Expected Outcomes for EE119: Introduction to Optical Engineering

1) Knowledge and understanding of the imaging properties of lenses, and design principles for simple imaging systems such as telescopes, microscopes, and optical projectors. Ability to design simple optical instruments.

2) Basic understanding of the optical properties of the human eye. Ability to properly design eyepieces for common optical instruments.

3) Knowledge of operating principles, sensitivity and noise characteristics of common optical detectors such as photomultiplier tube, photodiodes, and image array detectors.

4) Knowledge of operating principles of digital displays such as liquid crystal and digital mirror device. Basic understanding of light sources and condenser systems for projector systems.

5) Basic understanding of the fundamental principles of operation of lasers. Ability to design simple 2 mirror laser cavities. Understanding of the laws of propagation of Gaussian laser beams.

6) Basic understanding of optical diffraction theory, including rudimentary Fourier optics.

7) Basic understanding of optical interference and the design principles of common optical interferometers.

8) An understanding of the fundamental principles of holography.

9) A basic comprehension of fiber optical systems, the differences between single and multi-mode fiber, and methods for efficiently coupling light into fibers.

10) Exposure to experimental technique, through mini-labs.