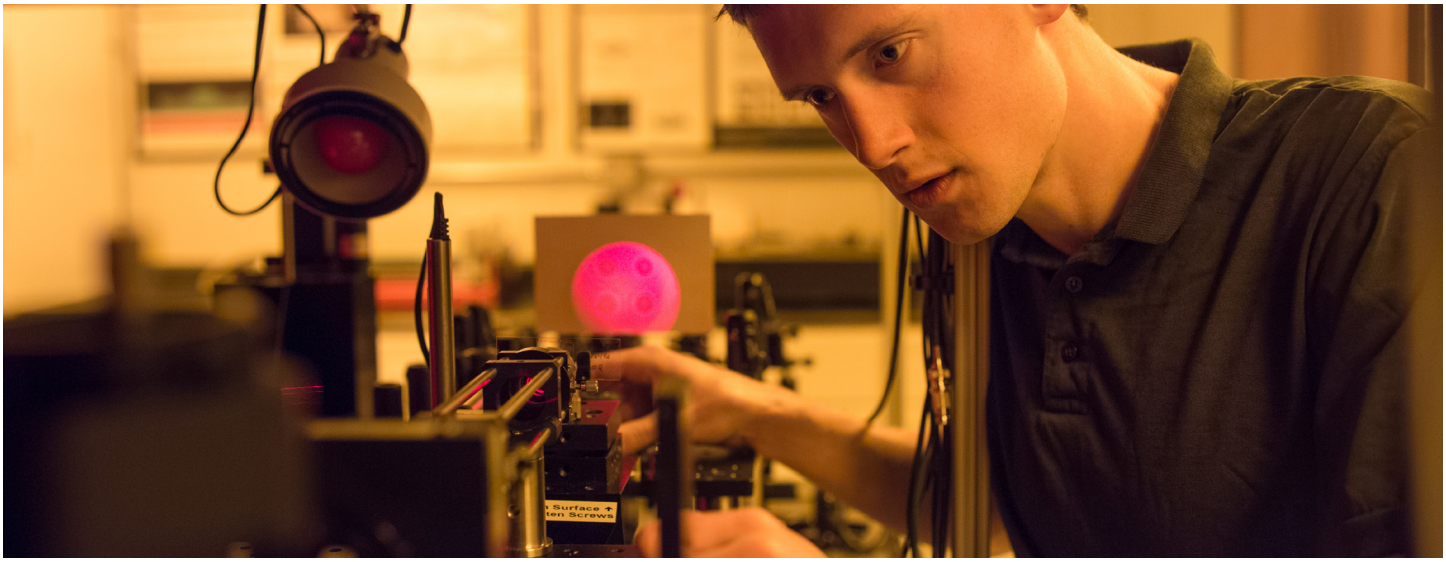
PROFESSIONAL MASTER'S OPTION

Earn Your Degree in Photonics Engineering



A world-class program founded on state-of-the-art design and fabrication tools to engender deep understanding coupled to practical skills.

The Department of Electrical, Computer and Energy Engineering at the University of Colorado Boulder is excited to offer the Photonics professional master's program covering high-demand talents such as computer-aided photonics design founded on a deep understanding of how light interacts with matter.

The program is offered under the College of Engineering and Applied Science's Professional Master of Science or Master's of Engineering degree. Through core courses (offered on campus and through several online formats for maxium flexibility) and a broad slate of electives, students enrolled in the Photonics program may pursue a 9-credit hour certificate or 30-credit hour degree.

Graduates will be poised to solve critical engineering challenges including monitoring our health and environment, producing and conserving our energy resources and creating the next generation of human/computer interface.

Why Photonics Engineering?

The 20th century was defined by the growth of electronics, but the 21st century belongs to photonics. LEDs will light homes powered by solar panels. Laser 3D printing will transform manufacturing. New microscopes and telescopes will peer into the depths of living cells and distant galaxies.

Photonics graduates will command skills in design, fabrication and laboratory practice to place them at the forefront of these industries and ones not yet invented.

For more information, visit www.colorado.edu/ecee/photonics

Electrical, Computer & Energy Engineering
UNIVERSITY OF COLORADO **BOULDER**

Be Boulder.

Critical Skills

- Geometrical optics
- CAD tools (Zemax, Code V)
- Aberrations and tolerances
- Optical instruments
- Optical lab skills
- Hands-on optoelectronics
- Laser assembly & operation
- Numerical analysis

Optical Technologies

- Dielectric thin films
- Absorption and dispersion
- Polarization & crystal optics
- Interferometers
- Diffraction and holography
- Fiber optics
- Imaging systems
- Quantum optics

Solid State Technologies

- LEDs and LASERs
- Detectors and modulators
- Nonlinear processes
- Energy bands in crystals
- Semiconductor junctions
- Optoelectronic devices
- Modern integrated circuits
- Semiconductor platforms

Current Applications

- Photovoltaic power generation
- Optical computing
- Photonic crystals
- Plasmonics
- Nano/micro electro-mechanical systems
- 3D imaging
- Compressive imaging
- Super-resolution

Program Courses

Course Name	Emphasis
Geometrical Optics	Design of optical systems with Zemax OpticStudio
Advanced Optics Lab	Optical lab skills in the context of multiple photonics technologies
Numerical Methods in Photonics	Creation and use of numerical photonics tools
Physical Optics	Light matter interactions including thin films, polarization, interference
Fourier Optics	Diffraction, spatial frequency analysis of optical systems, holography
Quantum Mechanics	Quantum foundations for photonics
Active Optical Devices	LEDs, lasers, detectors, modulators
Solid State Electronics	Materials & devices for solid state electronics and optoelectronics
Principles of Electronic Devices	Semiconductor devices & modern ICs, pn and metal junctions, MOS
Photovoltaic Devices	Thermodynamics, device physics and fabrication, materials and architectures
Nanophotonics	Nanoscale materials including photonic crystals, plasmonics, metamaterials
Micro/nano Mechancial Systems	Design, analysis and fabrication of N/MEMs such as optical scanners
Computational Imaging	3D imaging, tomography, compressive imaging, super-resolution