M.S. in Optics Plan B

The M.S. Degree in Optics and Photonics is an interdisciplinary, cooperative program managed by the Optics Program Committee on behalf of the three participating departments: Physics, Electrical and Computer Engineering, and Chemistry and Biochemistry. Students apply directly to the Optics and Photonics Graduate Program and are admitted through one of the participating departments, selected based on advisor affiliation and student interest.

The Optics and Photonics degree is distinct from the other graduate degrees offered by the participating departments because it requires interdisciplinary coursework involving at least two of the departments. The interdisciplinary program of study allows students to emphasize optics theory and applications in more depth than is possible through degrees in the traditional disciplines. Each optics student will be mentored by a graduate advisor from the faculty of one of the three participating departments, and a graduate supervisory committee made up of faculty from at least two of the three departments in the cooperative program.

The Plan B program emphasizes coursework, but also includes preparation of a required Professional Paper. The paper, prepared under the guidance of the student’s advisor, covers a focused aspect of research, design, or engineering education. The Professional Paper is generally not as comprehensive as the research Thesis required for the M.S. Degree Plan A, but it is desirable that the Plan B Professional Paper be of sufficient quality and scope to serve as the basis for a conference paper or presentation.

More information on the admission requirements, application process, and degree requirements can be found at:
https://optics.montana.edu/Optics_photonics_MS.html

Choose two key courses:

- PHSX 427 Advanced Optics
- PHSX 437 Laser Applications
- EEELE 482 Electro-Optical Systems
- EEELE 584 Laser Engineering

Choose one specialty course:

- EEELE 581 Fourier Optics/Imaging Theory
- PHSX 531 Nonlinear Optics/Laser Spectroscopy
- CHMY 527 Analytic Optical Spectroscopy
- CHMY 560 Symmetry, Orbital, and Spectroscopy

Optics electives (choose at least 6 credits):

- EEELE 408 Photovoltaic Systems
- EEELE 432 Applied Electromagnetics
- EEELE 482 Electro-Optical Systems
- EEELE 505 MEMS Sensors and Actuators
- EEELE 538 Adv Top Electromagnet & Optics
- EEELE 548 Optical Communications Systems
- EEELE 581 Fourier Optics/Imaging Theory
- EEELE 582 Optical Design
- EEELE 583 Remote Sensing Systems
- EEELE 584 Laser Engineering
- PHSX 427 Advanced Optics
- PHSX 437 Laser Applications
- PHSX 461 Quantum Mechanics I (for non-physics students)
- PHSX 507 Quantum Mechanics II
- PHSX 515 Advanced Topics In Physics
- PHSX 516 Experimental Physics (Fall - Optics)
- PHSX 520 Electromagnetic Theory II
- PHSX 531 Nonlinear Optics/Laser Spectroscopy
- CHMY 421 Advanced Instrument Analysis
- CHMY 527 Analytic Optical Spectroscopy
- CHMY 557 Quantum Mechanics
- CHMY 560 Symmetry, Orbitals, and Spectroscopy
- CHMY 564 Adv Quantum Chemistry
- MTSI 501 Material Structure and Bonding
- MTSI 503 Optical, Electronic, and Magnetic Properties of Materials
- MTSI 551 Adv Materials Characterization
- MTSI 552 Adv Material Character II
- EEELE/PHSX/CHMY/ 591 Special Topics
- EEELE/PHSX/CHMY/ 592 Independent Study
- OPTI 594 Optics Seminar

Technical electives (choose at least 12 credits in these areas. 7 of the 12 credits must be approved optics related electives): 6

- ECE, Physics, Math, Chemistry, Business, other as approved. All must be 400-level or above.

Professional Paper (OPTI 575) 3

Total Credits 30

Note: At least 20 credits must be at the 500 level.

1 A maximum of three (3) credits total among these courses is allowed if the subject is directly related to optics, upon the approval by the academic advisor and research advisor/instructor.
2 A maximum of two (2) credits total of optics seminar is allowed.
3 Optics related technical electives must be reviewed and approved by your academic advisor.

ACCELERATED MS IN OPTICS AND PHOTONICS

The accelerated master’s degree allows undergraduate students who are currently pursuing their minor in Optics and Photonics to make simultaneous progress toward an bachelor’s and master’s degrees that will prepare them for high-demand jobs in laser engineering, remote sensing, and more. In addition to the Optical Technology Center founded in 1995, MSU has a culture of interdisciplinary research and a history of partnership with Bozeman’s thriving optics and photonics industry. The accelerated MS in Optics and Photonics is an interdisciplinary degree managed by the Optics and Photonics Degree Program Committee on behalf of the Departments of Physics, Electrical and Computer Engineering, and Chemistry and Biochemistry. Students apply to the Accelerated MS in Optics and Photonics and earn reserved credits towards the MS degree in Optics and Photonics while still an undergraduate. Students are admitted after graduation into the MS in Optics and Photonics program through one of the participating departments, chosen by the applicant based on their areas and department affiliation of faculty working in those areas. More information about the accelerated MS in Optics and Photonics can be found here: Accelerated MS in Optics and Photonics (https://optics.montana.edu/Optics_photonics_MS_accelerated.html).