



## OSE 6820: Flat Panel Displays

CREOL: The College of Optics and Photonics, University of Central Florida

### COURSE SYLLABUS

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Instructor:	Prof. Shin-Tson Wu	Term:	Summer 2024
Office:	CREOL Rm 280	Class Meeting Days:	Tues. & Thurs.
Phone:	407-823-4763	Class Meeting Hours:	10:00-11:40 AM
E-Mail:	swu@creol.ucf.edu	Class Location:	Remote
Website:	<a href="http://lcd.creol.ucf.edu">http://lcd.creol.ucf.edu</a>	Lab Location:	No Lab
Office Hours:	Date and time: 10:00-11:00 AM, Wednesdays		

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#### I. Welcome!

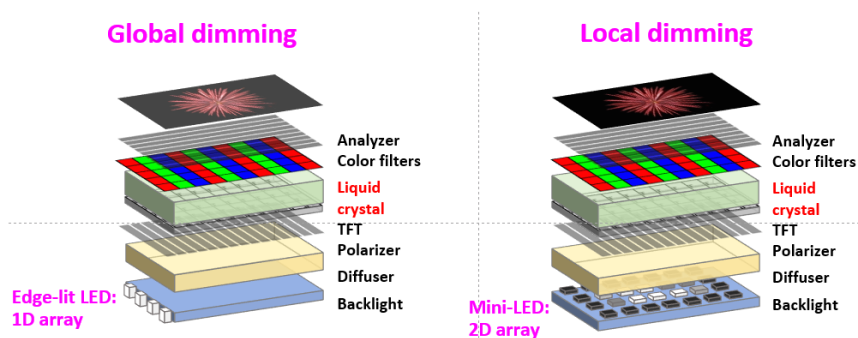
Flat panel displays, such as smartphones, tablets, computers, TVs, and data projectors, are ubiquitous in our daily life. In this course, students will learn the materials, device structures, and underlying operation principles of each display technology. Students will also apply the learned knowledge to design visually impressive displays.

#### II. University Course Catalog Description

Liquid crystal displays (LCDs), light-emitting diodes (LEDs), Mini-LED backlit LCDs, Mini/Micro-LED displays, organic LED displays, quantum dot LEDs, augmented reality and virtual reality displays, and projection displays.

#### III. Course Overview

Display devices have become indispensable in our daily life, ranging from smartphones, notebook computers, desktop monitors, TVs, head-mounted displays, to digital movies. This course is intended for graduate students who are interested in learning the latest flat panel display sciences and technologies. Topics to be covered include the basic materials and operation principles of liquid crystal displays, light emitting diodes (LEDs), organic LED displays, quantum dot LEDs, and microdisplays for augmented reality (AR) and virtual reality (VR).



*Global dimming and local dimming of thin-film transistor (TFT) liquid crystal displays*

#### IV. Course Objectives

- Display technology overview
- Liquid crystal materials and display devices
- LED materials and display devices
- OLED materials and display devices
- Thin film transistors
- Quantum dot materials and display devices
- Projection displays
- Reflective displays (Electrophoretic & MEMS)
- 3D displays
- Augmented reality and virtual reality
- Flexible displays

#### V. Course Prerequisites

Students should have some background in college-level physics, organic chemistry, semiconductor physics, and solid-state electronics.

#### VI. Course Credits

3 credit hours

#### VII. Required Texts and Materials

Lecture notes will be provided one day before class.

#### VIII. Supplementary (Optional) Texts and Materials

Reference: JH Lee, IC Cheng, H. Hua, and ST Wu, *Introduction to Flat Panel Displays*, 2<sup>nd</sup> Ed. (Wiley, 2020)

#### IX. Basis for Final Grade

Assessment	Percent of Final Grade
Homework	30%
Midterm	30%
Final	40%
	100%

Grading Scale (%)	
95-100	A
90-94	A-
85-89	B+
80-84	B
75-79	B-
70-74	C+
65-69	C
60-64	C-
0 - 59	F

**X. Grade Dissemination**

Graded tests and materials in this course will be returned individually only by request. You can access your scores at any time using "myUCF Grades" in the portal. Please note that scores returned mid-semester are unofficial grades. If you need help accessing myUCF Grades, see the online tutorial: <https://myucfgrades.ucf.edu/help/>.

**XI. Course Policies: Grades**

**Late Work Policy:**

There are no make-ups for in-class quizzes, the midterm, or the final exam. Homework turned in late will be assessed a penalty: maximum 70% of original score if it is two days late. Homework will not be accepted if overdue by more than seven days.

**Extra Credit Policy:** No extra credit is expected in this course.

**Grades of "Incomplete":**

The current university policy concerning incomplete grades will be followed in this course. Incomplete grades are given only in situations where unexpected emergencies prevent a student from completing the course and the remaining work can be completed the next semester. Your instructor is the final authority on whether you qualify for an incomplete. Incomplete work must be finished by the end of the subsequent semester or the "I" will automatically be recorded as an "F" on your transcript.

**XII. Course Policies: Technology and Media**

**Email:** Distant students can turn in homework assignments by emails. I will also send my lecture notes by email.

**Webcourses:** This class will be conducted in class and by Zoom simultaneously. All the registered students can review the recorded lectures.

**Laptop Usage:** Students are encouraged to use a laptop during lecture. I will email students my lecture notes in pdf file. Students are welcome to download the presentation files and bring their tablets to class.

**Classroom Devices:** Students can bring calculators to class, but not tape recorders, or other audio devices.

### XIII. Course Policies: Student Expectations

#### **Disability Access:**

The University of Central Florida is committed to providing reasonable accommodations for all persons with disabilities. Students who need accommodations must be registered with Student Disability Services (<http://sds.sdes.ucf.edu/>), Ferrell Commons Room 185, phone (407) 823-2371, TTY/TDD only phone (407) 823-2116, before requesting accommodations from the professor.

**Financial Aid & Attendance Policy:** As of Fall 2014, all faculty members are required to document students' academic activity at the beginning of each course. I will be adhering to this policy by taking attendance at each class meeting.

#### **Professionalism Policy:**

Per university policy and classroom etiquette, mobile phones, iPods, *etc.* **must be silenced** during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings.

#### **Academic Conduct Policy:**

Academic dishonesty in any form will not be tolerated. If you are uncertain as to what constitutes academic dishonesty, please consult The Golden Rule, the University of Central Florida's Student Handbook (<http://www.goldenrule.sdes.ucf.edu/>) for further details. As in all University courses, The Golden Rule Rules of Conduct will be applied. Violations of these rules will result in a record of the infraction being placed in your file and receiving a zero on the work in question AT A MINIMUM. At the instructor's discretion, you may also receive a failing grade for the course. Confirmation of such incidents can also result in expulsion from the University.

### XIV. Important Dates to Remember

The following dates and assignments are tentative and can be changed at the discretion of the professor.

Drop/Swap Deadline:	Thurs, May 16, 2024
Grade Forgiveness Deadline:	Wed. July 10, 2024
Mid – Term Examination:	Thurs, June 18, 2024
Withdrawal Deadline:	Wed. June 24, 2024
Final Presentations:	Tues. & Thurs. July 30 and Aug. 1, 2024

#### **Religious Observances**

Students are expected to notify their instructor in advance if they intend to miss class to observe a holy day of their religious faith. For a current schedule of major religious holidays, see the Faculty Center's main web page under "Calendars," and for additional information, contact the Office of Diversity Initiatives at 407-823-6479.