

SPRING 2012 COURSE ANNOUNCEMENT

Optical Signal Processing (ECE 545)

The wave properties of light are applicable to two-dimensional signal processing of images. Optical systems readily perform linear filtering, signal mixing and pattern recognition operations—both with monochromatic laser light and polychromatic white light. The course first introduces diffraction theory and demonstrates its mathematical equivalence to linear filtering. From this follows the Fourier transform properties of lenses and frequency analysis of imaging systems. These basic results are applicable to *Applied information optics*: e.g., analog and digital optical computers, holography, and Nyquist-Shannon sampling theory and to *Physical Optics*: e.g., resolution of microscopes and other optics-like instruments (e.g. electron and ion beam microscopes), antenna radiation patterns, three dimensional-optical profiling, Fourier transform infrared spectroscopy, and scattering from random rough surfaces.

Main texts: *J. W. Goodman, Introduction to Fourier Optics, 3rd edition*

Prereqs: *Linear Systems (ECE 420) or similar training on the Fourier Transform and Convolution Integral. Students from all Engineering departments, Physics, Chemistry, Ophthalmology and Psychology would find this course to be useful and are invited to attend.*

Course info: ECE 545
2:00 - 2:50 MWF

Taught by: R. W. Cohn, Professor and Director
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