Opti588: Introduction to Display Science and Technology
Syllabus and Course Policies

Time: Monday/Wednesday: 12:30~1:45PM    Location: TBD
Instructor: Hong Hua (Office: Rm 727    Email: hhua@optics.arizona.edu)
Course website: http://www.optics.arizona.edu/opti588

Course description (3 credits)
The class examines the fundamentals of 2D and 3D display technologies (e.g. human visual system, color and depth perception, color theory and metrology, and state-of-the-art display technologies), display performance evaluation and calibration, and display research frontiers. The class is suited for both graduate and undergraduate students. You are encouraged to talk to the Instructor to find out if this is the right course for you.

Prerequisite
Opti 202/502 or equivalent

Course outline
- Introduction (0.5 week)
  - How applications have been driving display developments?
  - Evolution of display technology
- Human visual system (1.5 weeks)
  - Eye anatomy and eye optics
  - Visual performance of the eye
  - Models of visual performance and photometry
- Color vision and colorimetry (3 weeks)
  - Color vision basics
  - Color matching experiments and color matching functions
  - Color systems and spaces
  - Colorimetry
- 2D display technology and operation (3 weeks)
  - Display system interfaces and performance parameters
  - CRT displays
  - Flat panel displays: AMLCD, LCOS, Plasma, OLED,
  - Projection systems
  - New display technologies: high dynamic range display, enriched color display
- Display metrology: display performance measurement and calibration (3 weeks)
  - General principles of display evaluation
  - Evaluation of 2D displays
  - Color management and calibration
- Binocular vision and 3D display technology (3 weeks)
  - Binocular vision and perception basics
  - 3D display principles and techniques
  - head-mounted displays
  - Spatially immersive displays
Auto-stereoscopic displays
Volumetric displays
Holographic displays
Human factors associated with 3D displays and 3D display evaluations

Textbook and reading
- No required textbook
- Recommended books
  - Color vision and colorimetry: theory and applications (by Daniel Malacara)
  - Electronic image display (by Jon C. Leachtenauer)
  - Display systems: design and applications (Edited by Lindasay W. MacDonald and Anthony C. Lowe)
- Lecture notes will be provided
- Supplementary readings (book chapters, articles) will be available for downloading from the course website.

Assignment and grading policy
The final grade of this course will be based on performance on (1) Written homework; (2) Exams; and (3) Final project presentation and reports. Grades in these individual items will be weighted as follows
- Written homework: 20%
- Exams (one term exam and one quiz): 30%
- Class project (each student is required to sign up for a class project starting at the beginning of the semester. The student will perform the project through several milestones and demonstrate the completion of the project through an oral presentation and a detailed project report): 50%

The Final letter grades will not be computed "on the curve". Instead, they will be determined on a fixed scale. You are not competing with other students for grades; you are trying to master the course material. In principle, everyone in this class could fail, and similarly, everyone could earn an A.

Honor code
All work in this course is to be your own, and the university honor code is in effect. Groups will collaborate on the final project, but the other three graded aspects of the course are based on individual work.