ECE 457: Fourier Optics

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

**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:**
- Advanced numerical simulation Coding

**Linear Systems Analysis**
- Understand Fourier transform

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

**Numerical Simulation**
- Use basic coding for technical computations

**Pre-requisites**
- ECE 311 with a minimum grade of C
- ECE 342 with a minimum grade of C

**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 and imaging systems

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

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