HUMAN CENTRIC LIGHTING
Human Centric Lighting is a solution to promote a person’s well-being, mood and health, improving concentration and efficiency in the work place, caring or educational environment. It can support healing processes and prevention of chronic diseases, particularly in elderly care where improving light quality has a known impact on vision and health.

Lighting solutions can be produced and installed in ways that specifically support the human circadian rhythm, enhance concentration, prevent sleeping disorders and improve overall well-being. Human Centric Lighting takes into account our requirements for good vision as well as our emotional and biological needs.

Human Centric Lighting creates positive effects in various every day life situations in hospitals, care homes, offices and schools. Products have been specifically designed to bring the well-being benefits into all these applications decreasing fatigue, extending concentration periods and aiding in the prevention of depression.

The transition from conventional light sources to LED modules makes it possible to imitate sunlight indoors during daylight hours. New LED technology enables optimum control of white light from 2700 kelvin to 6500 kelvin in combination with the lux level. This can be controlled by using either a DMX or DALI solution programmed to follow set times, producing regular repeat patterns of sunlight movement. Using intelligent solutions it is possible to simulate different scenes of the natural outdoor lighting environment by changing the colour temperature and intensity of the lighting.

For our full range of Human Centric Lighting go to www.apollolighting.co.uk
Time of day and time of year shape our natural rhythms. Be it breathing and heartbeat, being awake or being asleep, all biochemically controlled functions have their individual high and low points over the course of a day.

Shortly before waking up, body temperature, blood pressure and pulse frequency rise. Approximately one hour later, the body produces stimulating hormones. Therefore, complex mental tasks are easiest to handle between 10am and 12 noon. Short-term memory is also enhanced, a requirement for success in tasks such as tests and job interviews.

Between 12 noon and 2pm, the stomach produces the most acid, aiding digestion. In the process, the stomach uses significant energy and the rest of the body gets tired.

But even without eating anything, we experience a performance low during the middle of the day. In the early afternoon, things improve again for both body and spirit. In turn, the susceptibility to pain is also at a low point.

The performance of those engaging in sports between 4pm and 5pm is particularly high. This period is ideal for building muscle and for fitness training.

When it gets dark, we get tired and at 3am, our body reaches its absolute low. Circadian rhythms shape the flow of our day and well-being. In the course of evolution, the circadian system developed under the influence of the natural sequence of day and night.

The human hormonal balance is responsible for the circadian rhythm. In particular, melatonin is responsible for our wake and sleep patterns. To control its release, intelligent lighting systems provide different light spectra with different intensities, depending on the time of day.

Light sources with warmer light colour, and therefore a lower colour temperature, have a lower circadian activation factor. The greater the share of blue in the spectrum of the light source, the higher the circadian factor and the stimulation of the ‘blue receptors’ which are responsible for controlling the biological functions.

When artificial light is adapted to the natural human biorhythm via the control of colour temperature and intensity, positive effects can be achieved.

- **CORTISOL**
  - Hormone with stimulating effect on various bodily functions (‘stress hormone’).

- **MELATONIN**
  - Hormone that signals ‘night rest’ to the human body and makes us feel tired. Also referred to as the ‘sleep hormone’. It is produced from serotonin in the pineal gland and secreted during the night. It can be inhibited by exposure to light during the night.
BRINGING DAYLIGHT INTO YOUR BUILDING
Tunable White – giving you the option of setting the colour temperature of white light

The importance of daylight is becoming more obvious in all interior environments. With the right colour temperature and illumination it is possible to feel comfortable with artificial lighting whether you are working in an office, studying at university or recovering in hospital. The ‘Tunable White’ solution simulates natural daylight and can be adapted to personal requirements. The well-being of patients in healthcare facilities is improved and the healing process is accelerated. Students and office workers also benefit from these systems as they are able to concentrate for longer, enabling them to be more productive.

For our full range of tunable white products go to www.apollolighting.co.uk
APPLICATION - Office
Light for modern office & work environments

Work environments are undergoing enormous change. The increasing digitalisation of business processes puts increased pressures on employees. However, those who spend a large part of the day in closed buildings can no longer listen to their internal clock. An intelligent lighting control system based on circadian rhythms counters this. Large-format luminaires and brightened ceilings: a biologically effective illumination method, supports the well-being of humans at the workplace, makes them more alert and more focused, and helps to prevent phases of exhaustion and tiring. This function is particularly important during the winter months which feature less light.

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APPLICATION - Health

Light for health & well-being

For the sick or infirm, light can be like a medicine. To date, only the surface has been scratched with regard to opportunities to apply Human Centric Lighting solutions within the healthcare and care sectors. Hospital stays can be lengthy with patients only rarely going outside, or not at all. An illumination based on the circadian rhythm can counter this, both in general hospital operation and intensive care units where healthy light can additionally promote recovery. The impact of illumination is gaining importance in the support of natural sleep/wake rhythms of dementia patients in nursing homes.

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Because lighting profoundly affects numerous levels of human functions such as vision, circadian rhythms, mood, and cognition, its implicit effects on learning and classroom achievement cannot be dismissed. Several studies have addressed how the quality and colour of lighting can either impair or enhance students visual skills and thus, academic performance. Visual impairments alone can induce behavioural problems in students, and the level of concentration and motivation in the classroom.

Through the careful control of LEDs illuminance levels, colour temperature and direction of light, it is possible to positively alter the mood of pupils to help create an environment that is conducive to learning. Research carried out by scientists from the early 1990’s right up to the present day, has in fact found what needs to be addressed in terms of lighting control in order to create a more productive environment.

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