MODULE DESCRIPTION

Module title: **Illumination Engineering (IE)**
Module code: 61ECE117
Study program: **Electrical and Computer Engineering (ECE)**

Module coordinator/Lecturer:

Type	Lecturer	Email	Office	Office hours (if any)
Lecture	**Dr. Bui Minh Duong** **Dr. Thai Truyen Dai Chan**	duong.bm@vgu.edu.vn chan.ttd@vgu.edu.vn	B111	9:00-11:00 AM, Mon and Fri
Tutorial	None			
Lab	**Mr. Tran Quang Nhu**	nhu.tq@vgu.edu.vn	B102	None
Other	None			

Classification: ☐ Compulsory ☐ Compulsory optional ☒ Optional/Elective

Semester: Summer Semester at **Binh Duong campus/TBC**

Student workload:

Credits	**4**	**ECTS**
Contact hours	**52**	**AHs**
Assignments and independent learning	**68**	**AHs**
Total Working hours	**120**	**AHs**

Frequency: The module is offered each academic year

Prerequisites: None

Co-requisites: None

Applicability for other modules: Lighting Design and Application (LDA); and Energy Efficient Smart Lighting (EESL)

Duration: 15 weeks

Course objective:

This course is to provide an introduction to the fundamentals of illumination engineering and architectural lighting design; and to introduce lighting fundamentals, measurement, and technology and their application in the analysis and design of architectural lighting systems.

Intended learning outcomes:

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

- Get knowledge of the fundamentals of lighting technology: from wave to energy;
- Understand parameters of lighting (commonly used photometric and colorimetric quantities to describe light);
- Perform calculations on photometric performance of light sources and luminaires for lighting design;
- Gain practical skills to do lab experiments and learn how to measure light;
- Learn how to analyze effects of (day) lighting on humans;

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Module content:

No.	Topics
1.	Light and Radiation (Radiant energy and visible spectrum, energy conversion to light, color, eye and vision; different entities of illuminating systems)
2.	Photometry
3.	Colorimetry
4.	Optic characteristics of materials (absorptance, transmittance, reflectance)
5.	Introduction to light generation techniques and light sources (incandescent, electric discharge, fluorescent, arc lamps and lasers; energy efficient lamps; luminaries, wiring, switching and control circuits)
6.	Thermal radiators
7.	Daylight
8.	Optics (eye lenses and light fraction)
9.	Eye and the sensitivity to light
10.	Visual effects of light
11.	Non-visual effects of light
12.	Light perception and experience
13.	Measuring of light and understanding consumers (definition of luminous flux, luminous intensity, lumen, illumination, lamp efficiency, brightness or luminance, laws of illumination, inverse square law and Lambert's cosine law, illumination at horizontal and vertical plane from point source, concept of polar curve, calculation of luminance and illumination in case of linear source, round source and flat source)

Learning activities:

Activities	Expectation/Explanation
Attendance	Encouraged
Individual Assignments/Homework	There is an assignment in each lecture. The students must submit their works at the end of the lecture.
Group work	None
Online Activities	None
Self-study	At least 3 hours per week

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Activities	Expectation/Explanation
Lab or Workshop	Lab 1: Photometry and colorimetry Lab 2: Optic characteristics of materials (absorptance, transmittance, reflectance) Lab 3: Light sources, thermal radiators, and optics (eye lenses and light fraction) Lab 4: Visual effects of light Lab 5: Measuring and understanding consumers

Modes of Assessment:

Online interaction: None
Mini tests: None
Assignments: None
Group project: None
Final exam: It is a closed-book exam however students can use a cheat-sheet with the size of A4 (100 points). Length of examination is 90 minutes.

Grading policy:

Performance	German Grade
≥ 95 points	1,0
≥ 90 points	1,3
≥ 85 points	1,7
≥ 80 points	2,0
≥ 75 points	2,3
≥ 70 points	2,7
≥ 65 points	3,0
≥ 60 points	3,3
≥ 55 points	3,7
≥ 50 points	4,0
< 50 points	5,0

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Module materials:

Required texts (or textbooks):

1. Craig DiLouie, "**Advanced Lighting Controls: Energy Savings, Productivity, Technology and Applications**", CRC Press, 2005.
2. D.C. Pritchard, "**Lighting**", Routledge, 2016.
3. Jack L. Lindsey, "**Applied Illumination Engineering**", PHI, 1991.
4. **IES Fundamentals of Lighting**, Illuminating Engineering Society of North America, 2009, ISBN: 978-0-87995-235-8.

Recommended texts:

1. Kao Chen, "Energy Management in Illuminating Systems", Carlsons Consulting Engineers, San Diego, California, USA, CRC Press, 1999.
2. Mark Stanley Rea, "IESNA Lighting Handbook", Illuminating Engineering Society of North America, 2000.
3. John Matthews, "Introduction to the Design and Analysis of Building Electrical Systems", Springer, 1993.
4. M.A. Cayless, "Lamps and Lighting", Routledge, 1996.

Written/updated by	Approved by head of discipline/dean
Dr. Bui Minh Duong	**Dr. Thai Truyen Dai Chan**
Date: 26/08/2020	Date: ……/……./……