

**Syllabus**  
**OSE 5115: Interference, Diffraction and Coherence**  
**Fall 2018**

**Instructor:** Aravinda Kar, CREOL 284, Telephone: (407) 823-6921

**Catalog description:** Interference of light, optical interferometry, Fraunhofer and Fresnel scalar diffraction, diffraction gratings, temporal coherence, spatial coherence, and partial coherence.

**Prerequisite:** Admitted to a graduate program in Optics, Physics or Electrical Engineering, or C.I.

**Recommended Book:** E. Hecht, *Optics*, 5th Edition

**Reference Books:**

1. F. L. Pedrotti, S. J.; L. S. Pedrotti, and L. M. Pedrotti, *Introduction to Optics*
2. B. E. A. Saleh and M. C. Teich, *Fundamentals of Photonics*
3. J. W. Goodman, *Introduction to Fourier Optics*
4. M. Born and E. Wolf, *Principles of Optics*

**Syllabus:**

- 1a. Review of the Fourier transform
- 1b. Review of electromagnetic, wave propagation, and the plane-wave angular spectrum
- 2a. Scalar diffraction theory
- 2b. Rayleigh-Sommerfeld diffraction
- 2c. Fresnel and Fraunhofer diffraction
- 2d. Diffraction limited optical imaging
- 2e. Diffraction gratings
- 3a. Interference and optical path difference (Double slit interference)
- 3b. Two-Beam Interference (Mach-Zehnder interferometer, Michelson interferometer, Sagnac interferometer)
- 3c. Multiple-beam interference
- 4a. Introduction to coherence theory
- 4b. Spatial and temporal coherence
- 4c. Effect of coherence on optical imaging