

Measuring and characterising light and lighting for human health

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

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

Final examination

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

Registration

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

Administration

Number of places:

Minimum participants: 5

Internal course code:

Contact: euroteq.mobility@xzv.tum.de

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