

Practical Light & Colour Measurement

A one-day course on light measurement, radiometry, photometry & colorimetry designed to meet the needs of industry

Pro-Lite's "Practical Light & Colour Measurement" course has been delivered in partnership with Birmingham-based Photonics Cluster UK to over 120 delegates since 2005. The course majors on how to get the right results (and how to avoid common mistakes) when measuring the output of LEDs and other light sources. The key topics addressed in the course include:

- ▶ Light, and how we see it.
- ▶ Using the correct units to define light source outputs.
- ▶ Using numbers to describe the colour of light.
- ▶ The importance of colour rendering.
- ▶ Choosing the right equipment.
- ▶ How to measure LEDs accurately.

The course is perfect for scientists, engineers, technical marketing personnel and project managers seeking to understand the jargon used to describe the power and colour of light sources. Ease the pain of communicating understandable specifications with suppliers and customers – enrol on our course and *see the light!*



The course was designed and is delivered by Robert Yeo of Pro-Lite Technology in response to demand from industry for training in light and light measurements for those engineers from a predominantly electronics background charged with developing products using the latest generation of high brightness LEDs, in particular solid state lighting. It has proven particularly attractive to delegates from the automotive and aerospace sectors where it has provided a practical foundation in the measurement, analysis and application of lighting quantities used on a daily basis by those practicing LED lighting design.

The course provides an overview of the units used to define the output of LEDs, LED clusters and other light sources, as well as describing the type of equipment typically used in their measurement. Hints and tips specific to measuring LEDs and LED clusters accurately are presented, together with when and how to convert between different optical units.

The course content covers the fundamentals of photometry and colorimetry and the practical aspects of the measurement of luminous flux, luminous intensity, illuminance, colour temperature, and chromaticity of light sources. The delegate also learns how to specify and use equipment to perform photometric, colorimetric and spectroradiometric measurements on LEDs, displays and other light sources.

The one-day open course is delivered through the Photonics Cluster in Birmingham at their facility on the Aston University Science Park. Delegates benefit from access to the Cluster's Solid State Light Test Laboratory where demonstrations of state-of-the-art photometric equipment are provided, including a CCD imaging photometer, integrating spheres, colorimeter, spot photometer and spectroradiometer. Pro-Lite is also pleased to deliver the course on-site at the premises of individual companies and organisations.

Course Outline

Light and the Human Visual System

- » Radiometry versus Photometry
- » Measurement Quantities & Geometries
- » The Light Measurement Matrix
- » Luminous Flux; Illuminance, the Inverse Square & Cosine Laws; Luminous Exitance; Luminous Intensity & Solid Angle; Luminance
- » Converting Between Units: Monochromatic vs. Polychromatic Sources; Intensity to Illuminance; Illuminance to Luminance; Luminous Intensity to Flux; Flux to Intensity; Calculating Illuminance at a Distance & Off-Axis Illuminance

Colorimetry

- » Colour Vision and the Tristimulus Response
- » Describing Colour Numerically
- » Colour Temperature & Correlated Colour Temperature
- » CIE Standard Illuminants
- » Spectral Quantities (Peak & Centre Wavelength, Bandwidth)
- » Dominant Wavelength & Purity
- » Colour Rendering

Review of Equipment used for Photometry

- » Specifying Photometers for the Measurement of Total Flux, Illuminance, Intensity & Luminance
- » Colorimeters
- » Spectroradiometers
- » Imaging photometers
- » Goniophotometers

LEDs – The Measurement Challenges

- » Spectral Considerations
- » Geometric Considerations
- » Electrical & Thermal Considerations
- » Optical Equipment Used for Testing LED Flux & Intensity
- » Viewing Angle
- » Colorimetric Measurement of LEDs
- » Spectroradiometric Measurement of LEDs
- » LED Colour Rendering
- » LED Clusters – Special Considerations
- » Reporting Considerations for LED Measurements

Who Should Attend

The course is intended for scientists, engineers, technicians, product planners, marketing managers and designers involved with the development or marketing of lighting systems or the assessment of LED technology on current or future products within industries such as lighting, displays, automotive, avionics, medical, healthcare, instrumentation, signals and others.

Registration Details

The course is delivered approximately four times a year through the Photonics Cluster. Please see the Photonics Cluster web site www.photonicscluster-uk.org for dates of the next course. The standard delegate rate is £495 (ex. VAT). Photonics Cluster (UK) member rate is £395 (ex. VAT). The price includes a copy of the presentation and the accompanying Light Measurement Handbook that serves as a useful reference text. For further information, please contact Photonics Cluster-UK at +44 (0) 121 260 6020 or email to info@photonicscluster-uk.org.

Pro-Lite is also pleased to deliver the course on-site at individual company premises. It is also possible to tailor this course to suit individual needs. For further information, please contact Pro-Lite.