

A. PHD CORE COURSE REQUIREMENTS: FALL 2022 AND LATER

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For students entering the Ph.D. program in **Fall 2022 or later**, a total of 9 courses from the following lists are needed to fulfill a student's core course requirements. **If the 3-unit version of OPTI 511R was taken, or OPTI 544 was taken prior to Spring 2023, OPTI 541A is not required.**

Group I: Select **2 courses** from the following (3 units each):

- OPTI 503A: Mathematical Methods for Optics and Photonics
- OPTI 508: Probability and Statistics in Optics
- OPTI 512R: Linear Systems, Fourier Transforms
- OPTI 570: Quantum Mechanics
- OPTI 604: Mathematical Methods for Optics

Group II: Select **1 course per numbered topic**:

1. **Electromagnetic Waves**
 - OPTI 501: Electromagnetic Waves
2. **Geometrical Optics**
 - OPTI 502: Optical Design and Instrumentation
3. **Quantum Optics**
 - OPTI 511R: Optical Physics and Lasers (prerequisite: OPTI 501)
 - OPTI 544: Foundations of Quantum Optics (prerequisite: OPTI 570)
4. **Physical Optics**
 - OPTI 505R: Diffraction and Interferometry (prerequisites: OPTI 501, OPTI 512R, or OPTI 604; OPTI 570 will partially satisfy the prerequisites for Ph.D. students)
5. **Solid-State Optics** (not on qualifying exam)
 - OPTI 507: Solid-State Optics (prerequisite: OPTI 511R, OPTI 570, or PHYS 371)
 - OPTI 537: Imaging Physics and Devices (prerequisites: OPTI 501 and OPTI 536)
6. **Introduction to Lasers** (not on qualifying exam)
 - OPTI 541A: Introduction to Laser Physics (1 unit. Prerequisite: OPTI 511R or OPTI 544. Required only for students who have not taken the 3-unit version of OPTI 511R or who took OPTI 544 prior to Spring 2023.

Group III: Select **1 course** from this list. The material in the course chosen by the student will not be on the written portion of the comprehensive exam but may be questioned on the oral portion of the comprehensive exam.

1. **Photonics**
 - OPTI 510R: Photonics (prerequisite: OPTI 501)
2. **Image Science**
 - OPTI 536: Introduction to Image Science
3. **Applied Optics**
 - OPTI 503: Optical Design and Instrumentation II (prerequisite: OPTI 502)
 - OPTI 506: Radiometry, Sources and Detectors
4. **Optical Physics**
 - OPTI 541B&C: Laser Systems, Applications, Ultrafast Optics
 - OPTI 595B: Information in a Photon

