



Researching Lighting in the Built Environment: Techniques, Forms, and Effects

*KTH School of Architecture, Division of Lighting Design
March – October 2023; Course Credits: 7,5 credits*

Introduction of course content

Researching the intangible medium of light and lighting in the built environment means working within a field that spans different disciplines. Lighting related research calls for an understanding of the technologies available to create and shape the qualities of light in space as well as of the effects that different lighting qualities have on experience, perception, and behavior in architectural and urban contexts. This requires the engagement with research methods and objectives from different disciplines that shape lighting practice, while also building the confidence to follow, and further develop, an architectural, design-based research approach.

In 5 modules, this course will address and discuss motivations, approaches, and techniques to research light and lighting within the context of informing architectural and urban design.

Generally, the objective is for this course to provide tools to support doctoral students in their own research journey and projects. The course aims to help the participants to define and communicate their own research approach more clearly within this interdisciplinary field and discuss their projects and methods. Another goal is to encourage reflection on how the students' own interests relate to the larger context of the discipline, and to further strengthen and elevate the theoretical and practical foundation of research methods in this diverse field.

Prerequisites

The course is targeted at doctoral students in fields related to designing and evaluating lighting in the built environment. To follow the course a student must have completed a Master's degree in Lighting Design, Architecture, or a related field, or have an equivalent level of education. Priority is given to students enrolled at KTH or as doctoral students in architecture-related programs at other universities.

Intended learning outcomes

This specialization course aims to:

- Introduce basic concepts, methods and reference in the subject area
- Further delve into studies of central works within the subject area
- In essay or project form develop an application in relation to one's own planned or ongoing research project

On completion of the course, participants should be able to:

- Describe and discuss concepts, approaches, methods, techniques and references within architectural/urban lighting-related research in different traditions/disciplines and critically assess them in relation to aims and knowledge produced
- Critically reflect on their own research practice within the broader, interdisciplinary context of architectural/urban lighting research, and describe and discuss its relationship to lighting practice and application

Course Assignments and Examination

The course is graded P/F based on three parts:

- Module Preparations: Assignments in preparation for each of the five modules
- Attendance (at least 80%): Active participation in class activities (lectures, discussions, group work and workshops)
- Individual Assignment: Preparation of a conference contribution proposal, situating/positioning their own research project within the larger research context of "lighting in the built environment" (to be submitted for consideration to a conference, e.g., Light Symposium 2023). The deliverables consist of a written paper, a final presentation, and the discussion of fellow students' work.

For a passing grade, the participant must have completed the given assignments at an accepted standard and have attended at least 80% of the scheduled course gatherings.



Teachers

Course responsible and examiner:

Ute Besenecker (<https://www.kth.se/profile/uteb>), ute.besenecker@arch.kth.se, +46-73-276-0104

Course contributors include:

Craig Bernecker (<https://www.newschool.edu/parsons/faculty/Craig-Bernecker/>)

Katja Bülow (<https://adk.elsevierpure.com/en/persons/katja-b%C3%BClow>)

Ellen Hanssen (<https://vbn.aau.dk/en/persons/118179>)

Hillevi Hemphälä (<https://portal.research.lu.se/en/persons/hillevi-hemph%C3%A4l%C3%A4>)

Mette Hvass (<https://vbn.aau.dk/en/persons/138302>)

Ted Krueger (<https://www.arch.rpi.edu/2011/10/krueger-ted/>)

Johannes Linden (<https://portal.research.lu.se/en/persons/johannes-lind%C3%A9n>)

Siobhan Rockcastle (<https://archenvironment.uoregon.edu/directory/architecture-faculty/all/srockcas>)

Thomas Schielke (<https://www.linkedin.com/in/thomasschielke/?originalSubdomain=de>)

Karolina Zielinska-Dabkowska (<https://mostwiedzy.pl/en/karolina-zielinska-dabkowska,409111-1/bio>)

General Instructions and Schedule

The course is structured into 5 Modules. All modules will start at 9:30 CE(S)T on Thursday mornings and end on 12:00 noon CE(S)T on Fridays. Please note that on March 26th Sweden will change to summertime.

Each module will be composed of lectures with related discussions, group workshops, and presentations; preparatory readings will be made available in advance of each module. These are related to the respective module course activities, and all participants should read the assigned texts before the start of the modules.

The course will be held in person at the KTH Lighting Design Division, Seminar Room “Aristoteles” at Teknikringen 76, 3rd Floor (Entrance Level). For participants who are unable to attend on location, a zoom option is available using the following link: <https://kth-se.zoom.us/j/6903179854>. Please note that it is strongly recommended to attend, at least, Modules 2 (April) and 5 (October) in person at KTH, as those will include off-campus activities.

We will use KTH OneDrive for accessing, storing, and exchanging materials. You will receive an email with the access link, access will be linked on your email.

Schedule overview:

- **Module 1 (16-17 Mar 2023), in person with zoom option:**
 - Introduction and overview to research in architectural and urban lighting (selected examples from lighting research in different fields)
- **Module 2 (27-28 Apr 2023), in person:**
 - Techniques to develop knowledge in lighting design, e.g., collecting, analyzing, and describing information
- **Module 3 (11-12 May 2023), in person with zoom option:**
 - Researching lighting-related experiential phenomena as driver and “form giver” for design
- **Module 4 (7-8 Sep 2023), in person with zoom option:**
 - Researching lighting-related sustainability aspects as driver and “form giver” for design
- **Module 5 (5-6 Oct 2023), in person:**
 - Final Forum: Presentation and discussion of work produced during the course



MODULE 1: Research in architectural and urban lighting, 16-17 Mar 2023

The course will be held at the Lighting Design Division at KTH, Seminar Room “Aristoteles” at Teknikringen 76, 3rd Floor (Entrance Level). For participants that are unable to attend on location, a zoom option is available: <https://kth-se.zoom.us/j/6903179854>

SCHEDULE

Thursday 16/3, 9:30 – 17:00 CET

- 9:30 - 11.10 Introductions (course, participants, and module)
- Welcome and Introductions
 - Topic Overview: Ted Krueger and Ute Besenecker (readings #1 and #2)
- 11.15 - 12.15 Lecture and discussion: Karolina Zielinska-Dabkowska (reading #3)
- 13:30 – 14:30 Lecture and discussion: Mette Hvass (readings #4 and #5)
- 14:45 – 15:45 Lecture and discussion: Johannes Linden (reading #6)
- 15.45–17.00 Group Workshop Module 1

Friday 17/3, 9:30 – 12:00 CET

- 9:30 - 10.30 Group Workshop Module 1 (continued)
- 10:30 - 11.30 Group Presentations/discussion of workshop outcome with all participants
- 11:40 - 12.00 Summary and Closing Module 1, preview Module 2
- Recommended, optional, activities on Friday afternoon:
- 13.15-15.30 KTH Architecture Higher seminar series (Elizabeth Calderón Lüning, PhD thesis seminar, KTH Architecture, 6th Floor seminar room A608)

LITERATURE / READINGS (to read before Module 1)

Pre- module readings for module topic and related discussion

1. *Krueger, T., & Besenecker, U. C. (2019). Design-Based Research in Relation to Science-Based Research. In Design Cybernetics (pp. 137-151). Springer, Cham.*
2. *Hansen, E. K., & Mullins, M. (2014, September). Lighting Design: Toward a synthesis of science, media technology and architecture. In Fusion: Proceedings of the 32nd eCAADe*

Pre- module readings for lecture sessions and related discussion

3. *Pérez Vega, C., Zielinska-Dabkowska, K. M., Schroer, S., Jechow, A., & Hölker, F. (2022). A systematic review for establishing relevant environmental parameters for urban lighting: Translating research into practice. Sustainability, 14(3), 1107.*
4. *Hvass, M., Van Den Wymelenberg, K., Boring, S., & Hansen, E. K. (2021). Intensity and ratios of light affecting perception of space, co-presence and surrounding context, a lab experiment. Building and Environment, 194, 107680.*
5. *Hvass, M., Waltorp, K., Hansen, E.K. (2022). Lights out? Lowering Urban Lighting Levels and Increasing Atmosphere at a Danish Tram Station. Lighting Design in Shared Public Spaces edited by Shanti Sumartojo. Routledge. Published May 2022*
6. *Lindén, J., & Dam-Hansen, C. (2022). Flicker – a technological overview*