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Erasmus+ Programme  
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Developing Energy Efficient and Smart Lighting  
Education in Vietnam & Myanmar (DES�)

# Introduction of DES� project and its outputs

**October 24, 2023**  
**Thu Dau Mot city, Vietnam**

# ERASMUS+ KEY ACTION 2: Cooperation for innovation and the exchange of good practices

**Through this Key Action EU aims to**

- Support modernisation, accessibility and internationalisation of higher education institutions in Partner Countries around the world
- Support the partner countries to address challenges facing their higher education systems
- Programme countries partners not only contribute to technology transfer, training and capacity building but also learn from partnership and each other's practices

**Results and outputs are intended for partner countries**

# Key Action 2: Capacity Building in the field of higher education

Grant agreement number: 2019-1993/001-001

Duration 15 Nov 2019 – 14 Nov 2023



Finland



Netherlands

*University of Ljubljana*



Slovenia



Vietnam



Vietnam



Đại Học Quốc Tế Miền Đông  
Eastern International University

Vietnam



Vietnamese - German University

Vietnam



Myanmar



Myanmar



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# Motivation

- Electricity demand is higher than supply in developing countries/ many places are unelectrified ( Myanmar 65%)
- Lighting is major consumer of electricity in developing countries (35% of electricity in Vietnam), much higher in Myanmar
- Application of energy efficient lighting systems and practices not only reduces electricity demand but also reduces CO2 emissions



# Barriers of Energy Efficient Lighting in Developing Countries

- **Informatin Barriers:** Lack of awareness and information on energy efficient lighting among professionals, public
- **Ragulatory Barriers:** lack of government interest, insufficient enforcemtnt of policies, need for more qualified personnel
- **Technology Barriers:** lack of adequately equipped and staffed independent test labs, limited experience of energy efficiency testing amongst engineers
- **Environmental and health risk perception Barriers:** concerns about quality of light, concerns about environmental impacts of electronic components used



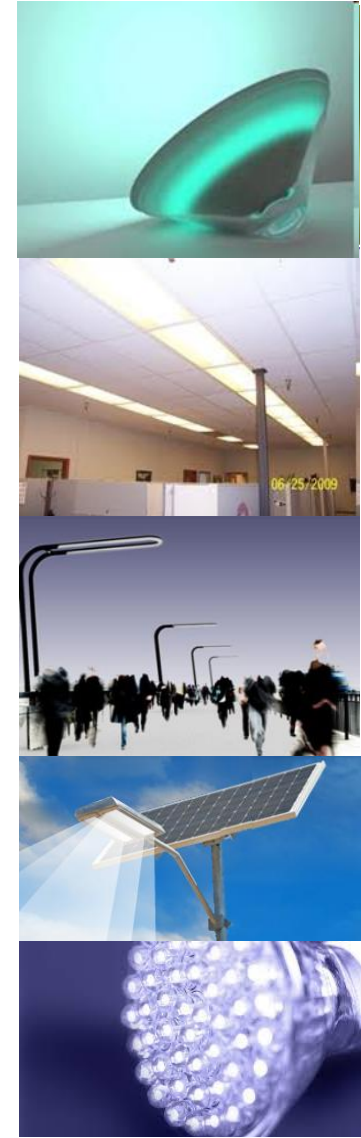
# Barriers of Energy Efficient Lighting in Developing Countries

- Partner countries lack technical knowledge and expertise
  - Research and development
  - Lighting Design and application
  - Quality control
- Shortage and need of well-trained human resources for the lighting industry in Vietnam



# DESL Objectives

- Raise the awareness in efficient and smart lighting
- Modernization of smart lighting curriculum and laboratory infrastructure
- Enhance and upgrade the skills and competences of teaching staff
- Strengthen the cooperation between university, industry, public sectors and society for the promotion of energy efficient and smart lighting



# Awareness raising and need assessment

- Seminar with stakeholders
- Dissemination through local media
- Survey using questionnaires (260 participants)
- Need assessment reports





# Development of lighting courses

- Development of 12 new courses and modernization of 13 other courses
- Inclusion of new courses in the existing BSc program



Summer Semester

# DESL1

## Illumination Engineering

*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.*

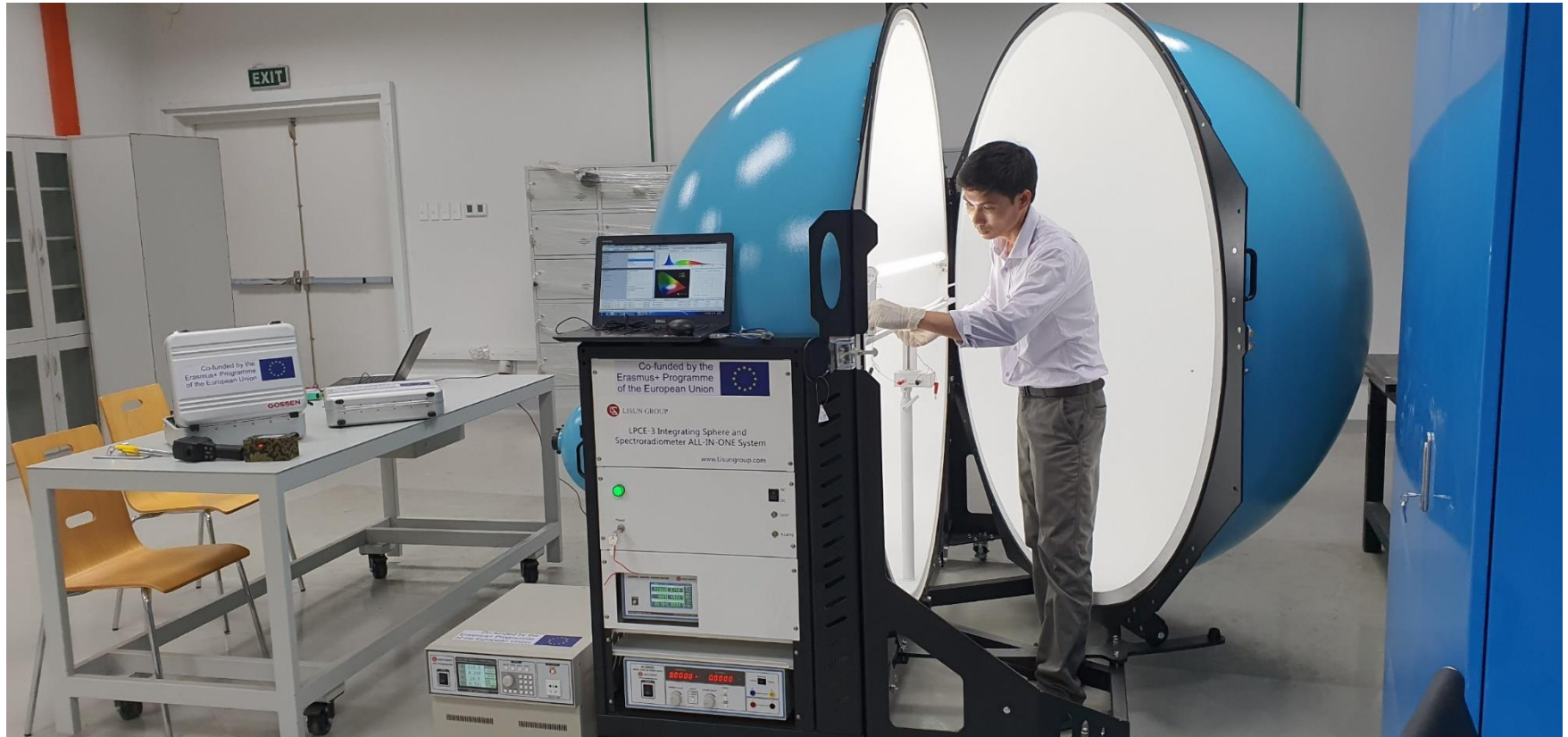
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Website: [www.vgu.edu.vn](http://www.vgu.edu.vn)

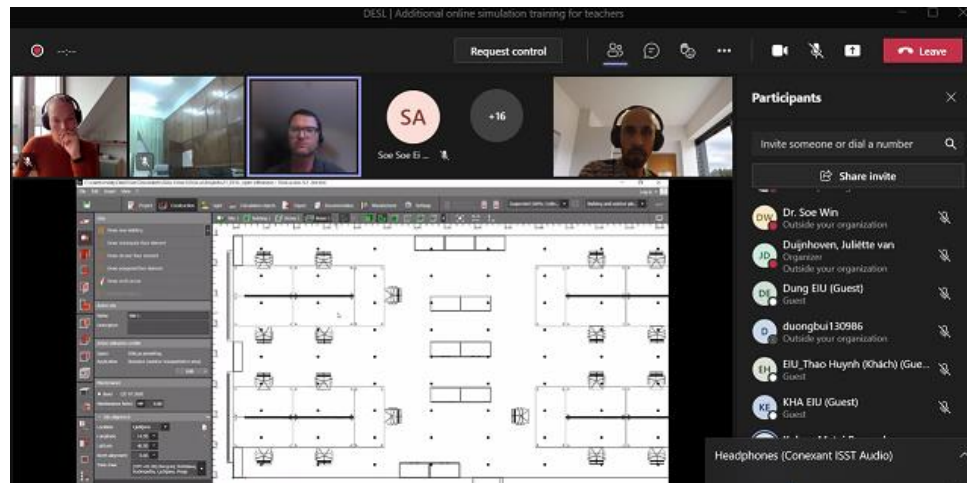
# Development of lighting courses

| HCMUT                  |                     |  |                |                  |
|------------------------|---------------------|--|----------------|------------------|
|                        |                     |  |                |                  |
| <b>Course</b>          | A                   |  |                |                  |
| <b>Name</b>            | Lighting Technology |  | <b>LECTURE</b> | <b>EXERCISES</b> |
| <b>Required #hours</b> |                     |  | <b>30</b>      | <b>30</b>        |
| <b>Modules</b>         | M1.2.1              | Advanced photometry  | 2              | NA               |
|                        | M1.3                | Colorimetry  | 2,5            | 4                |
|                        | M1.3.1              | Advanced colorimetry   | 2,5            | NA               |
|                        | M1.4                | Optic characteristics of materials (absorptance, transmittance, reflectance) | 2,5            | 1                |
|                        | M2.2                | Thermal radiators  | 1              | 4                |
|                        | M2.5                | Electroluminescence (Basics of LED lamps)                                    | 3              | 2                |
|                        | M2.5.2              | LED luminaires and LED ballasts and drivers                                  | 3              | 2                |
|                        | M3.3                | Lighting design through simulations  | 2              | 2                |
|                        | M3.4                | Light and architecture   | 3              | 2                |
|                        | M3.5                | Daylight applications  | 3              | 4                |
|                        | M3.6                | Prevention of design/projection errors                                       | 2              | NA               |
|                        | M3.7                | Lighting design considerations (advanced lighting design)                    | 4              | NA               |
|                        | M4.1                | Introduction to simulation Software  | 4              | 10               |
|                        | M4.2                | Calculations interior lighting (how do simulations work?)                    | 3              | 8                |
|                        | M4.3                | Calculations exterior lighting   | 2              | 8                |
|                        | M8.4                | Office lighting  | 3              | 2                |
|                        | M8.9                | Road and street lighting   | 3              | 4                |
|                        |                     |  |                |                  |
|                        |                     |  | <b>LECTURE</b> | <b>EXERCISES</b> |
| <b>#hours filled</b>   |                     |  | 45,5           | 53               |

# Development of Lighting Labs



# Teacher training and course testing



# Course running and evaluations

- First run of courses attracted more than 150 students
- Second run currently underway (more students than in first round)
- Course evaluation for improvement



# Course running and evaluations

TDMU: Lighting Engineering – 4,61

TDMU: Lighting Design – 4,70

VGU: Illumination Engineering – 4,08

VGU: Lighting Design and Application – 4,04

VGU: Energy Efficient Smart Lighting – 3,82

HCMUT: A Lighting Technology – 4,46

HCMUT: B Light and Experience – 4,75

HCMUT: C Smart Lighting – 4,56

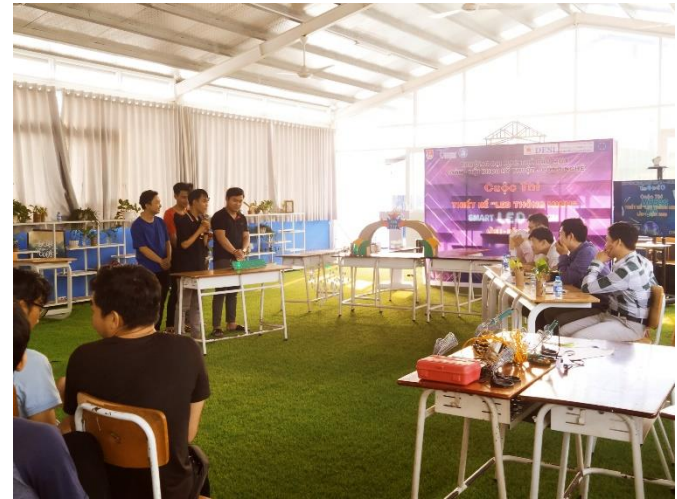
EIU: Lighting Engineering – 4,80

**Maximum score 5**

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# Outreach activities

- Industrial visits and traineeships
- Dissemination seminars/workshops
- Guest lectures from industry
- Organization of university-industry linkage seminars
- Signing of MOUs with industry/public organizations



# Overall outcomes

- Improved access to education and research in the field of smart lighting
- Improved teaching and research capacities of partner universities
- Improved quality of education and research in the field of smart lighting
- Enhanced linkage and cooperation between HEIs, Industry, public bodies and society

