

课程大纲

COURSE SYLLABUS

1.	课程名称(中英文) Course Title(Chinese and English)	先进显示与照明技术 Advanced Display and Lighting Technologies
2.	课程类别 Course Type	选修
3.	授课院系 Originating Department	电子与电气工程系 Department of Electrical & Electronic Engineering
4.	课程学时 Credit Hours	40 (理论课)
5.	课程学分 Credit Value	2
6.	授课语言 Teaching Language	双语（教材、作业、考试、课件英语为主，辅以中文解释） English with Detailed Explanations in Chinese
7.	授课教师 Instructor(s)	王恺，陈树明
8.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	近代光学，光学设计，固体电子，半导体器件导论
9.	教学目标 Course Objectives	
	<p>本课程将介绍先进显示与照明技术及当前研究前沿。在显示方面，将重点介绍平板显示技术，包括液晶显示，有机电致发光显示，量子点电致发光显示，显示驱动等，同时也将介绍其他新型显示技术，包括激光显示，3D 显示，触摸屏，电子纸等。在照明方面，将重点介绍基于 LED 的半导体照明技术，包括 GaN 外延生长，LED 芯片，LED 封装，LED 应用光学设计与散热技术等，同时也将介绍新兴的 LED 技术，包括可见光通信、量子点 LED 等。通过本课程的学习，学生能够理解并掌握先进显示与照明技术领域的基础知识，了解该领域的前沿技术发展动态，为将来从事相关领域研究工作打下基础。</p> <p>This course will introduce advanced display and lighting technologies and related emerging developments. For the display part, this course will focus on plane display technologies, including liquid crystal display, organic light emitting display, quantum dot light emitting display, and thin-film-transistor driving technologies. Moreover, other emerging display technologies, such as lase display, 3D display, touch display, e-paper, etc., also will be introduced. For the lighting part, this course will focus on solid state lighting technologies, including GaN epitaxial growth, LED chip, LED packaging, and LED optical design and thermal management technologies. Moreover, other emerging LED technologies, such as visible light communication, quantum dot LED, etc., also will be introduced. After completing the course, students should master the fundamental sciences behind each display technology and solid state lighting technology and understand the cutting-edge technologies and development trends of this area.</p>	
10.	教学方法及授课创新点 Teaching Methods and Innovations	
	1) 讲授先进显示技术及当前研究前沿，包括显示技术基础，液晶显示，有机电致发光显示，显示驱动等。	

To introduce advanced display technologies including display optics, liquid-crystal displays, organic light-emitting displays, thin-film-transistor driving technologies, and etc. Cutting-edge research on display will also be covered.

2) 讲授现代半导体照明技术及当前研究前沿, 包括 GaN 外延生长, LED 芯片, LED 封装, LED 应用技术等。

To introduce current lighting technologies with particular emphasis on LED and OLED lighting technologies, including GaN epitaxial growth, LED chip, LED packaging, LED application technologies, and etc.

11. 教学内容及学时分配 Course Contents and Course Schedule

Contents	Credit Hours
Introduction to Various Displays	2
Display Optics, Light Sources, Photometry and Colorimetry, Display Resolution	4
Liquid-Crystal Displays	2
Organic/Quantum-Dot Light-Emitting Displays	4
Thin-Film Transistor	2
Emerging Displays: Naked Eye 3D Displays, Flexible Displays, Touch Displays	2
Introduction to Solid State Lighting	2
GaN Epitaxial Growth	2
MOCVD	2
LED Chip	2
LED Packaging	6
Optical Design of LED	2
Thermal Management of LED	2
Reliability of LED	2
Emerging SSL: More Than Lighting, QD LED	2
Final Project Presentation	2

12. 课程考核 Course Assessment

学生成绩由平时成绩 40%、期中考试 20%、期末考试 40% 构成。期中、期末成绩通过开卷考试方式进行。

13. 教材及其它参考资料 Textbook and Supplementary Readings

- [1]. Jiun-Haw Lee et al: Introduction to Flat Panel Displays, Wiley
- [2]. 半导体照明技术, 方志烈 著, 电子工业出版社, 2009
- [3]. Sheng Liu and Xiaobing Luo, LED Packaging for Lighting Applications: Design, Manufacturing, and Testing, John Wiley and Sons Press, 2011