



An interdisciplinary course for graduate and postgraduate students

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Abstract

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The course Colour – Light – Space at the Aalto University School of Arts, Design and Architecture, aims at disseminating an in-depth understanding of the possibilities and role of colour and lighting in the built environment. Central pedagogical methods are learning-by-doing, real-life cases and collaborative learning. Lectures are based on past and ongoing research and scientific literature on the subjects of perception and experience of colour and light in space. The main assignment of the course is a real, on-going architectural project on which the students can test and develop their skills in colour design. Other assignments involve visual and multisensory analyses of existing spaces, their atmosphere and sense of place. These assignments are supported by lectures by colour and lighting experts and excursions to companies and urban environments.

Keywords: Architecture, Education, Colour, Light, Space



Figure 1. Analysis of the Lauttasaari metro station, Helsinki 2018. Anna Akins (BA student in interior architecture), Lotta Harjula (BA student in architecture) and Juhana Havas (BA student in landscape architecture).

The groups were mixed, with students from architecture, interior architecture and landscape architecture. This way the students benefited from a co-learning experience involving different viewpoints to spatial design. Photography, written descriptions as well as measurement and documentation of colours materials and surfaces with NCS and other available means were used in the analyses.

The students' observations of the factors affecting the perception of architectural colour and lighting support the findings of Karin Fridell Anter (Fridell Anter 2000). The PERCIFAL questionnaire and method were found especially useful for describing the light and shade and reflections in various materials and their orientations in the metro stations.

Background

Colour and lighting are multidisciplinary subjects that transcend traditional disciplinary borders and are therefore often left without a home in the educational structures of university programmes and curricula. Finnish education in architecture and spatial design is no exception; courses in colour or lighting tend to be ad-hoc and subject to individual teachers' interests in these areas. Colour and lighting education therefore often lacks continuity and a solid grounding in research. The Course Colour – Light – Space addresses this need and aims at disseminating an in-depth understanding of the possibilities and role of colour and lighting in our built environment. The course is taught by two teachers, up to five visiting lecturers with excursions to indoor and outdoor spaces of interest from the colour and lighting perspective.

The course aims at an experience-based and holistic approach to the built environment. Central pedagogical methods are learning-by-doing, real-life cases and collaborative learning. Lectures are based on past and ongoing research and scientific literature on the subjects of perception and experience of colour and light in space (Arnkil 2007, Arnkil 2015, Fridell Anter 1999, Klarén 2013, Böhme 2016, Pallasmaa 2016, Fridell Anter & Klarén 2017).

Colour – Light – Space

Theory and practice combined

The students are given three assignments at the beginning on which they work throughout the 12-week span of the course. During this time, the course meets once a week for a full afternoon of lectures, excursions, critiques or discussions. In between the classes the students work individually or in pairs and small groups. The scope of the course is 4 ECTS (European Credit Transfer System points) and most of the students take other courses alongside this one.

Assignment 1: Architectural colour design

Assignment 1 is based on a real, on-going architectural project in which the students can test and develop their skills in colour design. This assignment is chosen and specified in collaboration with a company and architects who provide the drawings and necessary details for colour planning. In spring 2017 the task was a residential project in northern Helsinki by Ark-House Architects, consisting of five connected six-story condominiums. In 2018 the students worked on a project by SARC Architects and SRV building contractors: four new skyscrapers which are to be built in the Keilaniemi area in Espoo (Figs. 3 and 4).

Assignment 2: Analysis of atmosphere

Assignment 2 is designed to prepare and give support for doing Assignment 1. It involves the visual and multisensory analysis of existing spaces, their atmosphere and sense of place. In 2017 the atmosphere analysis comprised four outdoor spaces and two interiors. In 2018 the locations were five new stations along the newly opened westward extension of the Helsinki metropolitan area metro line. One of the stations is located in between the Keilaniemi towers of assignment 1. The students studied the experience of spatial flow in the underground spaces, the escalators and overground station areas. They had to devise their own method of describing and conveying to others the interrelation of colours, lighting, space and materials. A closed Facebook site was set up, where the students could post their observations. This way the observations and measurements were immediately available to the whole group.

Lectures and excursions

These assignments are supported by a series of smaller tasks and exercises as well as lectures by the authors and visiting colour and lighting experts, covering such subjects as 1) The holistic and multisensory experience of space, 2) The quantitative and qualitative measurement and assessment of spaces, 3) Colour systems and colour tools for designers, 4) Lighting and colour: atmosphere, colour temperature and the Colour Rendering Index, 5) Architectural lighting and its latest technologies, 6) Principles and practicalities of colour design of residential areas, 7) Building conservation and historical colours of cities and buildings, 8) Indoor and outdoor paints, their technical properties, tinting systems and logic of colour charts.



Figure 2. Oulunkylä residential buildings. Sketches for façade colours, materiald and structures, 2017. Piia Jalkanen and Liisa Vuorenpää (BA students in interior architecture).

In 2017 the students produced a wide variety of designs. The site was unique in that its northeast edge was up against the main railway line. The buildings appeared very different when viewed from southwest than from a passing train or a nearby footbridge crossing the railway. The colour designs were artworks, short animations or 'flipbooks', studies of building materials, artworks on graphic concrete, double facades covered in creepers or illuminated facades glowing with colour. The main focus was on the experience of the facades in either slow or fast passing by.







19 students completed the course in 2017 and 12 in 2018. They were 7 from interior architecture, 4 from landscape architecture, 3 from architecture, 2 from art education, 1 form design and two doctoral students, one from architecture and one form art education. 13 students returned the feedback questionnaire. The talk by lighting designer Roope Siiroinen, the "colour walk" with Saara Pyykkö and the excursions to iGuzzini lighting company and Tikkurila paint factory were most often mentioned favourably. The assignments were well received throughout and were considered useful for the students' own major studies. Two of the students would have reduced the amount of lecturing on theory, and four students felt that there should have been more information and exercises on lighting. Two students would have liked more discussion on the relationship of colours to materials and textures. All in all, and considering the great variety of student backgrounds, the feedback was very positive and encouraging; it indicates that there is a great need for research-based colour and lighting education in the art, design and architecture disciplines.





In 2018 the students concentrated on the coloration and illumination of the skyscrapers' facades, the parking garage, entrance lobbies and the shared facilities in the upper stories. The towers will be built in an area near the seashore, which now contains only office buildings. It was crucial to understand how the skyscrapers alter the skyline and landscape, how they look in different seasons and weather conditions, and what it is like to live surrounded by office blocks.

In Figure 4 the point of departure was the resident's experience in the buildings' different parts and outside them. The starting point for the towers' colour and lighting design was their visual appearance in different weathers, seasons and lighting conditions. The design includes LED lighting panels which are computer-controlled to react to changes in the lighting and coloration of the sky. Ahti's design is a prime example of a careful analysis of the building's environmental and lighting conditions.

Figure 3. Analysis of façade colours in Paciuksenkaari street, Helsinki, 2017. Elka Lupunen (BA student in landscape architecture) and Linda Peuraharju (BA Student in Architecture).

In 2017 the sites for Assignment 2 were very different from each other, varying from residential areas from the 1990s and 2010s to Empire-style and Jugend quarters in central Helsinki. The students learned to employ the NCS together with photography and texts on two separate documentation tasks. They were surprised to see how different the colours looked in different ent materials such as limewash, plaster, painted concrete and wall cladding. Also the surprisingly strong effect of illumination at different times of day was noted. The systematic concentration on one site helped the students to understand not only the unstable nature of perceived colour, but also the limits and directions of change and their effect on the atmosphere of a specific place.

Paciuksenkaari, "The Red Street", built at the turn of the millennium, consists of residential buildings with façades of a variety of red-brown hues. The students documented the surfaces, materials and details of the facades with photography and studied the strong contrast of sunlight and shadow in the deep street space.

Student feedback

Figure 4. Keilaniemi towers, Espoo 2018. Ahti Launis (BA student in landscape architecture).





Figure 5. Keilaniemi towers, Espoo 2018. Jenny Jolkkonen (BA student in architecture) and Johanna Kesälä (BA student in interior architecture).

Results and conclusions

The relative freedom of the design assignment at first caused some orientation problems for the students, but each of them was able to focus on a feature or element that interested them most. Also, the students were able to immediately utilize in their design proposals the knowledge gained in the previous assignments. A thorough analysis of the projected site, its appearance in various illuminations, seasons and weathers, led to the best design results.

The lectures, excursions and assignments broadened the students' understanding of colour, light and space and their interrelation. In the atmosphere assignment, in which the students worked in groups on a single site, they learned through their own observations, the conversations within their groups and from the other groups' observations how the experience of space and its colours and illumination can be altered. They learned to describe to others the atmosphere and its changes. They learned also that each site is unique and requires the appropriate tools for analysing and communicating the experience of space and that for this more than one method or tool is always required.

'Atmosphere' was found to be an important concept for a holistic understanding of the way various design elements interact and contribute to a total experience of space. The students learned that a design task always involves both quantitative and qualitative methods and that designing spaces always means creating atmospheres. They also learnt that atmosphere is multisensory, temporal and dynamic experience.

The perception-based hands-on approach was a good way into the concepts of analysing and making of atmospheres in architecture. However, an in-depth understanding of its full significance requires more time. It was therefore decided to extend the course from 4 to 6 ECTS in order to include more reading of relevant literature.

Literature

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Above: Inspirational mood board for colour design. Jenny and Johanna developed the character and atmosphere of their design proposal with a visual and verbal concept analysis of the site. The words translate as reeds, seashore, lichen, autumn, organic and rustling.

Below: Night and daytime design illustrations for the garage wall and its adjacent street lighting. A wooden mesh structure gives a feling of warm tactility and enlivens the long garage wall. In the night, a dappled light pattern from the street lamps repeats the visual idea of the grid structure on the wall.

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