

ENME 808Z
Fundamentals of Optics and Optical Systems for Engineers

MW 3:30pm - 4:45pm - Room: CHE 2145

Instructor: Professor B. Han, Mechanical Engineering

bthan@umd.edu

COURSE DESCRIPTION:

Applications of optics have become ubiquitous in almost all advanced engineering research and product development. Examples include metrologies to measure critical engineering quantities, optical effect suppression and/or highlights in electronic products and systems (from home appliances to mobile devices), visualization of engineering phenomena, etc. This unique course is designed to teach the fundamentals of optics and optical systems for *engineering students*, more specifically (1) to familiarize students with the optical principles and applications, and (2) to help them learn the method details and develop skills for research and development.

The key concepts are presented, with an emphasis on their *physical* meanings rather than theoretical and mathematical meanings, to help create a better understanding of optics for engineering applications. The specific areas include (1) nature of light – reflection, refraction, polarization, birefringence and diffraction, etc., (2) optical elements – mirrors, prisms, lenses, wave plates, optical fiber, etc., (3) light sources – light emitting diode, laser diode, lasers, etc. (4) coherent and non-coherent optical interference, (5) classical and advanced optical interference systems and (6) examples of engineering applications – polariscopes, optical sensors, optical displays (e.g., LCD), bio-medical devices, automatic shape recognition for manufacturing inspection, surface topography characterization, deformation measurements, etc.