

## MODULE DESCRIPTION

**Module title:** Lighting Design and Application (LDA)  
**Module code:** 61ECE215  
**Study program:** Electrical and Computer Engineering (ECE)

### Module coordinator/Lecturer:

Type	Lecturer	Email	Office	Office hours
Lecture	<b>Dr. Bui Minh Duong</b>	duong.bm@vgu.edu.vn	B111	9:00-11:00 AM, Mon and Fri
Tutorial	None			
Lab	<b>Mr. Tran Quang Nhu</b>	nhu.tq@vgu.edu.vn	B102	None
Other	None			

**Classification:**     Compulsory     Compulsory optional     Optional/Elective

**Semester:** Winter Semester

### Student workload:

<b>Credits</b>	5	ECTS
<b>Contact hours</b>	60	AHs
<b>Assignments and independent learning</b>	90	AHs
<b>Total Working hours</b>	<b>150</b>	AHs

**Frequency:** The module is offered each academic year

**Prerequisites:** None

**Co-requisites:** None

**Applicability for other modules:** Energy Efficient Smart Lighting (EESL)

**Duration:** 15 weeks

### Course objective:

This course is to introduce the performance process and simulation tools utilized in creating and implementing a lighting design. This course, moreover, instructs students to interpret a light plot and paperwork, hang/cable/focus lighting equipment, and operate a lighting console for a production. Main contents of the course contain: introduction to the basic elements of lighting design, validation methods of lights designs, lighting design considerations, introduction to simulation tools in lighting design, different lighting designs through simulations, prevention of design/projection errors in lighting technology, calculations interior and exterior lighting (e.g. office lighting, residential lighting, lighting for agriculture and farming, road and street lighting, shop lighting, and lighting for hotels and restaurants).

### Intended learning outcomes:

On successful completion of this module, the learner will be able to:

- Be able to apply illumination engineering theory and validation methods to design the lighting for indoor and outdoor applications;
- Get insight in and make use of different simulation tools for making lighting designs;

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- Learn about methods to validate simulation models;
- Learn how to prevent design errors, and skills of presentation of ideas and design choices;
- Gain knowledge on (day)lighting applications in different domains;

### Module content:

No.	Topics
1.	Introduction to lighting design (determination of Lamp lumen output taking into account voltage and temperature variations, calculation of wattage of each lamp and the number of lamps needed, layout of lamp luminaire, calculation of space to mounting height ratio, standard recommendation and standard practices for illumination levels in various areas, special feature for entrance, staircase, corridor lighting and industrial building)
2.	Validation methods of lights designs
3.	Light and architecture
4.	Lighting design considerations (advanced lighting design)
5.	Introduction to simulation software tools (AGI 32, CalcuLuX, DIALux, Radiance, Microlux, LightCalc, Lumen Designer or Visual 3D)
6.	Lighting design through simulations
7.	Prevention of design/projection errors
8.	Calculations interior lighting (definitions of maintenance factor, uniformity ratio, direct ratio, coefficients of utilization and factors affecting it, illumination required for various work planes, space to mounting height ratio, types of fixtures and relative terms used for interior illumination such as DLOR and ULOR, selection of lamp and luminance, selection of utilization factor, reflection factor and maintenance factor)
9.	Calculations exterior lighting (terms related to outdoor lighting applications, types of fixtures and their suitable applications, selection of lamp and projector, calculation of their wattage and number and their arrangement, calculation of space to mounting height ratio, and recommended method for aiming of lamp)
10.	Office lighting
11.	Residential lighting
12.	Lighting for agriculture and farming
13.	Road and street lighting
14.	Shop lighting
15.	Lighting for hotels and restaurants

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### Learning activities:

Activities	Expectation/Explanation
<b>Attendance</b>	Students should attend 100% classes. The attendance will be checked by doing 15-minute quick tests for each lecture. <b>There is an extra point of 10% for the attendance completion.</b>
<b>Individual Assignments/Homework</b>	Every lecture has an assignment/homework. The submission deadline will be given at the end of the lecture. All works presented must meet professional standards regarding materials and format. <b>The homework occupies 20% of the total grade of the course.</b> Since it is a faculty's strong belief that a student's success is directly proportional to success with homework, it is imperative that the homework should be done. <b>No late homework will be accepted.</b>
<b>Group work</b>	None
<b>Self-study</b>	At least 3 hours per week
<b>Internship</b>	None
<b>Lab or Workshop</b>	Lab 1: Validation methods of lights designs Lab 2: Introduction to simulation software tools Lab 3: Calculations interior lighting Lab 4: Calculations exterior lighting Lab 5: Lighting applications designed by the software (including office lighting, residential lighting, lighting for agriculture and farming, road and street lighting, shop lighting, and lighting for hotels and restaurants)

### Mode of Assessment:

**Online interaction:** None

**Mini tests:** 15-minute quick tests for each lecture

**Assignments:** Every lecture has an assignment/homework

**Group project:** None

**Exam:** A final exam occupies 100% of the total grade of the course. It is a closed-book exam however students can use a cheat-sheet with the size of A4. It is very important to note that students cannot be allowed to increase the area of the A4-size paper.

Length of examination: 90 minutes

### Grading policy:

Assessment method	Percentage of total	Assessment date
<b>15-minute quick tests</b>	10% (extra point)	
<b>Assignments</b>	20% (extra point)	
<b>Final exam/Written exam</b>	100%	Followed by a VGU's timetable
<b>Total</b>	<b>130%</b>	

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Performance	German Grade	Vietnamese Grade
≥95%	1,0	9,5 – 10
≥90%	1,3	9,0 - 9,4
≥85%	1,7	8,5 - 8,9
≥80%	2,0	8,0 - 8,4
≥75%	2,3	7,5 - 7,9
≥70%	2,7	7,0 - 7,4
≥65%	3,0	6,5 - 6,9
≥60%	3,3	6,0 - 6,4
≥55%	3,7	5,5 - 5,9
≥50%	4,0	5,0 - 5,4
<50%	5,0	< 5,0

### Integrity:

Academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts".

### Module materials:

#### Required texts:

1. Mark Karlen, Christina Spangler, and James R. Benya "**Lighting Design Basics**," Willey, 2017.
2. Zelinsky Marilyn, "**Complete lighting design: a practical design guide for perfect lighting**," Quarry Books, 2006, ISBN: 1-59253-247-0,9781592532476.
3. Innes Malcolm, "**Lighting for interior design**," Laurence King Publishing, 2012.
4. Christopher Cuttle, "**Lighting Design: A Perception-Based Approach**," Routledge, 2015, ISBN: 0415731968.
5. Institution of Lighting Engineers, "**Outdoor Lighting Guide**," Routledge, 2005.

#### Recommended texts:

1. Christopher Cuttle MA FCIBSE FIESANZ FIESNA LC, "Lighting by Design," Second Edition, 2008.
2. Duco Schreuder, "Outdoor Lighting: Physics, Vision and Perception," Springer, 2008.
3. Steffen Marcus, "Residential Lighting Design," Crowood, 2014, ISBN: 9781847977571.

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Written/updated by  
**Dr. Bui Minh Duong**

Approved by head of discipline/dean  
**Dr. Thai Truyen Dai Chan**

Date: 24/06/2020

Date: ...../...../.....