Optics (OPT)

OPT 341 - GEOMETRICAL OPTICS
Semester Hours: 3
Introduces geometrical optics. The nature of light, basic radiometry, rays and waves, Fermat's principle, Snell's law, thin and thick lenses, paraxial rays, ray transfer matrix and ray tracing, optical imaging and imaging system design, aberrations, optical instrumentation, prisms, and dispersion. Prerequisite: PH 113. Prerequisite with concurrency: PH 305 and MA 244.

OPT 342 - PHYSICAL OPTICS
Semester Hours: 3
Electromagnetic waves, superposition of waves, interference of light, Young's double slit experiment, Michelson interferometer, Fabry-Perot interferometer, coherence, diffraction, diffraction gratings, polarization and its matrix treatment, and polarization generation. Offered Spring. Prerequisite with concurrency: OPT 341.

OPT 411 - GEOMETRICAL OPTICS LAB
Semester Hours: 2
Introduces optical laboratory techniques, focus and alignment with incoherent and coherent sources, the nodal slide, thin lenses, thick lenses, lens systems, the effects of aperture and stops, reflection, refraction and dispersion, aberrations, elements of radiometry. Offered Fall. Prerequisite with concurrency: OPT 341.

OPT 412 - PHYSICAL OPTICS LAB
Semester Hours: 2
Introduces physical optics phenomena, Young's double slit experiment, Lloyd's mirror, Fresnel biprism, Newton's rings, intensity distribution in fringe systems, Michelson and Fabrey-Perot interferometers, Fresnel and Fraunhofer diffraction, diffractions and diffraction gratings. Prerequisite with concurrency: OPT 341.

OPT 441 - OPTICAL SYSTEMS
Semester Hours: 3
Intermediate geometrical optics, first-order optics, linear transformations, paraxial optics, reflection and transmission at an interface, polarized light, Jones and Mueller calculi, matrix methods, ray tracing, apertures and stops, third order optics and aberrations. Offered Fall, even years. Prerequisite: OPT 342.

OPT 442 - INTERFERENCE & DIFFRACTION
Semester Hours: 3
Two beam interference, multiple beam interference, optical testing. Fraunhofer diffraction, Fresnel diffraction, the Fourier transform, Fourier methods in optics, Coherence, Holography.

OPT 444 - OPTOELECTRONICS
Semester Hours: 3
Reviews polarized light, propagation and modulation of light using effects of electro and acousto optics, Kerr, and Faraday. Photo-detection, signal processing, and signal-to-noise ratios. Design/analysis of beam scanners, various optical spectrum analyzers, sensors, and communication systems. Prerequisite: OPT 342.

OPT 445 - INTRODUCTION TO LASERS
Semester Hours: 3
Introduces concepts and principles of lasers. Stimulated emission, light amplification, optical pumping, optical resonator theory, cavity modes, gas lasers, solid state lasers, laser applications, Gaussian beams, coherence, and holography. Offered Fall, odd years. Prerequisite: PH 432. Prerequisite with concurrency: PH 351.

OPT 446 - RADIOMETRY, DETECTORS, SOURCES
Semester Hours: 3
OPT 447 - POLARIZED LIGHT & POLARIMETRY
Semester Hours: 3

Linear, circular, and elliptical polarization of light. Mueller and Jones calculi, Stokes vectors, measuring polarized light, polarization properties of crystals and thin films, polarization ray tracing. Offered Fall, odd years. Prerequisite: OPT 342.