ECE 457: Fourier Optics

Concepts:
- Fourier transforms in optical systems
- Angular (wavenumber) Spectrum analysis of optical systems and propagation
- Scalar diffraction theory
- Optical Coherence
- Light Scattering
- Noise and Radiance
- Speckle
- Multidimensional Fourier transforms

Applications:
- MATLAB simulation of propagation in optical systems
- Application of Fourier and linear systems to optical systems
- Gain intuitive understanding of optics and propagation
- Coherent and incoherent imaging systems

Tools:
- Complex MATLAB Coding

IN

Linear Systems Analysis
- Understand Fourier transform

Principles of Wave Optics
- Understand plane wave propagation
- Understand interference
- Understand basic concepts of wave diffraction

MATLAB Simulation
- Use basic MATLAB coding

Pre-requisites
- ECE 311 with a C or higher; ECE342 with a C or higher

OUT

Optical Systems Computation
- Compute diffraction of optical fields numerically and analyze with Fresnel and Fraunhofer propagation
- Calculate imaging transfer functions for coherent and incoherent imaging system

Optical Systems Analysis
- Analyze and design optical Fourier processing systems

Optical Systems Design
- Design and numerically simulate a full complex optical system

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