

## Measuring and characterising light and lighting for human health

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<b>University:</b>	TUM
<b>Level:</b>	BA3, BA4, MA all years, PhD
<b>Teaching mode:</b>	blended: mostly online, but presence on campus required in certain period
<b>Instructor(s):</b>	Manuel Spitschan

### Short description

Light is fundamental for human health and wellbeing. The eye contains specialised photoreceptors that sense short-wavelength light and signals environmental light intensity to the circadian clock. This course will focus on methods for characterising light and lighting for human health.

### Full description

Light impacts human health and well-being profoundly. Light-sensitive cells in the back of our eye signal to the brain during night or day, thereby synchronising our physiological rhythms to the environment. Notably, when we are exposed to light at the wrong time, this can have negative physical and mental health consequences.

In recent years, the metrology of optical radiation has been overhauled to include these so-called "non-visual" effects of light. Rather than just quantifying (il)luminance or colour, melanopic quantities have been introduced, which relate physical measurements of light to its effect on human physiology and behaviour.

This course will introduce concepts for measuring and characterising light and lighting in the context of human health. Specifically, the focus will be on measurement geometries, photometry, colorimetry and the recent International Standard CIE S 026/E:2018.

### Learning outcomes

At the end of the course, the learner will be able to describe fundamental concepts in the measurement of optical radiation, apply metrics and quantities that relate physical measurements to physiological responses, and develop measurement protocols and concepts to measure the impact of light and lighting on human health.

## Recommended in particular for students of the following study programmes

Lighting engineering, psychology, neuroscience, architecture

### General information

<b>Contact hours per week:</b>	12 hours (online, 1h/week) + 30 hours (summer school)
<b>Total workload:</b>	72 (in student hours for the whole course)
<b>ECTS credits:</b>	3
<b>Language:</b>	English
<b>Course start date:</b>	17 April 2023
<b>Course end date:</b>	04 August 2023
<b>Add. info about start date:</b>	
<b>Weekly teaching day/time:</b>	12 hours (online, 1h/week) + 30 hours (summer school 31 July-4 August 2023)
<b>Time zone:</b>	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
<b>Further information:</b>	12 hours (online, 1h/week) + 30 hours (summer school 31 July-4 August 2023)
<b>Prerequisites:</b>	Basic knowledge of optics, linear algebra
<b>Activities and methods:</b>	Lectures, Lab-work, Self-study, Exercises, Tutorial sessions, Prerecorded lectures available on Moodle, intensive in-person summer school
<b>Presence on campus:</b>	Practical work week at TUM in the format of a summer school 31 July-4 August 2023

### Final examination

<b>Form:</b>	project
<b>Date:</b>	
<b>Location/format:</b>	on campus of home institution
<b>Re-sit possibility:</b>	yes
<b>Transcript available:</b>	TUM will issue an official certificate indicating the number of ECTS, grade and workload instead of a transcript of records.
<b>Add. info/requirements:</b>	

## Registration

To register for this course, follow the registration requirements of your **home university** as specified here: [www.euroteq.eu/courses-registration](http://www.euroteq.eu/courses-registration).

## Administration

**Number of places:**

**Minimum participants:** 5

**Internal course code:**

**Contact:** [euroteq.mobility@xzv.tum.de](mailto:euroteq.mobility@xzv.tum.de)

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*This course is part of the EuroTeQ Engineering University joint course catalogue 2023. This is a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit [www.euroteq.eu](http://www.euroteq.eu) or get in touch with the above-mentioned point of contact.*