

**ILI****INTELLIGENT
LIGHTING
INSTITUTE****TU/e**

MASTER CERTIFICATE PROGRAM INTELLIGENT LIGHTING DESIGN

INTELLIGENT LIGHTING INSTITUTE & DEPARTMENT OF THE BUILT ENVIRONMENT

Light and lighting are essential elements for developing a sustainable living environment that supports the health, well-being, safety and performance of its inhabitants and is preferably aesthetically pleasing. The presence of sunlight forms the basis of life on earth, while the invention of artificial light shaped our current habitational ecological system. Due to the digitisation of lighting and its embedding in the rapidly growing fields of IoT, intelligent lighting is becoming an important element, for its potential to impact energy saving (smart buildings), safety (smart cities) and the user (health and well-being). This program prepares future engineers and designers that have the knowledge and skills to balance sustainability and user demands and optimise both.

TARGET GROUP

This program is accessible to all TU/e graduate students, and is specifically of interest to students of Built Environment, Industrial Engineering & Innovation Sciences, Electrical Engineering, Mathematics and Computer Science and Industrial Design.

We also expect interest and participation of post TU/e and non-TU/e graduates in the Life-Long-Learning program that is being set-up in conjunction with this Master Certificate Program.

A multidisciplinary program, offering a challenge-based approach to engineering and designing intelligent lighting solutions.

The program is coordinated by the department Built Environment in collaboration with the Intelligent Lighting Institute and with contributions of the departments Industrial Engineering & Innovation Sciences, Electrical Engineering, Mathematics & Computer Science, Industrial Design and innovation Space.

PROGRAM OBJECTIVES

Students that successfully completed the program:

- Gained state-of-the art knowledge on intelligent lighting systems
- Gained sufficient knowledge of the users' needs to design towards their needs
- Gained sufficient knowledge of sensing systems to design and engineer smart lighting solutions
- Can apply the above knowledge to find sustainable, smart lighting solutions for current and future users.

COMPONENTS

The program is 20 ECTS, students need to do 5 ECTS on top of their regular curriculum to receive this TU/e Master Certificate. The program is built up of one mandatory course, one defined elective (see the table on opposite page), and a multidisciplinary design and engineering challenge.

THEORETICAL FOUNDATION

All students in the certificate program follow the Lighting Technology course (7S880) to provide them with the fundamental scientific basis of lighting.

ELECTIVE COURSES

Next to the Lighting Technology course, students choose a course providing further relevant knowledge in the field of intelligent lighting. The partnering departments of ILI all offer a course that provides specific knowledge in their domain. Students can either choose to follow the course in their own department, or opt for an elective provided by the other departments. The aim for the certificate program is to have a nice balance of students with different perspectives to jointly be able to solve design and engineering challenges.

DESIGN & ENGINEERING CHALLENGE

In the Intelligent Lighting Design & Engineer Challenge students will apply the theory in a multidisciplinary challenge. They will not only learn to implement their own knowledge, but will also learn how other disciplines contribute to solving the challenge. Moreover, this challenge will also include professionals participating in the Life-Long-Learning program, so seasoned professionals learn from the fresh views of students, and students learn from the experience of professionals. The Design & Engineering Challenge completes the certificate program

COMPONENTS OF THE MASTER CERTIFICATE PROGRAM INTELLIGENT LIGHTING DESIGN

Lighting Technology 7S880 Providing a fundamental scientific basis of photometry, radiometry and colorimetry daylight and daylighting techniques, light effects on human, electrical light sources and luminaires, control types and strategies, lighting requirements and lighting applications. Students will get acquainted with the theory and will learn the evaluation and design of (indoor) lighting designs in practical assignments consisting of field measurements and computer simulations.						
Theoretical foundational course 5 ECTS						
	Theoretical course 5 ECTS (select one)	Capita Selecta Lighting Technology 7LL7M0 <i>provided by Built Environment</i>	Psychology of Light & Time 0HM200 <i>provided by Industrial Engineering & Innovation Sciences</i>	Bayesian Machine Learning & Information Processing 5SSD0 <i>provided by Electrical Engineering</i>	Internet of Things 2IMN15 <i>provided by Computer Science</i>	Design Science Methodology for Business & Product Creation 1ZM130/140 <i>provided by Industrial Engineering & Innovation Sciences</i>
	Gaining in-depth understanding on selected relevant topics in lighting technology. Students will achieve new skills by performing a systematic literature search and by applying the obtained theoretical knowledge into programming tools.	Engaging with theoretical models, critically reflect on recent empirical research and the methods and results reported there, and to formulate implications for new and innovative lighting solutions and potential applications, relating to both natural and electric lighting.	Coding new Bayesian machine learning algorithms and applying them to practical information processing problems. Students will apply the theory to an intelligent lighting application.	Gaining knowledge on IoT systems, networks and protocols, and IoT data analysis. Applying this knowledge in practical assignments. Students choose intelligent lighting related challenges for the practical assignments.	Conducting a design-science research project to link science and practice by using design as a core means of inquiry in generating knowledge for science and creating solutions for practice. Students will get a group assignment related to intelligent lighting.	Gaining an in-depth understanding of designing interactive and intelligent systems that provide users with a positive experience. The course provides theory and contextualises the theory through a (lighting related) case-based approach.
Multidisciplinary Design & Engineering course 10 ECTS (in innovation Space)	Intelligent Lighting Design & Engineering Challenge (Master Design Project 7LS0M0 Students from different master programs will work together on the design and realisation of an intelligent lighting solution (potentially in collaboration with professionals participating in the Life-Long-Learning program). In this course students will apply the knowledge gained in the theoretical courses in practice and learn to collaborate with students from other disciplines and with different backgrounds.					

Note: the red coloured course codes link to the respective pages in Osiris, but the descriptions may not (yet) reflect the link to the lighting certificate.