University of South-Eastern Norway

STUDY PLAN – *Master's in architectural lighting design*

Academic affiliation

- Faculty of Health and Social Sciences
- Department of Optometry, Radiography and Lighting Design

Name of study programme

- Master i arkitektonisk lysdesign
- Master i arkitektonisk ljosdesign
- Master's in architectural Lighting Design - *Light and lighting for life*

Scope and organization of the study programme

- Experience-based master's degree of 120 credits.
- Campus-based study, campus Krona
- Decentralized study at another location: Oslo
- Session-based study
- Online study with sessions
- Part-time study 30 ECTS/year

Language of instruction

- English

Funding

- 100% self-funding

Year group/study start

- 2023-2027

Admission requirements

Bachelor's degree or equivalent with an average grade of C or better. In addition, at least two years of relevant work experience is required, such as architecture, design, engineering or similar.
For admission to English-language study programs and courses, applicants must document English knowledge according to § 3 of the Regulations on admission to the University of Southeast Norway.

Objectives of the study programme

The master's program in architectural lighting design is a continuation of USN's bachelor's program in architectural lighting design. During the bachelor study students acquire basic knowledge, skills, and competences to start their career as professional architectural lighting designers. Master students will build on prior knowledge and skills and develop more advanced competences. Sustainable lighting design is the prime learning goal, and to achieve abilities to actively strive for lighting design that promotes economic, -social and ecological sustainability is essential. Master students in architectural lighting design will after graduation be part of cross disciplinary teams, as team leaders and senior designers. These functions require professional maturity, skills, and competence on advanced levels. Considerable design competence is vital, and the students will be trained in different design approaches and methods. At the same time the students are offered an opportunity to specialize in their favourite area in lighting design, under the supervision of skilled pedagogues, lecturers, and professional lighting designers.

The master's program in architectural lighting design is a design study where critical thinking and academic design are prerequisites for innovative approaches and thus sustainable solutions. The study aims at innovative lighting solutions. The students will achieve these through mixing scientific and design methods, broadening their understanding to include overlapping subject areas and professional fields, and have skills to tackle future challenges

The master's program is developed to meet future challenges in light and lighting with a strengthening bond between the practice field of lighting design and other professions, and USN.

Technological advances are driving the profession forward and new interest in IoT, human centred design, light pollution, health, biology, and sustainable urban development calls for highly qualified professionals trained in both design and academic research. As a multidisciplinary design study with strong ties to architecture and daylighting, engineering, technology, systems engineering, optometry, urbanism, and health the program answer to this demand by focusing on four major research areas: 1) Design and innovation, 2) evidence-based practice and academic design, 3) light and psychology and light and biology, and 4) sustainable lighting strategies.

The work of an architectural lighting designer is interdisciplinary, and they work in close teams with other professions. The students need to approach and understand problems from several angles and handle design processes that connect different subjects, needs and interests together.

Different stakeholders, interests and guidelines, new possibilities and awareness creates more complex frames for the future professional lighting designer. The students are trained to look for potential, design creative and intelligent lighting solutions by critically and reflectively engage themselves and fellow students in discussions and group work. The master graduates will have the ability to generate and complete advanced independent lighting design projects on a high international level and be able to communicate lighting design to both specialists and the public.

Learning outcomes

After completing the program, the students:

Knowledge

- has advanced knowledge in architectural lighting design and specialized insight into limited areas within the subject area
- has in-depth knowledge of scientific theories, evidence-based theories, and scientific methods used in lighting design
- has in-depth knowledge of design methodology, design processes and academic design within lighting design
- can apply advanced knowledge from architecture, daylighting, technology, systems engineering, optometry, environmental psychology, health, urbanism, and sustainability and combine and utilize it on new areas and innovative ways in lighting design
- can analyse professional issues in lighting design based on the subject area's history, traditions, uniqueness, and place in society

Skills

- can analyse and critically relate to articles, laws, regulations, norms, and guidelines within lighting design, and apply these to structure and formulate professional reasoning
- can analyse and critically relate to ideas, concepts, plans and strategies within lighting design and related subject areas, and apply these to structure and formulate lighting-professional reasoning

- can analyse plans, sections, elevations, and facades and read these critically to structure and formulate professional reasoning
- can analyse existing theories, methods, processes and interpretations within lighting design and related disciplines, and work independently with practical and theoretical lighting solutions
- can use relevant methods for research and development in lighting design in an independent way
- can use design methods and reflections in professional development work in an independent way
- can use various design tools and software in independent development projects
- can carry out independent research or development projects and write / carry out a master's project in architectural lighting design under supervision and in line with current research ethics norms

General competence

- can analyse relevant professional and research ethics issues in lighting design
- can apply their knowledge and skills in new areas of lighting design and carry out advanced work tasks and projects individually and in groups
- can reflect on their own practice and implement new knowledge and skills in lighting design in their own work and workplace
- can convey extensive independent work and master various forms of expression and visualization in lighting design
- can communicate about professional issues, analyses, and conclusions in lighting design, both with specialists and to the public
- can design advanced architectural lighting design and contribute to innovation and innovation processes within lighting design and associated disciplines.

Structure and completion

The master's program is organized around four central domains. The four pillars and research areas are: 1) Design and innovation, 2) evidence-based practice and academic design, 3) light and psychology and light and biology, and 4) sustainable lighting strategies. The students can specialize by selecting elective courses and emphasising a chosen research area and/or professional discourse in the master's thesis.

Tabel 1. Study model

Study model		
Specialisation		
	Autumn semester	*Spring semester*
1. year	Lighting fundamentals, 1 Design and innovation	2 Evidence-based practice, 3 Light and psychology
2. year	3 Light and biology, 2 Academic design and reflective practice, 4 Sustainable light strategies	Elective courses
3. year	4 Sustainable light strategies, 2 Protocol, 2 Quantitative methods	1 Experimental lighting design, 2 Protocol 2, Qualitative methods
4. year	Master's thesis	Master's thesis

Tabel2. Courses and structure

The table shows in yellow: Light modules, green: Elective subjects and white: Common method subjects

Sem.	Season	Modules and courses, SUM 15 ECTS				
1	Autumn	Lighting fundamentals - 5 ECTS	Lighting design methodology, methods, and processes - design thinking - 5 ECTS	Lighting design innovations - 5 ECTS		
2	Spring	Light and psychology - 5 ECTS	Evidence based practice -10 ECTS			
3	Autumn	Light and biology - 5 ECTS	Academic design and Reflective practice 5 ECTS	Sustainable light strategies, Social and economic - 5 ECTS		
4	Spring (Electives)[1]	Ecological management, governance practices and lighting – 10 ECTS (7,5-2,5)	Universal lighting design 1 – 5 ECTS,	Fundamentals of system engineering – 10 ECTS (7,5-2,5)	Internship – 15 ECTS	Exchange – 15 ECTS
5	Autumn	Sustainable light and lighting – ecology and light pollution- 5 ECTS	Thesis preparation, protocol, project description 1 – 5 ECTS	Quantitative research methods (statistics) - 5 ECTS		
6	Spring	Lighting X design - 5 ECTS	Thesis preparation, protocol, project description 2 – 5 ECTS	Qualitative research methods OR Advanced statistics – 5 ECTS		
7	Autumn[2]	Lighting Design master project - 15 ECTS				
8	Spring	Lighting Design master project - 15 ECTS				

The table above shows the course structure in the experience-based master's program. The students totally spend 4 years and are credited 120 ECTS. Each semester consists of courses that give a total of 15 credits. In the fourth semester, students can choose elective courses and combinations of courses. Two of the courses are 15 ECTS, two 7.5 + voluntary assignment of 2.5 ECTS totally 10 ECTS, and one course of 5 ECTS. Students can go abroad on exchange, complete an internship within a company, complete two 7.5 ECTS courses, or one of the courses of 7.5 + assignment (2.5) and the course of 5 ECTS.

[1] Elective courses in semester 4 are to be individually chosen to reach 15 ECTS

Tabel 3. Courses, ECTS, semester, place - learning activity, compulsory work, exam, and sum ECTS
The table shows in yellow: Light modules, green: Elective courses, and white: Common method subjects

MODULES/COURSES	ECTS	SEM.	ORGANIZED ACTIVITIES	COMPULSORY WORK	EXAM	SUM ECTS
MODUL 1, ALDF22 - Lighting fundamentals	5	1st	Seminar and studio work Krona, digital knowledge base	Multiple projects; Portfolio	Portfolio assessment	15
MODULE 2, ALDD22- Lighting design methodology, methods, and processes - design thinking	5	1st	Seminar and studio work Krona, digital knowledge base	Written hand-in	Oral examination with presentation on screen	
MODULE 3, ALDI22- Lighting design innovations	5	1st	Seminar and studio work Krona, digital knowledge base	Written hand-in	Written project report, with oral presentation	
MODULE 4, ALDLP22 - Light and psychology	5	2nd	Seminar Krona or external company	Workshop with written report	Home exam	15
COURSE, ALDEP22/MEBP019 - Evidence based practice	10	2nd	Seminar Krona	Written individual work. Oral presentation based on group work	Individually written paper	
MODULE 5, ALDLB22 - Light and biology	5	3rd	Seminar Krona or external company	Written hand-in	Home exam	15
MODULE 6, ALDA22 - Academic lighting design and Reflective practice	5	3rd	Lectures, group work, group discussions, fellow student feedback, presentations	Written hand in	Oral examination with presentation on screen	
MODULE 7, ALDSU122, Sustainable light strategies - Economic and social	5	3rd	Resource lectures, large scale urban light analysis on paper and PC/Mac, site visits in urban areas	Report hand in and presentation	Oral examination with presentation on screen	
Elective courses in semester 4 are to be individually chosen to reach 15 ECTS						
COURSE, ALDEC22 - Ecological management, governance practices and lighting	7,5 + 2,5	4th	Digital seminars + site visit	Course participation	Written home exam (+individual project hand in)	15
Module 8, ALDUU122, - Universal design	5	4th	Lectures, project work, practical exercises	Portfolio assignments	Portfolio submission	
COURSE, SEFS6102 - Fundamentals of system engineering	7,5 + 2,5	4th	Lectures, discussions of papers, case studies, video	Oral presentation	Written project (+individual project hand in)	
INTERNSHIP, ALDIN722 for lighting designers in exp. program	15	4th	Work experience at professional business company	Mandatory activity and attendance required at workplace	Internship period is evaluated, and written report is graded	
EXCHANGE, ALDEXC722	15	4th	N/A	N/A	Exam at location	
MODULE 9, ALDSU222, Sustainable light and lighting – ecology and light pollution	5	5th	Resource lectures at Krona and external company, light analysis, and site visits	Written hand in and presentation	Oral examination with presentation on screen	15
COURSE, ALDTH122/ MRES019, Thesis preparation, protocol, project description	5	5th	Lectures, seminars, group work and mentored workshops	Theme demarcation through literature search and overview. Detailed method description	Written home examination without invigilation	
COURSE, ALDQU22/ MANA019 (1) - Quantitative research method	5	5th	Lectures, online seminars, group work and mentored workshops	Assignments with oral presentations	Written home examination	
MODULEX, ALDX22 Lighting x design	5	6th	Intro seminar Krona, group- and individual work	Presentation	Project with presentation	15

COURSE, ALDQL22/ MANA019 (1) - Qualitative research method OR MSTA4010 – Statistics		5		6th		Lectures, online seminars, group work and mentored workshops		Written hand in		Written home examination	
COURSE, ALDTH222/ MRES019, Thesis preparation, protocol, project description		5		6th		Lectures, seminars, group work and mentored workshops		Theme demarcation through literature search and overview. Detailed method description		Written home examination without invigilation	
MODULE 11, ALDTH322/ MPRO5001 – Lighting Design master project		15		7th		Seminars with lectures, oral presentations, prepared fellow student responses and academic discussions		Written hand in		Monograph of approx. 15.000 words, excluding summary, table of content, tables/figures, references, tables, quotes	15
MODULE 12, ALDTH422/ MPRO5001 – Lighting Design master project		15		8th		Seminars with lectures, oral presentations, prepared fellow student responses and academic discussions		Written hand in		Monograph	15

Rating:

Applicants are ranked in accordance with § 4 Regulations on admission to the University of Southeast Norway, and Section 8 of the same regulation.

Application deadline:

The first group of students to the Master's in architectural lighting design will be admitted for studies commencing autumn 2023.
The application deadlines follow § 19. Application deadlines in the Regulations on admission to the University of Southeast Norway.

Scope of work:

At the Department of Optometry, Radiography and Lighting Design – IORL, 26.7 hours of work is expected for each credit and our part-time students will work 801 hours per year to be awarded 30 ECTS. Most of our "modules" (ordinary light subjects) are 5 ECTS (133.5 hours) and are in accordance with § 3-2. Regulations on studies and examinations at the University of Southeast Norway is regulating the students' scope of work, in § 3-1: A year of full-time study is standardized at 60 credits and corresponds to approximately 1600 working hours.

Tabell 4. IORL – typical workload for students/credits awarded

Course name:	*typical* course (Arch Light Des)		
ECTS	5		
Hours/ECTS	26,7		
Total hours for this course (maximum)	133,5		
Contact hours and study time (before and after)	# Teaching	Time factor	Workload
Lectures/seminars/lab etc.	9,0	3,0	27,0
Seminars	0,0	2,0	0,0
Lectures/seminars/lab etc.	9,0	1,0	9,0
Practical training/internship		1,0	0,0
Other	0,0	1,0	0,0
Total contact hours and study time			36,0
Curriculum	# Pages	Time factor	Workload
Curriculum (articles)	30,0	3,3	9,1
Curriculum (book chapters)	20,0	5,0	4,0
Total curriculum			13,1
Assessment and exam preparation	# Assessment	Time factor	Workload
Written exam	37,5	1,0	37,5
Oral exam	0,0	1,0	0,0
Written assignments	20,2	1,0	20,2
Oral assignments	0,0	0,0	0,0
Practical assignments	0,0	1,0	0,0
Other	0,0	0,0	0,0
Preparation for exam	133,5	0,2	26,7
Total assessment and preparation for exam			84,4
Workload (hours)			133,5
Overtime (hours)			0,0
ECTS based on workload			5,00

The table above shows a typical assembly for all 5 credit courses in the program, with teaching, time factor and workload shown. In total, students will have a workload of 133.5 hours/5 ECTS course when pre- and post-work is included.

Assessment methods:

In accordance with § 6-1. Assessment methods in the Regulations on studies and examinations at the University of Southeast Norway, the program uses written examinations, oral examinations, home examinations, practical examinations, portfolio assessment, master's thesis report and presentation.

Grading system:

When assessing an examination, grades shall, as a rule, be used on a scale of five steps from A to E for passing, and F for failing, in accordance with § 6-2. in the Regulations on studies and examinations at the University of Southeast Norway. There is a requirement that compulsory work must be approved to take part in the examination and continue the study, in accordance with § 7-2 in the same regulations. Work requirements are considered approved or not approved. This is explained in further details in the relevant course plans. The same apply to mandatory activity and requirements for attendance, cf. section 7-3

Master's thesis:

In accordance with the Master's degree regulations § 6, a master's thesis with a minimum scope of 30 ECTS must be included. The scope of the master's thesis is in accordance with requirements for other master's theses at USN.

Diploma:
After completing their studies, USN issues diplomas in accordance with Act no. 15 of 1 April 2005 on universities and colleges § 3-11. The documents will be designed according to the University and College Council's templates and according to templates laid down in the Joint Student System. The diploma will also, with reference to section 7, first paragraph of the Qualifications Framework, be assigned a qualification level (Level 7)

Completed studies gives the degree Master's in architectural lighting design. The diploma will include a brief description of the study, the learning outcomes, an overview of courses, grades obtained and an explanation of the grading scale. In addition, the title of the master's thesis will be given.
The master's program in architectural lighting design is not subject to framework plans.
Internationalization and student exchange:
In accordance with the Student Supervision Regulations, § 2-2. Requirements for the study offer, we set up student exchange to universities in the Nordic countries covered by Erasmus + agreements
Student participation:
The overall purpose of the quality system at USN is students achieving the defined learning outcomes. Student participation in the program council as class representatives, close dialogue with the program coordinator, study supervisor and course coordinators are part of the quality system. The same system provides opportunity to give feedback in mid-term evaluations and final course evaluations, in addition to periodic evaluations and the *Studiebarometer*.

Learning activities

The learning outcomes is in accordance with The Norwegian qualifications framework for lifelong learning (NQF) and activities are to give the candidates knowledge, skills and competences that enable them to handle future challenges. It is in the skills and competence they will lay the foundation for a certain approach to their own work. The knowledge and not least the technology in lighting design will be constantly renewed, and the candidates will seek new knowledge and be reflective. They must work with real life projects in all subjects.

The students will learn to dialogue and discuss various aspects of light-related issues, and actively seek alternative and innovative solutions where the demands and norms of the past are no longer sustainable. Candidates will be trained to search for new theories, models from adjacent subject areas and investigate applicability in their own work. For this the students use case-based learning.

The learning activities are design to be intentional, meaningful, and useful. The students will have focus on content, they will engage in critical thinking and reflection. They will engage in discussions and group work and produce solutions to problems. Common seminars with plenary exercises at campus or external company will introduce a topic or problematic by the lecturer, and together students and lecturers will use design thinking and academic design methods to broaden the horizon to create innovative and sustainable solutions.

The students will have to use their drawing skills to communicate ideas and concepts, use PC or Mac with different software to calculate and visualize their ideas, concepts, plans and schemes. Some projects are done in real life on 1:1 scale either in labs or outdoor in Kongsberg or Oslo.

The students are trained in academic writing, and they will write text reports, written hand ins, and written exams. They will produce visual reports and combinations of written and visual reports both in mandatory work and exams. Often the written and visual work is basis for a presentation on-screen,

and the students will be trained in making presentations and presenting them for a small or large group of people.

The students will in most courses evaluate each other work both orally and/or in writing.

In some courses the students read journals in Journal Clubs where they analyse scientific articles ahead of group or common meetings. This way they reflect on novel knowledge and relate it to their own practice, while discussing with fellow students.

Some courses are done digitally, but most modules and courses require student presence to observe light phenomenon, to produce drawings and illustrations in groups.

Most courses are seminar based. The students meet at campus for three days of resource lectures, supervised work, and common discussions. Lecturers and other resource people will facilitate individual or group work and in most courses the seminars are the starting point for further advances and work done individually or in groups. The students will have to hand in compulsory work which has to be passed prior to the exam. Lecturers will give feedback on all compulsory work, either individually or in groups, by written or oral comments or remarks or a combination of written and oral feedback.

Each course plan has specific requirements for compulsory work and attendance, as a rule 80% attendance is required to pass each course and each course has one or more mandatory hand ins that is part of the requirements for participation on the exams.

The master's program in Architectural lighting design has a foundation of four research areas: 1) Design and innovation, 2) evidence-based practice and academic design, 3) light and psychology and light and biology, and 4) sustainable lighting strategies. Researchers, practitioners, lecturers, and staff members are involved in research and development – R&D in all areas.

R&D projects are based on the USN strategy and competences in the architectural lighting group, in collaboration with external partners. This secures the relevance of the projects, and master students will get novel knowledge, skills and competences structured into the program. The students are encouraged to actively seek collaboration and participation in small or large R&D projects and take an active role in specific parts of R&D projects administrated by the professors, associated -and assistant professors. Master students will have supervision through all processes and different levels and can comfortably develop independent skills in conducting increasingly complex tasks. The students will start with simpler tasks in the first semester and advance to more complex projects through the following semesters completing their studies by conducting and finalising their independent research project – the master's thesis, in semester seven and eight.

Supervised professional training

In semester four the students can choose one or more elective courses. One offer is to complete an internship within a lighting design-related company, as described in the course plan. Students are given internship guidance in the 3rd semester. The work placement last for a duration of minimum 12 weeks. The training period is graded passed/not passed by the company supervisor and must be passed before students' hand in final internship report which is graded by letters A-E (F) at USN.

Coursework requirements

Compulsory work must be presented and be passed prior to the final exam.

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Forms of assessment

In accordance with § 6-1. Assessment methods in the Regulations on studies and examinations at the University of Southeast Norway, students are assessed by written examinations, oral examinations, home examinations, practical examinations, portfolio assessment, on-screen presentations, master's thesis report and presentation.

Student exchange and internationalisation

In the study programme semester 4 facilitates a period of studying abroad for a duration of minimum 3 months. In accordance with the Study Supervision Regulations, § 2-2. Requirements for the study offer, we organize student exchange to universities in the Nordic countries covered by Erasmus + agreements. Both Aalborg and Jönköping are Erasmus + partners. USN also has a Nordplus agreement with Aalto University.

More information about relevant partner agreements for Erasmus+ and similar is available from our website - https://www.usn.no/studier/utveksling-til-utlandet/sok-om-utveksling/

Lists of partner agreements can be updated and altered during the length of the programme. Information about the possibilities for exchange through the international partners of the university college is otherwise available from https://www.usn.no/studier/utveksling-til-utlandet/.

Students interested in exchange can contact study advisers at the faculty and Section for Internationalisation to find out more about studies abroad or professional training/work placement.

In the study programme all courses are offered in English. From time to time, guest lecturers from the university college's partner institutions will also be lecturing in English.

Authorization/certification

There is no national nor international standardized authorization or certification for architectural lighting design. The graduates receive the title master's in architectural lighting design.

Relevance for further studies

Experience-based master's degrees do normally not qualify applicants for admission to PhD programs. Graduates from the experience-based master's degree inn architectural lighting receives a total of 120 credits with research preparation for doctoral programs as part of the degree. PhD programs differ and applicants are advised to contact designated programs to clarify admission requirements for PhD programs.
For PhD programs at USN see more at https://www.usn.no/phd-courses/

To apply for admission to a PhD programme, you must have funding, a subject and relevant education corresponding to a completed five-year master's degree.

In most disciplines, a five-year master's degree consists of a completed 3-year bachelor's degree (min. 180 credits) + a 2-year master's degree (min. 120 points). A good master's degree grade is required, normally minimum B. If you have a foreign qualification then you can contact NOKUT for recognition of the qualification, or a similar assessment be made in connection with the application process. Each faculty or programme may place additional demands on qualifications.

University of South-Eastern Norway

Course plan – ***Lighting fundamentals***

Course code: ALDF22 - MODULE 1
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design – IORL

Course content

A proper understanding of the fundamentals in lighting is key for professional lighting designers, specifiers, and decision makers. The course runs through necessary light and lighting parameters, terminology and technologies needed in the lighting industry. Basic energy efficiency and control systems are part of the course. The course will also give the students the necessary vocabulary and visualization techniques to communicate advanced lighting design and visual effects by light.

Prerequisites

Admission to the master's program

Learning outcomes

After completing the course, the students:

Knowledge

- have advanced understanding of what light quality and light quantity is
- have in-depth knowledge of different light sources and their properties
- have in-depth knowledge of daylight and effects caused by natural light
- have advanced knowledge of various lighting techniques, control systems and approaches in lighting design
- have in-depth knowledge of vocabulary used in lighting design
- have advance knowledge of how general, and project-specific requirements affect the choice of lighting solution

Skills

- are able to describe electrical or artificial light and daylight or natural light, different components of a light system, light source, and luminaire in advanced ways and how they work together
- are able to select appropriate luminaires from calculation programs or catalogs
- are able to perform cost calculations and life cycle analyzes of lighting systems
- are able to present advanced lighting proposals in written reports and visual presentations

Competence

- are able to select suitable luminaires, components, and control systems/characteristics for the lighting system to perform as intended
- are able to comment on daylight solutions in terms of architecture, visual surroundings and health, on an advanced level

- are able to communicate by advanced lighting terms and by lighting design vocabulary individually and in groups

Learning activities

The course consists of teaching with various learning activities. Examples of learning activities are resource lectures, project work, practical exercises, group discussions, student presentations, as well as guidance for assignments and exercises.

The student is responsible for completing all the assignments in the course and will have to exercise independent disposition of the activities within the framework of the study. It is expected that the students largely work independently and come prepared for the teaching sessions.

Coursework requirements

Compulsory assignments included in a portifolio. Compulsory work must be approved to participate in the final exam.

Compulsory activity and compulsory attendance

Students must participate in at least 80 % of the learning activities to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-3).

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

Assessment of achieved learning outcomes in the course is assessed on the basis of portfolio assessment. The portfolio must be delivered by the deadline and be complete in order to sit for the exam.

Final assessment:
During the examination period, the students must individually further develop parts of their portfolio according to established criteria. The completed assessment portifolio will then form the basis for the final assessment.

The course is graded with A-E (passed) or F (failed).

Examination support material

All Sources available

University of South-Eastern Norway

Miscellaneous

Literature (reading list)

To be announced

Approved course plan

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan - ***Lighting design methodology, methods, and processes - design thinking***

Course code: ALDD22 – Module 1
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design – IORL

Course content

The course addresses design and design processes as a prerequisite to innovation in lighting design. The students learn how proper design will meet and manage future challenges. They will be able to handle the uncomfortableness of ambiguity whilst seeking insight. They will learn how to trust the process to generate appropriate ideas and the stamina and courage to test and choose solutions that are new.
Completing the course, the students can navigate through the landscape of design theory, and choose, use, and apply the right perspective, models, approaches, and methods to handle future light-related challenges and capture and exploit potential in and outside the core area of lighting design.

Prerequisites

Admission to the master's program in architectural lighting design

Learning outcomes

After completing the course, the students can:

Knowledge

- describe different and relevant design perspectives, methodologies, models and approaches
- describe the potential in different theories used to create new designs
- explain how design theory can be used to create lighting design projects

Skills

- analyze a design challenge and use relevant design theory to approach a lighting related solution
- use appropriate design theory to create new lighting solutions, independently or in groups
- use appropriate software and hardware to communicate different kind of design

General competence

- critically analyze and apply proper design methods and academic knowledge to solve real-world problems regarding lighting
- clearly communicate, both orally, in writing, and by drawings all parts of a design process leading towards lighting design
- critically analyze and determine if, and when, to use design theory to create new lighting solutions to be a part of a bigger solution of wicked problems
- Use various theories in original combinations to solve future lighting problems.

Learning activities

The students are to engage in individual and group activities, lectures, and supervised work on and off campus. The activities will include theorizing and practice around the different methods, perspectives models and approaches withing the design field by using different techniques, tools and other procedures related to designing. The work, either individual or group, will include oral and on-screen presentations, fellow student feedback and discussions.
Lecturers will give feedback on hand ins, compulsory hand in and sensor will grade the exam.

Coursework requirements

One compulsory hand-in.

Compulsory activity and compulsory attendance

Lectures, demonstrations, practical activities, and project work may have compulsory attendance, and this is stated in the semester plan.
In the case of compulsory attendance, attendance of at least 80% is a condition for being able to sit for the examination, cf. Regulations on studies and examinations at USN § 7-3. If the requirement is not met, this means that the student automatically loses the right to sit for the examination, cf. § 7-1.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

The compulsory hand-in is graded passed/not passed and must be passed prior to the final exam.

Final assessment:
The exam is an oral examination with presentation on screen.
The final exam is assessed according to letter grades A-E (F).

Examination support material

All sources available

Miscellaneous

Key words

- Design theories
- Wicked problems
- Empathic immersion
- Problem definition
- Problem solving
- Mindset
- Creativity and collaboration
- Iteration and co-creation
- Change into the preferred

University of South-Eastern Norway

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Lighting design innovations***

Course code: ALDI22 – Module 3
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

In a situation where innovation is an imperative, some try it, and a few succeed. What do we need to know, what do we need to do and how do we implement, to really change something? And when do we really need to innovate? What is the difference in result-oriented work, and process-oriented work?

This course addresses the different lighting design and innovation strategies and the cross- and interdisciplinary knowledge in the field of design to facilitate the synthesizing of new lighting design solutions. To create new and sustainable visual experiences for people in the future, this course seeks to explore radical change in how to approach design and innovation in the process of creating novel light and lighting solutions. There is need for innovative lighting approaches, systems and technologies and the students will work on a broad range of lighting challenges. Light sources, luminaires, sensors, and control gears are natural parts of the course, as well at new materials and technology.

Prerequisites

Completed and passed MODULE 2, ALDD22- Lighting design methodology, methods, and processes - design thinking

Learning outcomes

After completing the course, the students:

Knowledge

- has in-depth understanding of different innovation strategies and their intended area of application
- has advanced understanding of innovation processes and knowledge to be able to connect light strategies with different approaches
- has advanced understanding of innovation tools to drive innovation processes in lighting design

Skills

- can describe, plan, and use in advanced ways different design and innovation perspectives, models, and approaches to run processes for change in lighting design
- can conduct in-depth analysis of lighting situations prior to innovation process evaluations
- can set up and run independently and in groups processes for lighting innovation projects

General competence

- has the capability, tools, and knowledge to use the appropriate processes to remove barriers to link the unlikely connections
- can utilize different strategies to achieve impacts for change in architectural lighting design

Learning activities

This course will consist of resource lectures, project work, group work, practical exercises, discussions, student presentations, guiding sessions, student evaluations, and other relevant exercises to learn, use, and experience the selected processes, the differences in outcome and area of application.

Coursework requirements

One compulsory hand-in. Compulsory work must be approved to participate in the final exam.

Compulsory activity and compulsory attendance

Lectures, demonstrations, practical activities, and project work may have compulsory attendance, and this is stated in the semester plan.
In the case of compulsory attendance, attendance of at least 80% is a condition for being able to sit for the examination, cf. Regulations on studies and examinations at USN § 7-3. If the requirement is not met, this means that the student automatically loses the right to sit for the examination, cf. § 7-1.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

The compulsory hand-in is graded passed/not passed and must be passed prior to the final exam.

Final assessment:
The exam is a written project report, with an oral presentation with onscreen visuals of choice.
The final exam is assessed according to letter grades A-E (F).

Examination support material

All sources available

Miscellaneous

Key words

- Design perspectives
- Design approaches
- Interdisciplinary
- Antidisciplinary
- Radical change
- Experience design
- Technology, use and misuse

- Cross function and testing
- Artificial intelligence, augmented reality, virtual reality, and internet of things
- Value proposition, Value proposition design and canvas
- Double diamond – discover, define, develop, and deliver

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Light and psychology***

Course code: ALDLP22 - MODULE 4
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

The course is focusing on cognitive and emotional responses to lighting. Light as a stimulus and cognition and emotions as responses.

Lighting is a crucial variable of any environment and lighting can help create excitement and mystery in various scenes, in films, in theater, but also in real private or public spaces. Lighting can help a person navigate through new rooms, both large and small, a park or a cityscape. Light can help create a sense of calm and peace in sacred settings, and lighting can lead to strong disapproval of a room we otherwise could perceive as appealing. Light is an essential part of visual understanding of our surrounding spaces, and it can draw attention to meaning and experiences of places.

Hue, saturation, spectral distribution, lighting effects and lighting distribution can contribute to cognitive and emotional responses, good and desired effects, or unwanted negative effects.
The students learn how to use different lighting tools, principles, and strategies in aiming at enhanced beneficial effects of natural and artificial light and lighting. The students are also encouraged to keep a critical stance towards relevant literature and findings in the field.

Prerequisites

Admission to the master's program

Learning outcomes

After completing the course, the students:

Knowledge:

- has in-depth knowledge of theories and models used to understand the relations between light and emotions and cognitive processes
- has advanced knowledge on how general guidelines of lighting facilitate different psychological effects

Skills

- can critically analyse old and novel knowledge on the field of psychological effects of light and lighting
- can refer to scientific research and use research on the field in new areas of lighting design
- can independently and in groups assess different environments and projects and identify challenges related to psychological effects and light

- can analyse in-depth lighting projects and propose justified lighting design solutions taking care of desired effects of the lighting systems, and hinder unwanted effects

General competence

- can be a critical participant in lighting design projects with focus on psychological effects of light and act responsibly and ethically towards colleagues and other participants in common projects
- in collaboration with others and individually design and clearly communicate lighting design, in projects with the aim to generate certain emotions or cognitive responses
- can professionally argue, both in writing and orally, for lighting solutions with different psychological effects
- can reflect critically on their own and others' practice in designing lighting systems, that has intentionally psychological effects or not as a goal

Learning activities

The course consists of teaching with various learning activities. Examples of learning activities are resource lectures, project work, practical exercises, group discussions, submissions, inspections, and student presentations

The student is responsible for completing all the assignments in the course and will have to exercise independent disposition of the activities within the framework of the study. It is expected that the students largely work independently and come prepared for the teaching sessions where discussions are made in groups or plenum.

Coursework requirements

Workshop with written report. Compulsory work must be approved to participate in the final exam.

Compulsory activity and compulsory attendance

Students must participate in at least 80 % of the learning activities to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-3).

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

The compulsory hand-in is graded passed/not passed and must be passed prior to the final exam.

Final assessment:
The exam is a written home exam.
The final exam is assessed according to letter grades A-E (F).

Examination support material

All sources available

Miscellaneous

Keywords

- Psychological impact of light and color
- Cognition and emotions and effects by light and lighting
- Natural and artificial light
- Gender and age and light
- Interpersonal space
- Antisocial and prosocial behavior
- From Blackwell's Visibility Level and Rea's models of Relative Visual Performance to environmental psychological theories.
- Psychological impacts: Tense, relaxed, visual clarity, spaciousness, privacy
- Psychology and mood in: Showrooms, homes, nursing homes, hospitals, schools, workplaces
- Environmental psychology and light

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Science and evidence-based practice***

Course code: ALDQ22/MEBP019
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: Department of Optometry, Radiography and Lighting Design

Course content

The course address's basic themes in science such as epistemology, evidence-based practice, methodology and ethics. The course will position students to integrate best available research evidence with their professional expertise to make better-informed decisions in their profession. The introduction to visual science and the philosophy of science will stimulate to systematic reflection on how knowledge is constructed. Evidence-based practice and introduction to quantitative and qualitative methods will stimulate to discussion on how to optimize decision-making by emphasizing the use of evidence from well-designed and well-conducted research.

The course contains: (1) Introduction to visual science and the philosophy of science, (2) Evidence-based practice, (3) Epidemiology, (4) Introduction to quantitative and qualitative methods, (5) How to critically read and evaluate the quality of scientific papers, (6) Scientific writing, (7) Introduction to research ethics, (8) Training in use of library facilities, literature searching, plagiarism, academic misconduct, citations, and reference lists.

Prerequisites

Admission to this course corresponds to the admission requirements for the master's degree.

Learning outcomes

After completing the course, the students:

Knowledge:

- have thorough knowledge of key scientific theoretical themes including evidence-based practice
- have thorough knowledge of research as a goal and process and of different types of knowledge- and research-based reasoning
- have knowledge of key concepts in epidemiology
- have knowledge of basic statistics and most common qualitative methods, including mixed methods
- have knowledge of quality criteria of research and scientific documentation
- have knowledge of research ethics and plagiarism in scientific writing, literature searching, plagiarism, citations, and reference lists

Skills:

- can analyse and deal critically upon research ethics in connection with conducting a research project
- can use basic statistical and qualitative methods
- can use technology and carry out information/data management
- can use relevant methods to gather new knowledge, to do a literature search and to generate citations and bibliography

General competence

- can apply his/her knowledge and skills for problem solving, critical thinking and empirical inquiry
- can apply his/her knowledge to develop capacities for reflection, self-evaluation, and individual effectiveness skills
- can apply his/her knowledge to develop the ability to critically assess their own and others' research, to identify the opportunities and limitations of science, and to take responsibility for how knowledge is used
- can communicate orally and in writing about academic issues, analyses, and conclusions in the field, both scientific and as a collaborator
- can contribute to improve competencies in technology-based communication (audio and video options)

Learning activities

Teaching and learning activities will include lectures, online seminars, group work and mentored workshops. Mentoring and training will involve established researchers in optometry and vision science.

Coursework requirements

- Written individual work (estimated 1000 words)
- One oral presentation based on group work with peer-review

Compulsory activity and compulsory attendance

Students must participate in at least 80 % of the learning activities to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-3). Compulsory work requirements must be approved to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-2).

Supervised professional training

None

Course expenses

Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

One individually written paper (3000 words +/- 10%). The exam paper will be assessed and graded using a scale from A-F (A is best and F is fail).

University of South-Eastern Norway

Examination support material

All (there are no limitations on support material), but the students must make sure they do not plagiarize literature own previous work or other students' work.

Miscellaneous

Teaching language is English. However, if all students who take the course speak a Nordic language, teaching may be in a Nordic language

Literature (reading list)

Click to view interactive reading list in Leganto

Approved course plan

Approved by Trine Langaas, 18.03.2021

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Light and biology***

Course code: ALDB22 – Module 5
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

The course provides students with advanced knowledge about the biological effect of light on humans, plants, and animals. Throughout the course, students will work with complex light situations where they will learn to balance the light according to positive and negative biological effects. The course also provides deep insight into phototherapy and the use of light in various treatments.

Prerequisites

Granted admission to the master's program in architectural lighting design

Learning outcomes

After completing the course, the students:

Knowledge

- have advanced knowledge of key concepts, theories, and standards within the topic of non-imaging / biological effects of artificial and natural light
- have in-depth knowledge of different effects of light on humans and other biological organisms
- have deep knowledge of and understanding of different types of phototherapies

Skills

- can independently and in groups conduct light and lighting experiments related to biological/non-imaging and phototherapy
- can analyse own trials on light and biological effects
- can initiate experiments on light and non-image effects
- can use lighting design tools, software and other relevant tools to conduct small trials on biological effects
- can present and communicate knowledge on phototherapy

General competence

- can set up and conduct investigations relevant to biological effects of artificial and natural light
- are able to reflect critically on their own and others' practice regarding lighting design in connection with biological effects
- are able to think and innovate, both individually and in collaboration with others, when it comes to designing future lighting designs adapted to biological effects of light

Learning activities
The course consists of teaching with various learning activities, such as resource lectures, external company visits, individual work, group work, workshops etc.
Students are to be present at resource lectures either at campus or at external company and take part in individual and group work supervised by lecturer. Students will conduct small scale light trials.
Lecturers will give feedback on hand ins and compulsory hand in, and sensor will grade the exam.

Coursework requirements
A written hand-in. Compulsory work must be approved to participate in the final exam.

Compulsory activity and compulsory attendance
Students must participate in at least 80 % of the learning activities to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-3).

Supervised professional training
None

Course expenses
Transport to seminars at external company. Necessary paper, cardboard, drawing and sketching tools, and other materials for the investigations and trials, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment
The compulsory hand-in are graded passed/not passed and must be passed prior to the final exam.

Final assessment:
The exam is a written home exam.
The final exam is assessed according to letter grades A-E (F).

Examination support material
All sources available

Miscellaneous
Key words

- Non-imaging features conditioned by retinal light stimulation
- Circadian rhythms
- Horticultural lighting
- Blue light hazard
- Phototherapy
- Heliotherapy, Bilirubin, and Photodynamic therapy, Seasonal effective disease
- Low level laser therapy (LLLT)

Literature (reading list)
To be announced

University of South-Eastern Norway

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan - ***Academic lighting design and reflective practice***

Course code: ALDA22 – Module 6
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

Academic design is combining academic discussions and design practices, in discourses, discussions, and debates to create something new and valuable. It is dealing with real world problems by referring both to practice, and insights from academic discussions to frame a problem situation. It can be envisioned as an experimental scientific model translated into potential action, and by that, practice.

The course will help the students through different ways of reasoning; From induction, deduction, and problem solving, to creating novel concepts, models or frameworks integrating elements from lighting practice and academic discussion.

To be reflective in one's own lighting design practice is an imperative if sustainable lighting design is the goal. Students learn how to reflect on their own professional approaches and routines and take critical stances to learn and adapt continuously. This is important with increasing complexity in lighting design projects and professional competence development

To create a reflective lighting design practice the students must look at habits, review skills and processes. They will be able to acknowledge personal potential and can strive towards personal professional goals. By thinking critically and engage in reflective questioning of their thoughts and ideas on light and lighting they will develop broader design horizons. To be more productive can be an aim for some, for others more involvement and personal engagement in their professional work is the overall goal.

Completing the course, the students can amend their work to a more reflective and critical practice, with assessments, comparisons, and evaluations through scientific design methods.

Prerequisites

Granted admission to the master's program in architectural lighting design

Learning outcomes

After completing the course, the students:
Knowledge

- has in-depth knowledge of academic design and relevant design methodologies

- can apply knowledge from different relevant fields to lighting design frameworks to create novel lighting solutions
- has in-depth knowledge of reflective practices
- can use reflections on new areas of lighting design

Skills

- can analyze the potential and benefits in academic design and other methods for a multitude of lighting design projects
- can analyze and critically relate to academic design and other design methods
- can actively and critically participate in academic discussion, problem solving and design to establish models for lighting innovations and new knowledge in the field of architectural lighting design
- can use various design tools to test design hypothesis and communicate in an independent way and as groups
- can critically reflect on own professional lighting design practice
- can analyse and reflect on existing theories, methods, processes, and routines in own practice and independently make proper adjustments
- can use active reflection in long term competence development
- can analyze and critically reflect on light-related laws, regulations, norms and guidelines and apply these to structure and formulate professional reasoning

General competence

- can apply their knowledge and skill in new areas of lighting design by means of academic design and other design methods
- can reflect on their own practice and bring new knowledge and new skills in lighting design to their own work and workplace
- can combine intuitive and analytic design processes to frame potential novel light and lighting solutions

Learning activities

Students are to be present at resource lectures either at campus or at external company and take part in individual or group work supervised by lecturer. Students will engage in discussions and fellow student feedback and hypothesis and design novel solutions on paper or digitally. They will be asked to present their individual and group work orally and on screen. Lecturers will give feedback on hand ins, compulsory hand in and sensor will grade the exam.

Coursework requirements

One compulsory work must be approved to participate in the final exam.

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

This course has one compulsory written hand in that must be passed prior to the final exam. The exam is an oral examination with presentation on screen. The compulsory work is graded passed/not passed and the final exam is assessed according to grades A-E (F).

Examination support material

All sources available

Miscellaneous

Key words

- Academic Design, in the TUDelft, K. Dorst tradition
- Research-by-Design methods, Design as research, Reflection-in-action, Practice-based design
- Mixed methods research and design
- Critical Design
- Active reflections
- Metacognitive skills
- Description of experience, descriptive reflection, dialogic reflection, critical reflection.
- Reflection-in-action/ reflection-on-action
- Past/future experience; and/or personal and professional goals
- Induction and deduction
- Problem solving or seeing the potential
- Paradoxes
- Framing: create new approaches to problem situations
- Deep design
- Objective and strategy
- Process of multiple feedback
- Complex, wicked problems
- Investigation of strategies, procedures, methods, routes, tactics, schemes and modes

Literature (reading list)

To be announced
Will include:
Dorst, K. (2015). *Frame Innovation: Create New Thinking by Design*. Cambridge: Cambridge: The MIT Press.
Dorst, K. (2018). Mixing Practices to Create Transdisciplinary Innovation: A Design-Based Approach. *Technology innovation management review, 8*(8), 60-65. doi:10.22215/timreview/1179

Approved course plan

Randi Mork – Program coordinator

University of South-Eastern Norway

Course plan – ***Sustainable urban light strategies - economic and social***

Course code: ALDSU122 - MODULE 7
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

Light and lighting systems consume between 15 – 19 percent of the global electrical power, and accounts for five per cent of worldwide greenhouse gas emissions.

55 percent of the world's population or 4,2 billion people live in cities, and the trend is increasing. Municipalities and other stakeholders want more vibrant cities, with more activities and more social interaction even after dark. Recent, awareness on light pollution and the benefits of reducing unwanted lighting has grown, even to public demands on reduction in energy consumption and negative effects of light and lighting.

In what might be considered unsolvable paradoxes new ways of approaching light and lighting design must appear, and more complex lighting design contexts calls for new knowledge, new skills, and competences to deal with future light and lighting challenges.

The students are introduced to new scientific models and research that might help them in their work. The aim is partly to broaden the scope of the term sustainable lighting, and to search for intelligent and communicative effective light and lighting solutions in light strategies.

The students are encouraged to put aside established regulations and guidelines on specifics in lighting and look at the sum of needs, objectives, functions, and desires to recalibrate our public spaces and places in terms of light and lighting design. Rather than fixing rigid lighting plans the students are asked to work on visions and missions to generate sustainable light strategies.

Prerequisites

Admission to the master's program

Learning outcomes

After completing the course, the students:
Knowledge

- has in-depth knowledge of theories and models in perception and environmental psychology used in lighting design
- has advanced knowledge on energy saving, product lifetime, recyclability, and circular economy related to light, luminaires, and lighting design
- has thorough understanding of different urban sones, functions, and lighting needs

Skills

- can independently and in groups analyse urban areas and propose new solutions
- can analyse in-depth real human lighting needs in urban areas and design new lighting solutions
- can use understanding of urban grids, navigation and way finding in analyses of lighting needs or potential
- can analyse in-depth positive and negative consequences of light and lighting in cities and propose balanced lighting strategies, -principles, -schemes, and details.
- can use lighting design tools, software and other relevant tools to communicate large scale lighting projects

General competence

- can be a critical participant in urban light design projects and act responsibly and ethically towards colleagues and other participants in common projects
- can identify which urban research methods are best suited to different lighting projects
- can independently and in groups initiate and systematically develop and plan an urban lighting design project
- can communicate urban lighting design to specialist and public

Learning activities

Students are to be present at resource lectures either at campus or at external company and take part in individual or group work supervised by lecturer. Students will conduct large scale urban light analysis on paper and PC/Mac. Site visits in urban areas. They will individually and in groups precent compulsory work on screen.

Coursework requirements

One compulsory hand in must be passed prior to the final exam.

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

Lecturers will give feedback on hand ins and compulsory hand in, and sensor will grade the exam.

This course has one compulsory hand in that must be passed prior to the final exam. The exam is an oral examination with presentation on screen. The compulsory work is graded passed/not passed and the final exam is assessed according to letter grades A-E (F).

University of South-Eastern Norway

Examination support material

All sources available

Miscellaneous

Keywords

- Light strategies
- Dark acupuncture
- Space and Place
- Nighttime experiences
- Depthmap, Space Syntax, isovist and viewsheds
- Scientific models in perception and environmental psychology
- Night light
- Energy saving, product lifetime, recyclability, and circular economy

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan - ***Ecological management, governance practices and lighting***

Course code: ALDEC22
ECTS: 7,5 ECTS + optional individual project 2,5 ECTS
Number of semesters: 1
In study plan: MALD/MCS
Language: English
Ansvarlig: Master in Ecology and Environmental Management and Master in Architectural Lighting Design

Course content

The course addresses problematics on artificial light, lighting pollution, ecological systems, and public administration. The students learn how artificial light affect various ecological systems, and how to map and perform impact assessments on possible consequences of light pollution.
Completing the course the students are able to plan different artificial lighting systems according to ecological assessments.

Prerequisites

Granted admission to the master's program in architectural lighting design or Master in Ecology and Environmental Management

Learning outcomes

After completing the course, the students:

Knowledge

- can describe what light pollution is and strategies for reducing light pollution
- know the basic visual and sensory mechanisms of animals and plants
- can describe how animals and plants are affected by artificial light
- can explain how artificial light can be utilized in managemention

Skills

- can identify and map potential positive and negative effects by artificial light on various ecological systems
- can use GIS tools in mapping and presenting challenges and opportunities in connection with light pollution and ecology

General competence

- can clearly communicate, both orally and in writing, how the consequences of light pollution on different ecosystems can be addressed.
- can critically analyze and apply available information and academic knowledge to solve real-world problems regarding lighting and ecological systems.

Learning activities
Digital seminars, project work individually and in groups, student presentations, on site analysis, evaluations and measurements.

Coursework requirements
Two compulsory hand ins must be passed prior to the exam (to receive 7,5 ECTS). An individual project hand in will give additional 2,5 ECTS.

Compulsory activity and compulsory attendance
Students must be present in at least 80% of the common activities.

Supervised professional training
None

Course expenses

Transport to seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

This course has two compulsory hand ins that must be passed prior to the final exam. The exam is a written home exam. The compulsory work is graded passed/not passed and the final exam is assessed according to letter grades A-E (F).

To receive 10 ECTS students must hand in individual project report (2,5 ECTS) related to specific lighting design issue.

Examination support material
All sources available

Miscellaneous

Literature (reading list)
To be announced

Approved course plan
Randi Mork – Program coordinator

Change description
First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Universal lighting design***

Course code: ALDUU122 - MODULE 8
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

The UN Convention on the Rights of Persons with Disabilities shall ensure that disabled people have their human rights fulfilled in the same way as everyone else. Norway signed the UN Convention in 2007 and ratified it in 2013. This means that the state is obliged to comply with what is stated in the convention. This convention is often abbreviated CRPD after the English title "Convention on the Rights of Persons with Disabilities".
Norway, also have our own Gender Equality and Discrimination Act, which makes it prohibited to discriminate against disabled people in education, working life and in other areas of society. The purpose of the law is to promote equality and prevent discrimination. Equality means equality, equal opportunities, and equal rights. Gender equality presupposes accessibility and facilitation. Lack of universal design of offers aimed at the public is considered discrimination (https://universellutforming.no/b/litt-om-universell-utforming---hva-kan-kreves)

The course teaches the students how to create and design universally designed visual environments for everyone, by advanced lighting and visual strategies.

Prerequisites

Admission to the master's program

Learning outcomes

After completing the course, the students:

Knowledge

- has in-depth knowledge of theories and models used in universal lighting design.
- has advanced knowledge on how considerations and guidelines of universal design can be taken care of as part of an overall lighting design.
- can describe factors related to lighting and vision-related conditions, which are important for creating a good visual universal environment

Skills

- can independently and in groups can assess different environments and projects and identify challenges related to universal design
- can analyse in-depth lighting projects and propose justified lighting design solutions to take care of universal design
- can use understanding of universal design to propose justified solutions for optimal visual conditions and good visual utilization and comfort in different types of light projects

can refer to relevant literature and critically analyse it

General competence

- can be a critical participant in universal lighting design projects and act responsibly and ethically towards colleagues and other participants in common projects
- can, individually and in collaboration with others, design and clearly communicate lighting design in projects based on considerations of universal design
- can reflect critically on their own and others' practice when it comes to lighting design in connection with universal design
- can professionally argue, both in writing and orally, for solutions in the field of lighting and universal design

Learning activities

The course consists of teaching with various learning activities. Examples of learning activities are resource lectures, project work, practical exercises, group discussions, work with portfolio submissions, inspections, student presentations, as well as guidance for portfolio assignments and exercises. The work with the portfolio submissions (written / project assignments, individually and in groups) will be included throughout the semester.

Coursework requirements

The student is responsible for completing all the assignments in the course and will have to exercise independent disposition of the activities within the framework of the study. It is expected that the students largely work independently and come prepared for the teaching sessions. Lectures, demonstrations, practical activities, and project work may have compulsory attendance, and this is stated in the semester plan. A portfolio is to be handed in and must be passed prior to the exam.

Compulsory activity and compulsory attendance

In the case of compulsory attendance, attendance of at least 80% is a condition for being able to sit for the examination, cf. Regulations on studies and examinations at USN § 7-3.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

Assessment of achieved learning outcomes in the course is assessed based on portfolio assessment. Folder submissions through the course are collected in an individual digital folder that can be processed throughout the semester and students can receive guidance along the way, both from the teacher and fellow students. The portfolio must be delivered within the set time and be complete in order to sit for the exam.

Final assessment:

During the examination period, the students must individually further develop parts of their portfolio according to established criteria and submit an individual assessment portfolio. The entirety of the completed assessment file will then form the basis for the final assessment in the course.

The assessment folder is graded A-E (pass) or F (fail).

Examination support material

All sources available

Miscellaneous

Relevant regulations

UN Convention
The Equality and Discrimination Act
The Equality and Anti-Discrimination Ombudsman
The Discrimination Tribunal
The Planning and Building Act
The building code

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – *Fundamentals of Systems Engineering*

Course code: SEFS6102
ECTS: 7,5 (+2,5)
Number of semesters: 1
In study plan: MSE/MALD
Language: English
Responsible: The Department of Science and Industry Systems - Systems Engineering (Industry Master)

Course content

Systems engineering is an interdisciplinary approach to design and develop a holistic problem solution considering the entire system lifecycle from ideation through disposal. It begins with eliciting stakeholders' needs in various domains to generate requirements that determine the system's functionality and architecture including eventual verification and validation of the final solution. The course provides an overview and a foundation for students and professionals to achieve an understanding of and ability to apply a core subset of concepts, processes, methods, and techniques. The course targets the needs of working professionals and students with industry practice.

Prerequisites

Master's degree entry level.

Learning outcomes

After completing the course, the students:

Knowledge

- can explain the fundamental processes, methods, and techniques for systems engineering
- can explain composition of a system, a system of systems, systems integration, systems engineering management and a systems development lifecycle
  can understand how the systems engineering approach aids in improving the quality of a system's performance throughout the system's life cycle

Skills

- can identify and prioritize the stakeholders and elicit their needs and convert these needs into requirements that will influence the design and engineering of the solution system
  can apply existing SE methods or tailor a methodology with the intention to create a process for managing the progress and outcomes of a project

General competence

- can assess and integrate multiple perspectives in order to establish the holistic systems view

- can transfer and apply the knowledge, skills, and attitude into their daily practice and projects as systems engineers
- can appreciate the importance of Systems Thinking and apply systems thinking practices

The intention is that the students should develop a mindset where they are able and willing to communicate with a diversity of stakeholders with the appropriate terminology in order to provide and receive correct information on which to base decisions.

Learning activities

The course combines traditional lectures, discussions of papers, case studies, video. The course is blending theory and practice. Participants will be exposed to numerous case studies and illustrative examples that are relevant for bigger or smaller systems. The team project will allow students to integrate their knowledge and to apply it in practice. The course is designed to facilitate the sharing of experiences among the professionals who participate in the program.

Coursework requirements

Oral presentation at the end of the course week is set as a compulsory requirement. Assessment: Approved/not approved. Students will need to achieve 'approved' in both 'coursework requirements' and 'compulsory activity and compulsory attendance' to be allowed to submit their written project assignment. An individual project hand in related to specific lighting design topic will give additional 2,5 ECTS.

Compulsory activity and compulsory attendance

Full attendance during the intensive course week is a compulsory activity. Maximum number of hours that can be missed is 4, duly justified and never on Friday (or day of team project presentations). Assessment: Approved/not approved.
Students will need to achieve 'approved' in both 'coursework requirements' and 'compulsory activity and compulsory attendance' to be allowed to submit their written project assignment.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

Final assessment

The written project, which is due between 10 and 18 weeks later, due date to be announced via Studentweb, will count for 100%.

Assessment type/scale

A-F; A (highest)- F (lowest), E is the lowest passing level

Examination support material

All sources available

Miscellaneous

Keywords
- Systems engineering introduction
- Customer & business context
- Stakeholder needs & requirements
- Architecting
- Design
- Verification & Validation
- Lifecycle Qualities
- SE Management
- Cross topics

Literature (reading list)

To be announced

Approved course plan

10.03.2021 Morten Christian Melaaen, Dean

Change description

University of South-Eastern Norway

Course plan – *Internship*

Course code: ALDIN22
ECTS: 15
Number of semesters: 1 – minimum 3 months
In study plan: MALD
Language: English
Responsible: IORL

Course content

Internship is a workplace practice, where the student is responsible for finding a company that is willing to offer an internship for 12 weeks in Norway. Internships will provide students with work experience, make students' competence visible to the business community, and connect universities and the business community more closely.

Prerequisites

Completed 3 semesters of the master's program in architectural lighting design, with ordinary or as close to ordinary credit production as possible. In the event of deviations, the matter must be clarified with the program coordinator / placement location. Normally, only one course omitted before admission to the course is accepted.

Learning outcomes

After completing the course, the students:

Knowledge:

- will have advanced insight into work experiences relevant to the academic study profile the student is pursuing
- have deep understanding of challenges related to specific subject areas

Skills:

- has gained insight and skills in practical tasks related to a real work situation
- can take active part in professional work processes and collaborations

General competence:

- gain real work experience, both in independent work and in teams with other professional groups
-

Learning activities

Work experience at professional business company for a minimum of 12 weeks. After completing the internship period, the student submits a Project Report. The project report must be prepared in accordance with the guidelines for the project report given in the course and submitted within the stipulated time.

Coursework requirements

The student must be present at the work placement for 12 weeks. Afterwards an internship report must be submitted.

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Compulsory activity and compulsory attendance

Mandatory activity and attendance required at workplace. Students follow ordinary daily operations and are part of regular projects at company

Supervised professional training

Students are allocated a professional mentor at company and have access to USN mentor on request.

Course expenses

The student must cover travel expenses in connection with the internship period. Expenses imposed on the student must be clarified with USN and place of work in advance.

Forms of assessment

The internship period is evaluated by the contact person at the internship site in collaboration with USN - as approved / not approved.
Assessment from USN: Project report is assessed and graded by examiner (A-F)
Internship and report must be passed for the course to be passed.
Student submits the project report in digital form. The final report from the client with feedback is attached. Guidance of the report will be given along the way, on the initiative of the student.

Examination support material

All sources available

Miscellaneous

N/A

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – *Outbound exchange from USN*

Course code: ALDEX22
ECTS: 15
Number of semesters: 1 - minimum 3 months
In study plan: MALD
Language: English
Responsible: IORL

Course content

https://www.usn.no/english/academics/usn-outbound-exchange/

Get an advantage when applying for a job

International experience is an advantage when you apply for a job in Norway. Two out of three job-seeking students have experienced that employer view their study abroad as a plus, shows a report from NIFU.

Exchange for a sustainable future

International cooperation is needed to be able to contribute to a sustainable world! On exchange and study abroad, you get experiences and networks that can help to see the world in a new and different way! Do you want to travel on an exchange stay, but at the same time think about your Co2 footprint? Then this site is perfect for you!

Does not have to be expensive

Norwegian citizenship can apply for loans and scholarships from Lånekassen.
You get basic support from Lånekassen, which is the same as you get here in Norway. In addition, it is possible to receive travel grants, language grants and tuition support.
Check how much you support you can get

Erasmus+ scholarship

If you travel on Erasmus+ agreements, you will receive from 410 - 610 Euro extra per month in scholarships.
Erasmus+

Sustainable travels?

If you travel abroad using environmentally friendly transport, you can receive an extra environmental grant of NOK 2,000.
Sustainable travles

Prerequisites

https://www.usn.no/english/academics/usn-outbound-exchange/how-to-apply/

All students who have been admitted to a study program at USN should be able to apply for an exchange stay. The exchange can last for one semester and is approved as part of the degree you take at USN.

Basic admission requirements

- You must have completed a minimum of 60 credits in higher education to be able to go on an exchange.
- You can only travel abroad in the semester / year that is arranged for it in the study program. Which semester you can go abroad are stated in top of this page!

Language and grade requirements

- *Language requirements*: As an exchange student, you avoid language requirements in most places. However, some of our partners still require documentation of 4 in English from High School.
- *Karakterkrav*: USN stiller ingen absolutte karakterkrav til studenter som vil reise på utveksling. Noen av våre partnere stiller likevel karakterkrav til studenter for å kunne gi opptak. Dette varierer *Grade requirements*: USN does not set absolute grade requirements for students who want to travel abroad. However, some of our partners still set grade requirements for students to be able to provide admission. This varies from partner to partner.

For more information about language- and grade requirements, see the description under each partner institution.

Prerequisites

Please note that prior knowledge may be required for certain courses you wish to take as an exchange student. If you need to document such prior knowledge, you can refer to the course description on USN's website in English in the study and course plan overview.

Learning outcomes

N/A

Learning activities

N/A

Coursework requirements

N/A

Mandatory work

N/A

Supervised professinal training

N/A

Course expenses

N/A

Forms of assessment

N/A

Examination support material

N/A

Miscellaneous

N/A

Literature (reading list)

University of South-Eastern Norway

N/A

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Sustainable light and lighting – ecology and light pollution***

Course code: ALDSU222 - MODULE 9
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

Climate change and the loss of the world's biodiversity are major challenges that also affect the lighting industry. They mean that the societies we live in must change - both to prevent further warming and further loss of nature.

CIE provides a general definition of "light pollution", a term that indicates the sum of all adverse effects caused by artificial light (CIE 2010a). Such effects can be the disturbance of ecosystems as artificial light at night affects most species, by restricting their natural habitats, changing their emigrational patterns, reproduction, and pollination, among others. In addition to the negative impact on the environment, excess light can lead to impaired astronomical observations and negative economic consequences. Negative effects of lighting are well documented, and light pollution is a growing problem since global light pollution has increased by at least 49% over a 25-year period.

On the one hand a transition to energy efficient lighting such as LED is the most straightforward and cost-effective approaches to significantly reduce the threat of global climate change, according to UN Under-Secretary-General and UNEP Executive Director. On the other hand, the use of LEDs may increase harmful light pollution and need special attention.

The students will learn about light pollution, the negative and harmful effects of light and lighting, and how to mitigate such effects. The students will get specific knowledge on how to control the light, how to specify the spectral distribution and shielding/glare. They will be able to plan future sustainable lighting systems and communicate their findings, research, and strategies to specialists as well as the public.

Prerequisites

Admission to the master's program

Learning outcomes

After completing the course, the students:

Knowledge

- has in-depth knowledge of theories on how to prevent light pollution

- has advanced knowledge on luminaries and lighting systems on the matter of light control, color temperature / spectral distribution, shielding and glare restriction
- has thorough understanding of different lighting qualities, sones, functions, and lighting needs

Skills

- can independently and in groups analyse possible light polluting systems and propose new solutions
- can analyse in-depth ecological effects of lighting
- can use understanding of complex lighting situations with different needs, effect, and stakeholders to balance and propose new lighting solutions
- can analyse in-depth positive and negative consequences of light and lighting on different actors in ecological systems and propose and design balanced lighting strategies, principles, schemes, and details
- can use lighting design tools, software, and other relevant tools to communicate on effects of light, lighting, and light pollution

General competence

- can be a critical participant in sustainable light design projects and act responsibly and ethically towards colleagues and other participants in common projects
- can identify which research methods are best suited for developing sustainable lighting further
- can independently and in groups initiate and systematically develop and plan ecological sustainable lighting design projects

Learning activities

Students are to be present at resource lectures either at campus or at external company and take part in individual or group work supervised by lecturer. Students will conduct large scale light analysis. Site visits in urban and rural areas. Students will individually and in groups precent compulsory work on screen. Lecturers will give feedback on hand ins and compulsory hand in, and sensor will grade the exam.

Coursework requirements

One compulsory hand in must be passed prior to the final exam.

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Supervised professional training

None

Course expenses

Transport to company visits and seminars at external company. Necessary paper, cardboard, drawing and sketching tools, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

This course has one compulsory hand in that must be passed prior to the final exam. The exam is an oral examination with presentation on screen. The compulsory work is graded passed/not passed and the final exam is assessed according to letter grades A-E (F).

Examination support material

All sources available

Miscellaneous

Keywords

- Astronomical light pollution
- Ecological light pollution
- Light control
- Spectral distribution
- Shielding, glare restriction
- UNEP-GEF en.lighten initiative, International Dark-Sky Association, Illuminating Engineering Society
- Model lighting ordinance
- Biophilic lighting design
- Dark sky preservation

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – *Research methods and project description*

Course code: ALDQ22/MRES019
ECTS: 10
Number of semesters: 2
In study plan: MALD
Language: English
Responsible: Department of Optometry, Radiography and Lighting Design

Course content

Development of a research project requires good thematic and methodological knowledge as well as a detailed insight into and overview of time and resource management. In this course, the student develops a project description for a research project that forms the basis for the master's thesis. The course consists of three parts. In the first part, the student performs literature search and review that is relevant for their own project. Relevant literature is compiled as a background for choice, formulation, and justification for the problem in the master's thesis. In the second part, the student deepens in the research methodology to be used in the master's thesis. In the third part, the student develops the project description based on the first and second parts. If method selection indicates, an application will be developed for ethical approval or notification to the data protection official for research, including information letter and consent form. The course contains: (1) Literature search and strategies for literature search; (2) Research design and research methods; (4) Research project protocol; (5) Research ethics and protection of subjects participating in research; (4) How to apply for and get ethical approval for research on humans; (6) How to notify to the data protection official for research.

Prerequisites

ALDEP22/MEBP019 must have been passed

Learning outcomes

After completing the course, the students:

Knowledge

- has thorough understanding of how a research project is planned and laid down in a research project protocol
- has in-depth insight into both national and international research in the field in which the student must write the master's thesis
- has advanced knowledge about the formulation of research questions and hypotheses, data collection methods, and analytical strategies in research
- has advanced knowledge of the research methodology that will be used in the master's thesis
- has advanced knowledge of research ethical considerations regarding research design that will be used in the master's thesis
- has knowledge of the application processes for REK and NSD

Skills

- can conduct systematic literature searches and produce the results of this in a summary of knowledge as a background for a problem
- can evaluate critical method and results in published quantitative research articles
- can prepare a protocol for a research project including research design, realistic schedule, and ethical considerations

General competence

- can be a critical participant in research projects and to act responsibly and ethically towards colleagues and participants in research projects
- can identify which research designs and methods are best suited to different research questions or hypotheses
- can initiate and systematically develop and plan a research project
- can use science theory and ethics in the development and implementation of research plans

Learning activities

Teaching and learning activities will include lectures, seminars, group work and mentored workshops. Mentoring and training will involve established researchers in optometry, vision science, lighting design and preferably by the one who will mentor the student for the master thesis. Feedback is given by the assigned mentor and peer-review by a fellow student.

Coursework requirements

The student must, according to the given criteria, complete and approve the following individual compulsory assignments to qualify for the final examination:

- Theme demarcation through literature search and overview, 1000 words +/- 10%.
- Detailed method description (including NSD and/or REK forms if relevant).

Compulsory activity and compulsory attendance

Students must participate in at least 80 % of the learning activities. Attendance will be registered.

Supervised professional training

None

Course expenses

All (there are no limitations on support material), but the students must make sure they do not plagiarize literature, own previous work, or other students' work.

Forms of assessment

Compulsory work requirements will be evaluated and considered to be approved/not approved.

Written home examination without invigilation: Each candidate has to submit a final project description no later than 4 weeks after the last course day. Project description should be no longer than 10 pages including figures and references (11 point minimum font size). The report will be assessed and graded using a scale from A-F (A is best and F is fail).

University of South-Eastern Norway

Examination support material

All (there are no limitations on support material).

Miscellaneous

Literature (reading list)

To be announced

Approved course plan

Randi Mork – Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Quantitative and qualitative methods***

Course code: ALDQ22/MANA019
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: Department of Optometry, Radiography and Lighting Design

Course content

Part 1 covers the most used methods for statistics analyses. In part 2, the student chooses either advanced statistics (2a) or qualitative research methods (2b).

PART 1: Statistics

Part 1 of the course gives the student knowledge about statistics and the use of statistical analytical tools. The course contains: (1) Common descriptive analysis of distribution, central tendency and estimation of variance, (2) Bivariate regression analysis and correlation, (3) Hypothesis testing and confidence intervals, (4) Sampling, (5) Statistical inference, (6) Parametric statistics including introduction to analysis of variance (one-way ANOVA), (7) Non-parametric statistics, (8) Proportions and contingency tables, (9) Use of statistics software.

In part 2 the student can choose between two alternatives: Advanced statistics, or Qualitative methods.

PART 2a: Advanced statistics

The purpose of the subject Advanced statistics is that the student gains competence in advanced statistical methodology that is applicable for further work with the master's thesis. The course contains (1) Multiple regression analysis, (2) Multi-way ANOVA, (3) Analysis of covariance, (4) Repeated measures analysis of variance.

PART 2b: Qualitative methods

The purpose of the subject Qualitative methods is that the student gains competence in qualitative research design and methodology that is applicable for further work with the master's thesis. The course contains: (1) Research considerations related to selection and recruitment, (2) Collection and analysis of data through interview and observation, (3) Text analysis - different principles (4) Quality in qualitative research, and (5) ethical considerations in the various aspects of the research process.

Prerequisites

Admission to PART 1 is the same as the admission requirements for the master's degree.
Admission to PART 2: The student must have passed the requirements for part 1 of this course.

Learning outcomes

After completing the course, the students:

PART 1 Statistics

Knowledge

- has thorough knowledge and understanding of common descriptive statistical methods of analysis, and bivariate regression analysis and correlation
- has thorough knowledge and understanding of hypothesis testing, confidence intervals, sampling, and statistical inference
- has thorough knowledge and understanding of parametric and non-parametric statistics

Skills

- can employ common statistical methods to plot and analyse data
- can perform and interpret quantitative analysis of variance
- can perform and interpret statistical hypothesis testing and estimation

General competence

- can use acquired knowledge to employ tools for most common types of statistical analyses
- can use acquired knowledge to critically assess other research where similar analyses have been applied and to understand statistical analysis of problems based on quantitative data
- can use acquired knowledge to be able to apply academic and research ethical considerations related to the implementation of a quantitative study

PART 2a Advanced statistics

Knowledge

- has thorough knowledge and understanding of statistical analysis of problems which can be based on quantitative data, and which are organized according to the general linear model
- has knowledge of multiple regression analysis included logistic regression
- has knowledge of factorial designs and analysis of variance including repeated measures

Skills

- can demonstrate understanding of analysis of statistical problems involving independent, dependent and mediated effects in linear models
- can analyse approaches to problems involving moderated effects (interaction) and problems involving non-linear connections between variables analysed with linear models
- can analyse results from designs involving repeated measures

General competence

- can use acquired knowledge to understand, reflect and act upon the need for multivariate analysis
- can use acquired knowledge to analyse and explain variance in measured variables
- can use acquired knowledge to employ tools for advanced statistical analysis and able to critically assess other research where similar analyses have been applied

- can use acquired knowledge to capable of using acquired knowledge as a basis for further research within related areas

PART 2b Qualitative methods

Knowledge

- has in-depth knowledge of essential principles and challenges in applying qualitative research approaches
- has in-depth knowledge of the collection of qualitative data with particular emphasis on interview
- has advanced knowledge of research ethical considerations in qualitative research

Skills

- can perform qualitative interviews in connection with data collection
- can analyse and interpret qualitative data, and follow basic principles and approaches to text analysis
- can consider the quality of published qualitative research

General competence

- can use acquired knowledge to identify which qualitative research designs and methods best suit different research questions
- can use acquired knowledge to apply academic and research ethical considerations related to the implementation of a qualitative study
- can use acquired knowledge to capable of using acquired knowledge as a basis for further research within related areas

Learning activities

Teaching and learning activities will include lectures, online seminars, group work and mentored workshops. Topical lectures and tutorials, including the use of software for statistical analyses, and analysis-based tasks. The tasks give students training in statistical analyses and use of tools for statistical analyses and/or training in qualitative analyses.

Coursework requirements

Students following PART 1 and PART 2a:
Two compulsory assignments with oral presentations.

Students following PART 1 and PART 2b:
PART 1: One compulsory assignment with oral presentation.
Please see other course plan for coursework requirements regarding PART 2b.

Compulsory work requirements must be approved to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-2).

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Supervised professional training
None

Course expenses
All (there are no limitations on support material), but the students must make sure they do not plagiarize literature, own previous work or other students' work.

Forms of assessment
Students following PART 1 and PART 2a:
PART 1: Written home examination
without invigilation (four hours). Counts 50% of the total grade.
PART 2a: Written home examination without invigilation (six hours). Counts 50% of the total grade.
Assessments methods in PART 1 and PART 2a are graded using a scale A-E (pass) or F (fail). Both assessments must receive a passing grade in order to pass the course. The final grade is calculated from the weighted grades of the two assessments and will appear as a single grade on the diploma.

Students following PART 1 and PART 2b:
PART 1: Written home examination without invigilation (four hours). Counts 50% of the total grade.
PART 2b: Written individual home examination without invigilation over 1 week of maximum length 3000 words +/- 10%. Counts 50% of the total grade.
Assessment PART 1 is graded using a scale A-E (pass) or F (fail). Assessment PART 2b is assessed as passed or failed. Both assessments must receive a passing grade in order to pass the course. The final grade will appear as two separate grades on the diploma.

Examination support material
All Sources available

Miscellaneous

Literature (reading list)
Introduction to Statistics
E-BOOK
David M. Lane,
Part 1 Statistics: Chapter 3: p.131-135, 140-151; Chapter 5: p.186-197; Chapter 7: p.249-265; Chapter 9: p.300-315; Chapter 10: p.329-355; Chapter 11: p.370-391; Chapter 12: p.399-411, 428-431; Chapter 13: p.448-457; Chapter 14: p.462-475, 476-494 (optional); Chapter 15: p.516-531. Part 2a Advanced Statistics: Chapter 14: p.462-506; Chapter 15: p.516-568.

(Optinal reading)
The art of statistics : learning from data
Spiegelhalter, D.J., London, Pelican, Total Pages XVI, 426 sider, 2019, isbn: 9780241398630; 9780241258767,

R Commander an introduction
Natasha A. Karp, Wellcome Trust Sanger Institute, 2014,

Using the R Commander : a point-and-click interface for R

Fox, John, Boca Raton, FL, CRC Press, Total Pages XIV, 219 s., cop. 2017, isbn: 9781498741903,

Approved course plan

Approved by Elise Dees Krekling 18.03.2022.

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Lighting X design***

Course code: ALDX22 – Module X
ECTS: 5
Number of semesters: 1
In study plan: MALD
Language: English
Responsible: The Master's program in Architectural lighting design - IORL

Course content

The letter X is often used in math to indicate a value that is not yet known. The purpose of this course is to let the students focus on a chosen specific part of light or lighting to strengthen the skills and competence in conducting practical small-scale try outs with artificial and natural light, and -materials, reflections, color, shadow, tools, technology or systems in space and place.

The students are then encouraged to test if the observations and phenomenon have scalability and potential in unexpected areas and on a larger scale. The activity is research through design and emphasis is put on the learning activities, as a source of finding the potential x, less at hitting a defined goal.

Focus is two-fold: Process and transferability. Main initial focus is hands on trials and processes. After the initial experiments students are asked to build and run prototypes when luminaires are tested, make scaled mockups of urban areas, build virtual environment for VR/AR goggles, to test transferability further.

Prerequisites

Granted admission to the master's program in architectural lighting design

Learning outcomes

After completing the course, the students:

Knowledge

- has in-depth knowledge of research by design processes and transferability related to lighting design
- can use understanding gained by practical trials on new areas of architectural lighting design

Skills

- can independently and in groups conduct practical light and lighting experiments
- can analyse own trials and experiments and initiate further tests of transferability
- can set up small scale observations, demonstrations, inspections, and investigations with artificial and natural light and different materials, -technologies, -systems, -spaces, in new ways and on new areas of lighting design
- can use lighting design tools, software and other relevant tools to conduct trials
- can evaluate the transferability potential in small scale light investigations

General competence

- can set up and conduct different practical investigations relevant to their own practice and bring new understanding to their own work and workplace
- can communicate different stages of light related trials, possible transferability, and possible applications in an independent way

Learning activities

Students are to be present at resource lectures either at campus or at external company and take part in individual or group work supervised by lecturer. Students will conduct small scale light trials, try to understand the phenomenon and observations, and continue with further practical trials to test scalability and possible real-world applications.

Coursework requirements

One compulsory work must be presented and approved prior to the final exam.

Compulsory activity and compulsory attendance

Students must be present in at least 80% of the common activities.

Supervised professional training

None

Course expenses

Transport to seminars at external company. Necessary paper, cardboard, drawing and sketching tools, and other materials for the investigations and trials, PC/Mac with sufficient software and hardware (to be announced at start of semester)

Forms of assessment

Lecturers will give feedback on hand ins and compulsory hand in, and sensor will grade the exam. The final exam is a presentation on screen. The compulsory work is graded passed/not passed and the final exam is assessed according to letter grades A-E (F).

Examination support material

All sources available

Miscellaneous

Key words

- Intuitive testing
- Practical investigations, trials, and hands on experiments
- Process and transferability
- Spiral of understanding and feasibility
- Testing light and:
  Materials, reflections, technology, systems

Literature (reading list)

Will be announced prior to start of semester in autumn 2023

University of South-Eastern Norway

Approved course plan

Randi Mork Program coordinator

Change description

First plan ALD established May 2022

University of South-Eastern Norway

Course plan – ***Master's thesis***

Course code: ALDTH322/MPRO5001
ECTS: 30
Number of semesters: 2
In study plan: MALD
Language: English
Responsible: Department of Optometry, Radiography and Lighting Design

Course content

The course is included in Master of Optometry and Visual Science and Master in Visual Rehabilitation. The Master's thesis is an independent and individual research project completed under supervision, from an approved research protocol to a master's thesis.
The theme of the master's thesis must be within the faculty's and master's competence areas and guidance capacity and be relevant to the student's profession and / or meet the student's or employer's need for academic clinical specialization.
The master thesis is a presentation of original research. The subject and research area must be described thoroughly. The research method (quantitative or qualitative) must be disseminated considering results and academic background. The results must be described, as well as interpreted and discussed and related to clinical / empirical experience. The discussion is an important part of the master's thesis. The student shows academic maturity and understanding of the research process through discussion of the subject / research background, chosen method and interpretation of results.

Prerequisites

The student must have completed and passed all common and elective subjects before the master's thesis can be completed and submitted.

Learning outcomes

After completing the course, the students:

Knowledge

- has in-depth knowledge within an area of interest related to the chosen specialization
- has knowledge of the whole process of research
- has the ability to formulate research questions within the subject area
- has the ability to analyze academic problems based on the theoretical background of visual science and lighting design

Skills

- can carry out an empirical research study in line with norms and requirements according to good scientific and ethical practice
- can present the research study in line with applicable norms, preferably as a monography or a scientific article
- can attain and critically evaluates relevant academic research literature
- can describe and discuss research and professional knowledge relevant to the subject area
- can describe and discuss the applied method of research

- can present, analyze and discuss results from the research study
- can criticize and defend results and discussion both orally and in writing

General competence

- to carry out and document a research project
- to contribute to the development of the area of specialization through research
- to critically evaluate, analyze and discuss the various parts of the research process
- to disseminate and communicate academic issues with other specialists and the general public

Learning activities

The student completes the planned research project under the supervision of the principal supervisor and possibly a second supervisor. Data is collected and analyzed with the relevant quantitative or qualitative methods, and the results are presented in a comprehensive presentation in the actual thesis. Supervised implementation of the various parts of the research process contributes to the student achieving competence in professional development and research.
The student participates in master's seminars with lectures, oral presentations, prepared fellow student responses and academic discussions. The learning activities contribute to the student being able to present, interpret and discuss results from his or her own and others' research. Participation in the master's seminar enables the student to critically evaluate, argue and evaluate theoretical models, results, and research method.
During two semesters, the student is offered 15 hours of supervision with the principal supervisor on the master's thesis. Through the master's seminars, the student also receives supervision in a group from academic staff associated with the master's program.
Prior to submitting the thesis, the student prepares required work in the form of an abstract based on the content of the thesis. This learning activity contributes to the student getting an overview of the thesis as a whole. The learning activity also contributes to the student and supervisor being able to assess whether the master's thesis is ready for submission.

Coursework requirements

1) Six weeks before the submission of the master's thesis, the students must submit a written work requirement in the form of an abstract describing the thesis (background, method, results, discussion and conclusion). The abstract should be between 250 - 500 words. The requirement abstract may be delivered and assessed a maximum of 3 times. The abstract must be considered as passed by the supervisor, for the student to submit the master's thesis. The passed abstract may be revised and reworked for submission of the master thesis. If the abstract is considered a fail, the student may not submit the master's thesis to the scheduled deadline. Submission of the master thesis must then be postponed to a later main submission.
2) Oral presentation. The assignment includes an oral public presentation of the master thesis, followed by time to answer questions from the audience. The order of the student presentations will be drawn and presented in the program for the day. The oral presentation will take place after the written thesis has been submitted, and do not count towards the grade of the thesis.

Compulsory activity and compulsory attendance

Participation in the master's degree seminars is compulsory.
During the course, the student participates in 2 master's seminars (1 seminar per semester). Each seminar may include lectures and the students present an oral presentation of parts of their research project (twice) and participate in academic and methodical discussions with academic staff and fellow students. In connection with the seminars, each student receives a fellow student's presentation of research work and must prepare orally and written critical and constructive feedback.

Students must participate in at least 80 % of the compulsory activities to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-3).
Compulsory work requirements must be approved to qualify for the final exam (cf. Forskrift om studier og eksamen ved USN § 7-2).

Supervised professional training
None

Course expenses.

Forms of assessment
During the course (over two semesters) the student works on the master's thesis which is submitted as an individual written exam without supervision.
The master's thesis is preferably written as a monography of approx. 15.000 words, excluding summary, table of content, tables/figures, references, tables, quotes. The thesis consists of four main parts: Background, method, results, and discussion. The thesis must be an integrated whole and presented in a coherent and linguistically satisfactory manner.
The master's thesis can be written in Nordic or English, depending on the master's program, and language must be agreed upon with the supervisor prior to instigation of the writing process.
The student can, by agreement with the supervisor and course coordinator, alternatively choose to write the master thesis as a publishable scientific paper (about 3000 - 4000 words) in a relevant. The article-based master's thesis should also include an in-depth written assignment. The assignment should contain 5000 words (+/- 10 %) (excluding article).
A written guide with in-depth criteria for the master's thesis is available in the online learning platform Canvas.
A committee consisting of one internal and one external examiner will assess the thesis. The Master's thesis will be assessed using a scale from A-F where A is the best grade and F is a fail.

Examination support material
All (there are no limitations on support material), but the students must make sure they do not plagiarize literature, own previous work, or other students' work.

Miscellaneous

Literature (reading list)
To be announced

Approved course plan
Approved by Elise Dees Krekling 22.03.2022

Change description
First plan ALD established May 2022