

**Course Title: Illumination Engineering**

**Course Code: EPEG 423**

**Credit Hours: 3**

**Course Description:**

This course introduces students with lighting fundamentals, measurement and technology and introduces solid state lighting technology and imparts the skills necessary for implementing light emitting diode in various sectors of illumination.

**Course Contents:**

**Unit 1: Introduction**

Introduction to illumination engineering, Fundamental of light and light sources, radiant energy and colour, Visual and non-visual aspects of optical radiation, Photometry, radiometry and colorimetry principles and measurements; Lab exercise: Optical measurements

**Unit 2: Lighting Technology**

Light sources and luminaires, luminaire optical parameters, lighting applications

**Unit 3: Basic of Solid State Lamp**

Electroluminescence and radiant efficiency, radiative recombination, hetero-structure and quantum well, semiconductor material system for high brightness LED, WLED basics, color mixing, phosphor technology and emission spectrum and dichromatic and polychromatic phosphor technology, LED optics and light extraction, Introduction to OLED and laser; Lab exercise: Measurement of LED electrical and optical characteristic.

**Unit 4: LED Luminaries Design**

LED light source optical design and construction, LED lamp driver circuits, intelligent control of LED light; Lab exercise: LED driver characteristics

**Unit 5: LED Applications**

Application of LED for indoor and outdoor lighting, application of LED in developed and developing country and economic analysis and case studies, Lighting electrical layout planning and implementation; Lab exercise: Luminaire placement and average illumination calculation

**References**

1. Zukauskas, A., M.S. Shur, and R. Gaska, *Introduction to Solid State Lighting*, New York: Wiley, 2002.
2. Schubert, Fred E., *Light Emitting Diodes*. 2nd ed. New York: Cambridge University Press, 2006.
3. Csele, Mark. *Fundamentals of Light Sources and Lasers*, New Jersey, Wiley, 2004.
4. DiLaura, D., Houser, K., Mistrick, R. and Steffy, G. *IES Lighting Handbook*, 10th edition. New York:IES.
5. Robert Simpson, *Lighting Control: Technology and Applications*, Oxford : Focal, 2003,
6. Peter Robert Boyce, *Human Factors in Lighting*, Third Edition, 2014, CRC Press, ISBN



7. Schanda, J. (2007) *CIE Colorimetry, in Colorimetry: Understanding the CIE System*, John Wiley & Sons, Inc., Hoboken, NJ, USA
8. E. Fred Schubert, *Light-Emitting Diodes* – 2nd Edition, 2006
9. Karlicek, R., Sun, C.-C., Zissis, G., Ma, R., *Handbook of Advanced Lighting Technology*, 2017
10. P.Mottier, *LEDs for Lighting Applications*, pp. 1-27, Editions Wiley-ISTE, New York,

**Evaluation:**

In-Semester Evaluation: 50%

End-Semester Evaluation: 50%