBN</b>	0471386383

<b>Course Material</b>	Book
<b>Author</b>	CIBSE
<b>Publishing Year</b>	2002
<b>Title</b>	Code for Lighting (CD Rom + printed extracts)
<b>Subtitle</b>	

<b>Edition</b>	
<b>Publisher</b>	CIBSE
<b>ISBN</b>	0750656379

<b>Course Material</b>	Book
<b>Author</b>	Philips, D.
<b>Publishing Year</b>	2004
<b>Title</b>	Daylighting Natural Light in Architecture
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	Architectural Press
<b>ISBN</b>	0750656379

<b>Course Material</b>	Book
<b>Author</b>	CIBSE
<b>Publishing Year</b>	2004
<b>Title</b>	LG12 Emergency Lighting and Design
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	CIBSE
<b>ISBN</b>	1903287510

<b>Course Material</b>	Book
<b>Author</b>	Cuttle, C.
<b>Publishing Year</b>	2003
<b>Title</b>	Lighting by Design
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	Architectural Press
<b>ISBN</b>	075065130X

<b>Course Material</b>	Book
<b>Author</b>	Tregenza, P.
<b>Publishing Year</b>	2004
<b>Title</b>	The Design of Lighting
<b>Subtitle</b>	
<b>Edition</b>	
<b>Publisher</b>	Spon Press
<b>ISBN</b>	0419204407

## Notes

This module is a key component for those students wishing to complete the programme following an 'electrical' building services pathway. It aims to develop the student from an awareness of the principles of basic general lighting to a greater understanding of lighting design in the built environment. The module emphasises

the need for energy efficient, innovative lighting design strategies but equally recognises the creative nature of lighting design. The module covers the design and control of general, task, display and emergency lighting schemes.