

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

Classification	Electrical Engineering > Electrical Installation and Maintenance
-----------------------	--

Available grade	Achieved
------------------------	----------

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.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

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	31 December 2025
Rollover and Revision	3	15 March 2012	31 December 2025
Revision	4	15 January 2014	31 December 2025
Rollover and Revision	5	28 January 2021	31 December 2025
Review	6	27 April 2023	31 December 2025

Consent and Moderation Requirements (CMR) reference

0003

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