

Title	Design simple electric lighting installations		
Level	5	Credits	5

Purpose	<p>This unit standard and is intended for the use in training and assessment of electricians beyond trade level and covers the design of simple installations of electric lighting.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of terms associated with illumination; – design an area floodlighting installation for both horizontal and vertical areas of approximately 100 square metres each; and – design a general indoor lighting installation for a room with a floor area of approximately 100 square metres.
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Classification	Electrical Engineering > Electrical Installation and Maintenance
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Available grade	Achieved
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Guidance Information

- 1 Recommended skills and knowledge:
National Certificate in Electrical Engineering (Electrician for Registration) (Level 4) [Ref: 1195] or equivalent trade qualification for electricians.
- 2 This unit standard has been developed for learning and assessment off-job.
- 3 It is expected that trainees will have achieved Unit 1710, *Demonstrate knowledge of electric lighting*, or have demonstrated equivalent knowledge of basic lighting principles before being assessed against this unit standard.
- 4 References
AS/NZS 1680.1:2006 *Interior and workplace lighting – Part 1: General principles and recommendations*;
AS/NZS 1680.2.4:2017 *Interior lighting –Industrial tasks and processes*;
AS/NZS 1680.2.5:2018 *Interior lighting –Hospital and medical tasks*.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of terms associated with illumination.

Performance criteria

- 1.1 Reflection factor is defined in terms of the proportion of incident flux that is reflected by a surface.
- 1.2 Absorption factor is defined in terms of the proportion of incident flux that is absorbed by a surface.
- 1.3 Transmission factor is defined in terms of the proportion of incident light that is transmitted through a material.
- 1.4 Glare is defined in terms of discomfort from excessive contrast.
- Range brightness contrast, colour contrast, direct, reflected.
- 1.5 Light output ratios are defined in terms of luminaire output and lamp output.
- Range total light output ratio, upward light output ratio, downward light output ratio.
- 1.6 Cut-off angle is explained in terms of direct glare cut-off.
- 1.7 Control of cut-off angle is described in terms of luminaire design.
- Range open luminaire, louvre-screened luminaire.
- 1.8 Photometric data of a luminaire are explained in terms of luminous intensity at various angles.
- Range illuminance cone, isolux diagrams, glare limitation curves, Cartesian diagrams, polar diagrams, space to height ratios.
- 1.9 Maintenance factor is defined in terms of appropriate allowance for deterioration of output and surroundings of a luminaire.
- 1.10 Utilisation factor is defined in terms of the proportion of lamp output reaching the working plane.
- 1.11 Key functions required to obtain quality in a lighting design are defined.
- Range safety of people;
performance – illuminance levels, uniformity, glare;
appearance and comfort – colour temperature of light source, colour rendering, surface reflectance or luminance ratios, modelling.

Outcome 2

Design an area floodlighting installation for both horizontal and vertical areas of approximately 100 square metres each.

Performance criteria

- 2.1 Required illuminance value is determined from a lighting level guide, or from given data.
- 2.2 From given options, suitable luminaires are chosen for the type of application.
- 2.3 Design lumens of chosen luminaires are determined from a given table.
- 2.4 Number of floodlights required is calculated from given formula.
- 2.5 Spacing distances of luminaires are calculated for an even spread of light.

Outcome 3

Design a general indoor lighting installation for a room with a floor area of approximately 100 square metres.

Performance criteria

- 3.1 Required illuminance value is determined from a lighting level guide, or from given data.
- 3.2 From given options, suitable luminaires are chosen for the installation.
- 3.3 Design lumens of the chosen luminaires are determined from a given table.
- 3.4 The number of required luminaires is determined using the total lumen method and appropriate factors.

Range illuminance required, room dimensions, room index, maintenance factor, utilisation factor.
- 3.5 The orientation and spacing of luminaires are determined using manufacturers' data.

Range layout, longitudinal and transverse spacing factors.

Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 February 2002	31 December 2013
Review	2	19 June 2009	N/A
Rollover and Revision	3	15 March 2012	N/A
Revision	4	15 January 2014	N/A
Rollover and Revision	5	28 January 2021	N/A

Consent and Moderation Requirements (CMR) reference

0003

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.