

In lieu of listing Graduate Internship Program experience on student resumes, we have provided a summary of the proficiencies students from each track will have gained through their coursework. If there are any questions about the skills acquired by the Optical Materials & Devices track, please reach out to Dr. Nima Dinyari (kdinyari@uoregon.edu).

Free Space Optics:

- Designed and built various free-space instrumentation including beam expanders, video imaging systems, an optical isolator, Michelson Interferometer, Fabry-Perot Etalon, and numerous other optical assemblies (all from basic components) to study the Fresnel equations, Fourier optics, diffraction, interference, MTF and aberrations of optical systems.
- Measured and characterized the optical modes of a Fabry-Perot laser resonator utilizing an optical spectrum analyzer.
- Characterized the profile and divergence of a HeNe laser using a CCD beam profiler on a one-dimensional linear stage (M^2 tool).

Fiber Optics:

- Observed and analyzed the Gaussian beam profile of single mode fiber utilizing an M^2 tool.
- Coupled a He-Ne laser into a bare single-mode fiber by mode matching the Gaussian beam profile of the laser to the mode supported by the fiber.

Optoelectronics:

- Constructed different electronic circuits to drive and characterize (I-V curve, response time and optical spectrum vs drive current) various (standard diode, LED, Laser Diodes and Photodiodes) electronic and optoelectronic devices.
- Created and quantified the diffraction efficiency of various grating patterns using a Spatial Light Modulator (SLM).
- Studied holographic images created with an SLM using Fourier optics.
- Modulated a HeNe laser output with an acoustical optical modulator (AOM).

Zemax OpticStudio:

- Utilized Zemax OpticStudio to design, simulate and optimize optical systems (in both sequential and non-sequential mode) such as a singlet, doublet, double Gauss & long-working-distance objectives, galvanometer & polygon scanners, multi-slit systems, a confocal microscope and coupling single/multiple sources into an optical fiber.

Fall term electives:

- Commonly chosen electives (2) for students remaining at UO through the fall term include: Design of Experiments with JMP software, Electron Microscopy (FIB-SEM, TEM), and Surface Elemental Composition Analysis (EDX, XPS, ToF-SIMS).