Course Description:
Explores optical principles, image formation, electrooptical materials and components, electrooptical detector, radiometry, and photometry, electrooptical devices and instruments, and electrooptical systems analysis and design. Design for senior-level undergraduates and first-year graduate students.

Prerequisites:
ECE 3870 or PHYS 3600

Textbook:
No textbook required

Course Outcomes:
1. Understand optical emission, transmission and detection fundamentals.
2. Analysis of electrooptical systems.
3. Design and implementation of an electrooptical system.

Topics Covered:
- Lumens Converter; Energy Converter; Optical Sources; Periodic Table; Light Sources; Spectral Calculus
- Stoboscope; Plasma TV
- Optical Diodes; LED; Photovoltaic Solar Cells; Solar Panels; Solar Isolation
- Diode Lasers
- Gas Lasers; Optical Lasers
- Diffraction; Optical Transfer Components
- Fiber Optics; Fiber Cable
- Fiber-Optics Systems
- Detector Modeling
- Photodetector Noise
- Detector Noise Modeling; Signal to Noise in Systems; Fourier Spectroscopy
- Types of camera; camera lens design; photovoltaic detectors
- Microscopes; electron microscope
- Biological Eyes; Eye Design/Night Vision
- Image Intensifier and Holograms

Outcome Assessments (Grades):
Participation 15%
Lab Experiments & Book 20%
Homework  20%
Quizzes 25%
Final Exam 20%
Class Schedule:
Class Three times a week for fifty minutes.

Contribution of course to meeting the requirements of Criterion 5:
3 credit hours of Engineering Topics and contains significant engineering design content

Relationship of course to student outcomes:
   a. An ability to apply knowledge of mathematics, science, and engineering.
   b. An ability to design and conduct experiments, as well as to analyze and interpret data.
   c. An ability to design a system, component, or process to meet desired needs.
   d. An ability to function on multidisciplinary teams.
   e. An ability to identify, formulate, and solve engineering problems.
   g. An ability to communicate effectively.
   k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Instructor:
   Doran Baker, Professor
   January 2014