

EE6808 LED Lighting and Display Technologies

Acad Unit: 3
Pre-requisite: Nil
Effective: AY2014-15 S1
Last update: Oct 2013

LEARNING OBJECTIVES

- To study state-of-the-art optoelectronic devices for lighting and displays with an emphasis on innovation.
- To inspire innovation by walking students through generations of devices.
- To develop a good understanding and deep appreciation of the device architecture and operating principles of LEDs and major display technologies.

CONTENT

Review of optoelectronic processes and related optics. Review of lighting and display technologies. Light-emitting diodes. Plasma display panels. Field emission displays. Liquid crystal displays. Organic light-emitting device. Electroluminescent and electrochromic displays.

COURSE OUTLINE

The course provides the students with both fundamental concepts and technological advances in lighting and displays. The course bridges between the fundamentals and applications related to lighting and displays. The course covers the review of physics for optoelectronic processes and structures and background optics related to lighting and displays as well as the review of lighting and display technologies. It spans light-emitting diodes operating principles and lighting metrics. Among various lighting and display technologies covered in the course are plasma display panels, field emission displays, liquid crystal displays, inorganic light-emitting diodes, organic light-emitting devices, and electroluminescent displays, and electrochromic displays.

In each technology covered in the course, the basic device structure and the operation principles are studied. The advantages and disadvantages offered by each technology are related to the basic device operation. Discussing generations of devices in each technology innovation is emphasized.

LEARNING OUTCOME

Through this course, the students are expected to acquire a thorough understanding of light-emitting diodes (LEDs), plasma display panels (PDPs), field emission displays (FEDs), liquid crystal displays (LCDs), organic light-emitting devices (OLEDs), electroluminescent displays

(ELDs), and electrochromic displays (ECDs). Other desired learning outcomes of the course include a high level of technical competence in the state-of-the-art device architecture and operating principles of lighting and major display technologies and ability to evaluate and compare lighting and display technologies.

ASSESSMENT SCHEME

Continuous Assessment	20%
Final Examination	80%

TEXTBOOKS

- [1] E. F. Schubert, "Light-emitting Diodes", Cambridge Univ. 2006.
- [2] J.-H. Lee, D. N. Liu, S.-T. Wu, "Introduction to Flat Panel Displays," The SID (the Society for Information Display) - Wiley Series in Display Technology, 2009.