MOTIVATION

Digital cameras are replacing film cameras for still and moving image capture. Especially, CMOS image sensors making it possible to integrate image capture and processing on the same chip enabling new applications and technologies. Basic knowledge of image sensors and camera electronics becomes necessary for 21st century engineers as well as the general public. CMOS image sensors and camera systems as a whole provide also a good opportunity and platform for students to appreciate and relate what they learned in semiconductor physics, analog/digital electronics, and packaging classes to real world application and system.

DESCRIPTION

This course introduces various concepts and fundamentals related to semiconductor image sensors. Topics cover light production and detection, video image formats, image sensor characteristics and performance metrics, basic and advanced operation principals and types of semiconductor image sensors (CCD and CMOS), noise in imagers, image and color processing, and issues related to camera system design, integration and signal processing.

The course will consist of in-class lectures, homework, and a class project. There will be in-class exams and a class project. For students taking the course for graduate credit (ECE 504) the class project will consist of a professional-level term paper and class presentation. For students taking the course for undergraduate credit, the class project may be done in groups but reported individually.

Course Prerequisite(s) : ECE 310 or equivalent.


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