

Photonics and Laser Technology

PALT 401 INTRODUCTION TO PHOTONICS AND LASER TECHNOLOGY

An introductory review of photonics and laser technology (PALT) and the mathematical skills to address engineering problems in PALT. Topics include: Review of various PALT quantities, common PALT algebraic expressions, visualization of typical linear and non-linear behaviors in PALT, geometry and trigonometry in PALT elements like lenses and prisms, description of sinusoidal and wave motion, introduction to concepts like polarization through complex notation and vectors. *Pass/No Pass Only. Degree Credit.*

Units: 2

Hours/semester: 32-36 Lecture; 64-72 Homework

Transfer Credit: CSU

PALT 402 GEOMETRICAL OPTICS

A hands-on introduction to geometrical optics that deals with image formation by considering light as rays. Topics include: concepts of reflection, refraction, transmission, and dispersion; the interaction of light rays with optical elements like mirrors, lenses, prisms, and stops; image formation characteristics, aberration, and optical design using ray tracing and matrix methods; description of common optical systems like cameras and telescopes. *Letter Grade Only. Degree Credit.*

Units: 4

Hours/semester: 48-54 Lecture; 48-54 Lab; 96-108 Homework

Prerequisites: Completion of, or concurrent enrollment in, PALT 401

Transfer Credit: CSU

PALT 403 OPTICS AND PHOTONICS MODELING AND DESIGN

A hands-on introduction to modeling, analysis, and design of optical and photonics systems using matrix based computational programming (MATLAB or Octave) and commercial optical design software like ZEMAX. Topics include: plotting and data visualization; use of arrays to understand image processing; design of optical and photonic systems using the ZEMAX software (or similar commercial software). *Letter Grade Only. Degree Credit.*

Units: 3

Hours/semester: 32-36 Lecture; 48-54 Lab; 64-72 Homework

Prerequisites: Completion of, or concurrent enrollment in, PALT 402

Transfer Credit: CSU

PALT 404 WAVE OPTICS

An introductory hands-on course in wave optics describing the properties of light and its interaction with objects using wave equations. Topics include: concepts of superposition, polarization, interference and diffraction; the interaction of light waves with small objects such as wires, apertures and multilayered coatings; mathematical techniques needed to quantify interactions. *Letter Grade Only. Degree Credit.*

Units: 4

Hours/semester: 48-54 Lecture; 48-54 Lab; 96-108 Homework

Prerequisites: Completion of, or concurrent enrollment in, PALT 402

Transfer Credit: CSU

PALT 405 INTRODUCTION TO LASER TECHNOLOGY

A hands-on introduction to the principles and technology of lasers including properties of different types of lasers. Topics include: safe use and operation of lasers; principle of producing laser light; techniques to control laser light; applications of laser in various medical, non-medical, defense and entertainment industries. *Letter Grade Only. Degree Credit.*

Units: 3

Hours/semester: 32-36 Lecture; 48-54 Lab; 64-72 Homework

Prerequisites: Completion of, or concurrent enrollment in, PALT 404

Transfer Credit: CSU

PALT 406 COMPONENTS AND DEVICES IN PHOTONICS AND LASER TECHNOLOGY

An introductory review of basic components and devices that make up optics and photonics systems. Topics include: polarizers and filters; non-laser light sources; light detectors; light modulators; selection of appropriate optical device for a desired application. *Letter Grade Only. Degree Credit.*

Units: 2

Hours/semester: 32-36 Lecture; 64-72 Homework



Prerequisites: Completion of, or concurrent enrollment in, PALT 404

Transfer Credit: CSU

PALT 407 OPTICAL COATING TECHNOLOGY

A hands-on review to optical coating technology. Topics include: matrix methods in coating analysis and design; Thin film coatings; coatings in color applications; coating production techniques; safe use and handling of coatings; measurement and modeling of coating performance. *Letter Grade Only. Degree Credit.*

Units: 3

Hours/semester: 32-36 Lecture; 48-54 Lab; 64-72 Homework

Prerequisites: PALT 404

Transfer Credit: CSU

PALT 408 OPTICAL FIBERS

An introductory hands-on course in optical fiber technology describing the transmission of light through optical fibers. Topics Include: principles of light transmission in optical fibers; fiber optic fundamentals; fiber technology; applications of fiber optics; experiments with light behavior through fibers. *Letter Grade Only. Degree Credit.*

Units: 3

Hours/semester: 32-36 Lecture; 48-54 Lab; 64-72 Homework

Prerequisites: PALT 405

Transfer Credit: CSU

PALT 409 ADVANCED PHOTONICS TECHNOLOGY

A hands-on introduction to advanced photonics and laser technologies. Topics include: ultrashort pulse propagation; nonlinear optics; synchrotron and other advanced light sources; photonic crystals; generation and measurements of ultrashort pulses. *Letter Grade Only. Degree Credit.*

Units: 3

Hours/semester: 32-36 Lecture; 48-54 Lab; 64-72 Homework

Prerequisites: PALT 405

Transfer Credit: CSU

