

# 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](https://optics.montana.edu/Optics_photonics_MS.html)

and at:

M. S. in Optics and Photonics (<https://www.montana.edu/academics/optics-photonics-graduate/>)

Choose two key courses:	6
PHSX 427	Advanced Optics
PHSX 437	Laser Applications
EELE 482	Electro-Optical Systems
EELE 584	Laser Engineering
Choose one specialty course:	3
EELE 581	Fourier Optics/Imaging Theory
EELE 582	Optical Design
PHSX 531	Nonlinear Optics/Laser Spectroscopy
CHMY 527	Analytic Optical Spectroscopy
CHMY 560	Symmetry, Orbitals, and Spectroscopy
Optics electives (choose at least 6 credits):	6
EELE 408	Photovoltaic Systems
EELE 432	Applied Electromagnetics
EELE 482	Electro-Optical Systems
EELE 505	MEMS Sensors and Actuators
EELE 538	Adv Top Electromagnet & Optics
EELE 548	Optical Communications Systems
EELE 581	Fourier Optics/Imaging Theory
EELE 582	Optical Design
EELE 583	Remote Sensing Systems
EELE 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 <sup>1</sup>	
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	
EELE/PHSX/CHMY/ 591	Special Topics <sup>1</sup>	
EELE/PHSX/CHMY/ 592	Independent Study <sup>1</sup>	
OPTI 594	Optics Seminar <sup>2</sup>	
Technical electives (choose at least 12 credits in these areas. 7 of the 12 credits must be approved optics related electives): <sup>3</sup>		12
ECE, Physics, Math, Chemistry, Business, other as approved. All must be 400-level or above.		
Professional Paper (OPTI 575)		3
<b>Total Credits</b>		<b>30</b>

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

<sup>1</sup> 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.

<sup>2</sup> A maximum of two (2) credits total of optics seminar is allowed.

<sup>3</sup> Optics related technical electives must be reviewed and approved by your academic advisor.