SCHEDULE

1. Introduction (Aug. 24)

2. Two dimensional signals and systems (Aug. 26, 31, Sep. 2, 7)
   ◦ Fourier analysis
   ◦ Linear systems
   ◦ Two-dimensional sampling

3. Wave Optics (Sep. 9, 14, 16, 21)
   ◦ Wave equation, Helmholtz equation, Angular spectrum of plane waves
   ◦ Diffraction
   ◦ Paraxial approximation: Fresnel and Fraunhofer diffraction, Huygens principle

4. Analysis of coherent optical systems (Sep. 23, 28, Oct. 5)
   ◦ Thin optical elements: slab, prism, lenses, gratings
   ◦ Fourier transforming properties of lenses
   ◦ Image formation
   ◦ Operator notation

5. Analog optical information processing (Oct. 7, 19, 21)
   ◦ Spatial filtering
   ◦ Correlators, pattern recognition
   ◦ Matrix-vector multiplier

No class on October 12.


6. Partial coherence (Oct. 26, 28, Nov. 2, 4)
   ◦ Temporal and spatial coherence
   ◦ Mutual coherence function, mutual intensity
   ◦ Optical systems with partially coherent light

7. Spatial frequency analysis of optical imaging systems (Nov. 9, 11, 16)
   ◦ Coherent systems: amplitude transfer function
   ◦ Incoherent systems: optical transfer function, modulation transfer function
   ◦ Aberrations
   ◦ Resolution, coherent and incoherent cases

8. Wavefront modulation devices (Nov. 18, 23)
   ◦ Photographic film
   ◦ Spatial light modulators: liquid crystals, acousto-optic, MEMS devices

9. Holography (Nov.30, Dec. 2, 7, 9)
   ◦ Gabor and Leith Upatnieks holograms
   ◦ Image location and magnification
   ◦ Classification of holograms
   ◦ Thick holograms
   ◦ Computer generated holograms
   ◦ Applications