

Guide Syllabi For Courses To Meet The Academic Standards In Lighting For The CIBSE Lighting Certificate And Diploma

INTRODUCTION

In the absence of any current nationally agreed syllabi for educational courses on Lighting Design and Technology, the Lighting Division of CIBSE offers the following guide syllabi to those teaching establishments wishing to include a lighting content within an existing or new course. It is recognised that institutions are free to develop specialised syllabi. The guidelines offered here are based on the need for lighting courses to incorporate the art, science and engineering of lighting. The core material has been written to meet the general fundamental level required for the CIBSE Lighting Certificate. The Applications Modules have been written to cover the more advanced levels required for the CIBSE Lighting Diploma. There is also a need to have experience in lighting in order to qualify for the CIBSE Lighting Certificate and Diploma.

GENERAL PHILOSOPHY

The 'Core Material' contains the basic principles and concepts necessary for the academic component of the Lighting Certificate. It is also the essential pre-requisite for the 'Applications' modules. The 'Applications' modules proposed here are indicative of typical content and the achievement of higher level educational objectives. Where the 'Core' material may include the need for the student to 'understand' and 'describe' the Applications' modules would include the need to 'compare' and 'discuss'.

It is stressed that Educational Institutions are encouraged to develop their own 'Applications' syllabi which may well incorporate their own particular specialisation and interests.

Successful completion of the 'Core' material fulfils the academic requirement of The CIBSE Lighting Certificate. Successful completion of the 'Core' material plus at least two 'Applications' modules fulfils the academic requirements of The CIBSE Lighting Diploma. Further details on the routes to the CIBSE Lighting Certificate and Diploma, and the necessary experience required for these awards can be found in the Guidance Notes for Applicants for the CIBSE Lighting Certificate and Diploma.

ENTRY REQUIREMENTS

Lighting is a broad topic and it is recognised that the students will have a variety of educational backgrounds. An entrant would need to be reasonably numerate up to the level of GCSE Mathematics, or Scottish Standard Grade, Grade 'C' and Physics at this level would also be an advantage.

Once an applicant has completed satisfactorily an approved Lighting Course or its equivalent no other academic qualifications are required for the awards. Those applying for these awards must also have relevant experience in lighting as given in the Guidance notes for these awards. The applicant is required to be a member, at any grade, of the Institution. It should also be noted that neither the CIBSE Certificate nor the Diploma, on its own, meets the academic requirements for Corporate Membership of the Institution.

CORE MATERIAL

Aims

The aims of this course are to:

- identify the objective and subjective factors which influence the quality of lighting design within a human factors context.
- to become acquainted with the physical, engineering and architectural aspects of lighting.
- allow the student to understand the qualitative and quantitative influences on lighting design.

Objectives

The student will be able to:

- Identify the factors which influence the objective and subjective use of light, including vision, stimulus, sensation, colour, adaptation, contrast, modelling and glare.
- Understand the effects of material and surface characteristics, including reflection, colour, texture, transmission, refraction and diffraction.
- Analyse simple visual tasks
- Understand the units of light and derive illuminance and luminance from flux and intensity.
- Use photometric data to calculate illuminance and luminance from point, linear and area sources.
- Appreciate the basic principles of both the qualitative and relative aspects of daylight in rooms.
- Understand the significance of the three components of daylight to daylight design.
- Identify the factors which influence glare.
- Understand light emission processes and their implication on the design and operation of electric lamps.
- Describe the spectral emission characteristics of light sources and the effects on their Colour rendering and appearance
- Understand the basic principles of optical design of lamps and luminaires, light distribution and its classification,
- Be familiar with manufacturers' basic data for both lamps and luminaires.
- Determine cost comparisons of lamps and their applications.
- Appreciate the environmental consequences of lighting design solutions, including energy use and lamp disposal.

APPLICATIONS MODULES

Note: In all applications modules the holistic approach to design should be enhanced by the opportunity to include:

- **Case studies of good practice and design**
- **The critical appraisal of lighting designs**
- **Current applications of computer programs**
- **Current Regulations, Codes and Guides**

It is stressed that Educational Institutions are encouraged to develop their own 'Applications' syllabi which may well incorporate their particular specialisation and interests.

INTERIOR LIGHTING

Aims

The aims of this course are to:

- develop the principles of lighting in design from first principles, using light as part of the appreciation of architectural shape, form and function for a range of interior spaces.
- apply visual, physical and engineering design principles.
- show an understanding of the integration of engineering and aesthetic design concepts in order to adopt an holistic approach to interior lighting design.

Objectives

The student will be able to:

- develop from first principles the key criteria which influence interior lighting design. This will include the selection criteria for lamps, luminaires and associated costs.
- understand the factors which enable light to complement and enhance the architectural form, shape and function of building interiors.
- provide design solutions for interiors which recognise the need to consider task performance, safety of occupants, building services integration, maintenance and the provision of a visually stimulating environment.
- understand the importance of balance and relative values of lighting parameters in users' perception of space.
- calculate the direct and indirect illuminance and luminance on interior surfaces and discomfort glare index.
- understand the implications of Regulations, Codes and Guides when assessing design criteria.
- understand the characteristics of lighting control systems and the criteria for their use.
- examine the role of daylight in providing an integrated interior lighting design solution.
- carry out post-occupancy evaluation and field measurements of interior lighting schemes.
- understand the factors which influence emergency lighting practice for interiors.

EXTERIOR LIGHTING

Aims

The aims of this course are to:

- apply visual, physical and engineering design principles to exterior lighting.
- apply design concepts to complement and enhance the architectural form, shape, appearance and function of building exteriors and spaces.
- show an understanding of the integration of engineering and aesthetic design concepts in exterior lighting design.

Objectives

The student will be able to:

- develop from first principles the key criteria which influence exterior lighting design. This will include the selection criteria for lamps and luminaires, costs and an assessment of glare.
- understand the factors which enable light to complement and enhance the architectural form, shape and function of building exteriors and roadway lighting.
- provide design solutions for exteriors and roadways which recognise the need to consider task performance, including sports, safety of users, maintenance, security aspects and the provision of a visually stimulating environment.
- identify the influence of BS Codes of Practice and other Regulations which influence the design of roadway and exterior lighting.

- understand the causes and quantification of light pollution and the relationship to sky glow from exterior lighting.
- carry out post-completion evaluation and field measurements of exterior lighting schemes.

PHOTOMETRY AND DESIGN OF LUMINAIRES AND LAMPS

Aims

The aims of this course are to:

- identify the physical and engineering aspects which influence the quality of the design of lamps and luminaires.
- understand the influence of photometry on the quantitative and qualitative aspects of lamp and luminaire design.

Objectives

The student will be able to:

- describe the types of equipment used for the production of photometric data for luminaires.
- describe the procedure used for the measurement of intensity distribution, luminous flux, illuminance, luminance and luminaire efficiency.
- using photometers and other equipment produce a range of photometric data.
- specify colour appearance and colour rendering through the use of CIE Chromaticity co-ordinates and Colour rendering indices.
- measure the spectral distribution of a lamp.
- design optical systems for reflectors, refractors and louvres.
- test and specify luminaires.
- be familiar with various types of light measuring devices, their care and calibration.

DAYLIGHT AND WINDOW DESIGN

Aims

The aims of this course are to:

- apply visual and physical design principles to the Daylighting of building interiors.
- apply Daylighting design concepts to complement and enhance the architectural form, shape, appearance and function of buildings.
- show an understanding of the integration of Daylighting and artificial lighting design concepts in lighting design.

Objectives

The student will be able to:

- assess the implication of building form and siting in relation to daylight and direct sunlight penetration.
- design and position windows and rooflights to meet interior lighting requirements.
- use a range of methods for predicting daylight factor from windows and rooflights.
- describe the effects of view, glare and privacy in relation to windows and rooflights.
- design lighting schemes which integrate daylight and artificial light sources.
- evaluate average daylight factor.
- understand the importance of balance and relative values of light parameters to the users' perception.

- appraise a range of systems used to control daylight distribution into buildings.
- compare the cost implications of daylight and artificial lighting designs.
- assess the thermal implications of windows and rooflights.
- carry out post-occupancy evaluation and field measurements of Daylighting schemes.

TIME ALLOCATION

Core Subjects

Formal lectures	60 hrs.
Project/laboratory	30 hrs.
Tutorial/private study	30 hrs.

Application Modules

Each of the two application modules will take, typically, a total of 90 hours divided suitably into teaching and project and tutorial time.

The typical total time to complete the core subject plus two application modules will be 300 hours.

EXAMINATIONS AND ASSESSMENTS

Typical assessment of the Core material would be a 3 hr examination which would equate to 70% of the total mark. The remaining 30% would be the Coursework element.

Typical assessment of the Applications modules would be by a 3 hr examination, which equates to 60% of the total mark. Coursework at 30% and a presentation of 10% would complete the assessment pattern. A project based assessment pattern may also be adopted for the Applications Modules.

Cases for exemption from the core material and the applications modules will be individually assessed.

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Note 2001: The CIBSE Lighting Division has been replaced by the Society of Light and Lighting, which now awards the Lighting Diploma. The criteria are unchanged. The Lighting Certificate is being phased out but will still be awarded to suitable candidates on request. The Society's Lighting diploma should not be confused with the Lighting Diploma course of the Lighting Education Trust.