

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Building Services Engineering
1.3	Department	Building Services Engineering
1.4	Field of study	Civil Engineering and Building Services
1.5	Cycle of study	Master
1.6	Program of study/Qualification	Building Services for Regenerative Cities / MS Engineer
1.7	Form of education	Full time
1.8	Subject code	2.00

2. Data about the subject

2.1	Subject name	Human Centric Lighting		
2.2	Course responsible/lecturer	Assoc.prof.Ph.D.Eng. Dorin Beu - dorin.beu@insta.utcluj.ro		
2.3	Teachers in charge of seminars	Assoc.prof.Ph.D.Eng. Dorin Beu - dorin.beu@insta.utcluj.ro		
2.4	Year of study	I	2.5 Semester	1
			2.6 Assessment	Exam
2.7	Subject category	Formative category		DA
		Optional		DI

3. Estimated total time

3.1	Number of hours per week	2	of which	3.2 Course	1	3.3 Seminar		3.3 Laboratory		3.3 Project	1
3.4	Total hours in the curriculum	28	of which	3.5 Course	14	3.6 Seminar		3.6 Laboratory		3.6 Project	14
3.7 Individual study:											
(a) Manual, lecture material and notes, bibliography											15
(b) Supplementary study in the library, online and in the field											15
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays											12
(d) Tutoring											2
(e) Exams and tests											3
(f) Other activities											
3.8 Total hours of individual study (sum (3.7(a)...3.7(f)))											47
3.9 Total hours per semester (3.4+3.8)											75
3.10 Number of credit points											3

4. Pre-requisites (where appropriate)

4.1	Curriculum	Physics and Architecture elements
4.2	Competence	Use of computer (MS-Office)

5. Requirements (where appropriate)

5.1	For the course	Video-projector
5.2	For the project	Lux-meter, spectral-photometer, luminance meter,

6. Specific competences

Professional competences	<p>Lighting basics</p> <ul style="list-style-type: none"> • photometric and colorimetric quantities • lighting equipment - lamps, luminaires and control systems • interior, public and architectural lighting • knowledge of European standards in the field of lighting <p>After graduating this subject, students will be able to:</p> <ul style="list-style-type: none"> • to evaluate the current state of a lighting installation • to compare lighting solutions • to propose lighting solutions for human wellbeing, with sustainable and energy efficient solutions • to use lighting measurement equipment • to use the European lighting software DialuxEvo
Cross competences	<ol style="list-style-type: none"> 1. Use of efficient and responsible work strategies, on-time, honest and personal engagement, based on principles, norms, and ethical professional values. 2. Knowledge of team efficient work, on different hierarchy stages. 3. Use of references in a foreign language, for professional and personal development, through continuous formation and efficient adaptation to new technical specifications.

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Acquiring competence in human centric lighting, with a holistic view on the regenerative impact of this topic
7.2	Specific objectives	<ul style="list-style-type: none"> • Human Centric Lighting – impact of daylight and electric lighting on human wellbeing • Impact of night lighting on environment and solutions to reduce it • Finding regenerative lighting solutions for buildings and cities • Knowledge of European norms: EN 12464, EN 13201, EN17037, EN 1838 and SR EN 15193 • Use of software for lighting design and control

8. Contents

8.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
1. Lighting fundamentals	2	Video-Projector Teaching style based on the interactive teacher-student partnership; Presentation of case studies.	
2. LEDs and luminaires	2		
3. Wellbeing and health issues related to lighting	2		
4. Natural lighting. Luminaire design	2		
5. Lighting control systems	2		
6. Regenerative approach	2		
7. Lighting waste treatment: circular economy	2		
Bibliography			
<ol style="list-style-type: none"> 1. Van Bommel, W., Interior Lighting - Fundamentals, Technology and Application, Springer, ISBN 978-3-030-17195-7, 2019 2. Van Bommel, W., Road Lighting - Fundamentals, Technology and Application, Springer, ISBN 978-3-319-11466-8, 2015 3. Steffy, G., Architectural Lighting Design, John Wiley & Sons, 2012, ISBN 0-471-38638-3 			

4. Moran, N, Performance Lighting Design, A&C Black Publishers LTD 2007, ISBN 978-0-7136-7757-7 1. ***, 1000 Lights, Taschen, 2004, ISBN 978-3-8228-5287-3 2. Descottes,H, Ultimate Lighting Design, teNeues, 2008, ISBN 978-3-8327-9016-5			
8.2. Project	Number of hours	Teaching methods	Notes
1.Measuring illuminance, colour rendering and colour temperature	2	Site visits, role play during the projects, modeling execution, computer exercises, group project	
2.Using DialuxEvo	4		
3.Understanding the European lighting norms	2		
4.Interior lighting (from concept to site)	2		
5.Public lighting (from concept to site)	2		
6.Lighting future	2		
Bibliography 1. Norms EN 12464, 1838, 13201 and 15193 2. International journal of Sustainable Lighting – open access at www.lightingjournal.org 3. DialuxEvo software free download at www.dial.de 4. Lighting sustainable criteria's at www.usgbc.org			

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The course is supervised by ELEA – European Lighting Experts Association and Romanian Lighting Association ARI. A steering is realised by Signify Romania, Zumtobel Group Romania and Schreder Romania.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Technical content, word count, structure and critical analysis;	Mid-term exam final report grade	20% 40%
10.5 Project	Technical content, presentation and communication skills;	class activity, assignments, presentation grade	40%
10.6 Minimum standard of performance			
5 points out of 10 total points (5 min/10 max)			

Date of filling in: 23.06.2023		Title Surname Name	Signature
	Lecturer	Assoc.prof.PhD. Dorin Beu	
	Teachers in charge of application	Assoc.prof.PhD. Dorin Beu	

Date of approval in the Department of Building Services
Engineering

Head of department
Assoc.Prof.PhD.Eng. Carmen MÂRZA

29.06.2023

Date of approval in the Council of the Faculty of Building Services
Engineering

Dean
Assoc.Prof.PhD.Eng. Florin DOMNIȚA

29.06.2023