New Graduate Student Orientation:
Curriculum, Degree Requirements, and
Examinations
CURRICULUM AND DEGREE REQUIREMENTS
“Definition” of a Degree in Optics

Degrees in optical science produce graduates whose coursework has covered the generation, propagation, manipulation, and detection of light, the interaction of light with matter, and their applications

Degrees at the College of Optical Sciences

Bachelor of Science in *Optical Sciences and Engineering*

Professional Graduate Certificate in *Optical Sciences*

Master of Science in *Optical Sciences*

Ph.D. in *Optical Sciences*

*Options include:*
- Accelerate Master’s Program
- Industrial-track MS Option
- MS subplan for Optomechanical Engineering
- Distance Learning Options for Graduate Program
Certificate

Courses → Graduate

MS with Technical Writing Course

Courses → Defend → Graduate

MS with Report

Courses → Write → Defend → Graduate

MS with Thesis

Courses → Research → Write → Defend → Graduate

PhD

Courses → Exams → Research → Write → Defend → Graduate
Courses at the College of Optical Sciences

About 80 graduate optics courses
About 30 different courses per semester
Around 40 courses are offered through distance program

Over 30 undergraduate optics courses
Continuous Enrollment

https://grad.arizona.edu/policies/enrollment-policies/continuous-enrollment

Continuous Enrollment Master’s/Certificate

• Must be enrolled in at least 1 unit in the fall and spring semesters
• Full-time is 6 units (needed for assistantships, international students, federal loans)
• Once you have completed the 32/35 thesis/master’s report units, you can enroll in 1 unit of 910/909

Continuous Enrollment PhD

• Must be enrolled in at least 1 unit in the fall and spring semesters
• Full-time is 6 units (needed for assistantships, international students, federal loans)
• If on a FoTO scholarship, need to enroll in at least 10 units Fall & Spring (or at least 9 if some courses already completed)
• Once you complete coursework and dissertation units, you can enroll in 1 unit of 920
• Can defend in summer or winter without being enrolled

Leave of Absence

• If you need to take a semester/year off, you **must** submit a leave of absence request
• If you don’t submit a request, you will be discontinued and will need to reapply
MS DEGREE REQUIREMENTS

Courses ➔ Defend ➔ Graduate

Courses ➔ Write ➔ Defend ➔ Graduate

Courses ➔ Research ➔ Write ➔ Defend ➔ Graduate
M.S. in Optical Sciences

Has no core curriculum
  • Focus on one of the division courses, multiple areas, core Ph.D. courses – you choose
  • Exception: Optomechanical Engineering subplan has a core curriculum

Coursework
  • Thesis Option:
    • 32 total units (total includes 8 units of OPTI 910 Thesis and 2 lab units)
  • Non-Thesis Option:
    • 35 total units including 2 lab units and one of the following:
      – Master’s Report (3 units)
      OR
      – OPTI 597 Technical Writing and Communication (3 units)

Maximum Time Limit is 6 years
  • Average time 2 years for full-time students

http://www.optics.arizona.edu/academics/ms-optical-sciences/requirements
# M.S. in Optical Sciences

## MASTER'S SUGGESTED SCHEDULE

### 1ST SEMESTER
- **GRAD PATH:** Responsible Conduct of Research Statement
- **Complete Key Request Form:** Complete form and submit to OSC Rm. 620. Bring your CatCard.
  - Forms can be found at [www.azoptics.arizona.edu/auab/grad-forms](http://www.azoptics.arizona.edu/auab/grad-forms)

### 2ND SEMESTER
- **Determine a Faculty Advisor**
- **GRAD PATH:** Plan of Study
- **Thesis (12 units):** Optics (5 units), OPR (1 unit), Other coursework (6 units)
- **Non-Thesis, Master's Report (15 units):** Optics (4 units), OPR (1 unit), Other coursework (10 units)
- **Non-Thesis, Technical Writing (15 units):** Optics (1 unit), OPR (1 unit), Other coursework (13 units)
- **Complete the First-Year Graduate Student Survey**
  - Forms can be found at [www.azoptics.arizona.edu/academics/graduate-students/forms](http://www.azoptics.arizona.edu/academics/graduate-students/forms)

### LAST SEMESTER
- **GRAD PATH:** Master's/Specialty Committee Appointment Form (Should be completed and approved before scheduling the final exam).
- **Schedule Final Oral Exam**
  - Coordinate a day/time that works for you and your committee.
  - Complete M.S. Final Oral Exam Scheduling, Check Grad College Important Dates and Deadlines for recommended latest exam date.
  - Forms can be found at [www.azoptics.arizona.edu/academics/graduate-students/forms](http://www.azoptics.arizona.edu/academics/graduate-students/forms)
  - **Take Final Oral Exam:** (It is customary to provide snacks/drinks for committee)

### AFTER PASSING ORAL EXAM
- **Submit Master’s Thesis to the Graduate College** (For Thesis students only),
  - Check Grad College Important Dates and Deadlines for last day to submit thesis.
- **Email a Copy of Your Thesis or Master's Report to the OSC Graduate Advisor**
- **Complete College of Optical Sciences Exit Survey**
  - Forms can be found at [www.azoptics.arizona.edu/academics/graduate-students/forms](http://www.azoptics.arizona.edu/academics/graduate-students/forms)
- **Complete the OSC Clearance Form**
  - Forms can be found at [www.azoptics.arizona.edu/academics/graduate-students/forms](http://www.azoptics.arizona.edu/academics/graduate-students/forms)
- **Update Mailing Address in UAccess to Receive Diploma** (if needed)
- **Celebrate! RSVP for OSC Convocation Ceremony**
M.S. Defense

All degreed graduate students at UA must do a final defense

- Your faculty advisor is the chair
- Two other members complete the committee
- Typically 1-2 hours long

Focus of the defense

- Thesis Option:
  - Presentation: thesis
  - Primary: you will be asked questions about your thesis
  - “Secondary”: you will be asked questions pertaining to your coursework

- Non-Thesis with Report Option:
  - Presentation: report (typical)
  - Primary: you will be asked questions about your report
  - Secondary: you will be asked questions about your coursework

- Non-Thesis with Technical Writing Course:
  - Presentation: none required – decision made by your committee
  - Primary: you will be asked questions about your coursework
  - Secondary: helpful if you present something, so that you can be questioned about it
PHD DEGREE REQUIREMENTS
Ph.D. in Optical Sciences

Has core curriculum

- Total of 8 courses make up a student’s core curriculum
  - [http://www.optics.arizona.edu/academics/phd-optical-sciences/requirements](http://www.optics.arizona.edu/academics/phd-optical-sciences/requirements)
- 3 Required Course Groups
  - Select 2 courses from Group I (mathematical foundation)
  - Select 1 course from 5 course areas in Group II (optics foundation): Electromagnetic Waves, Geometrical Optics, Quantum Optics, Physical Optics, Solid-State Optics
  - Select 1 specialized course in Group III (your track): Applied Optics, Image Science, Photonics, and Optical Physics

Coursework

- 45-54 Total Units of Coursework, depending on PhD research advisor’s requirements
- Coursework units must include core curriculum and 2 lab courses
- 18 Dissertation Units (OPTI 920) in addition to Coursework units

Maximum Time Limit

- Within 5 years of completing comprehensive exam
- Average time under 5.5 years
### Course Areas

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<tr>
<th>Mathematical and Physical Foundations 1</th>
<th>Applied Optics Track</th>
<th>Image Science Track</th>
<th>Photonics Track</th>
<th>Optical Physics Track</th>
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<tbody>
<tr>
<td> </td>
<td>OPTI 512</td>
<td>OPTI 512R OR OPTI 604</td>
<td>OPTI 503A OR OPTI 512r</td>
<td>OPTI 503A OR OPTI 512R</td>
</tr>
<tr>
<td>Mathematical and Physical Foundations 2</td>
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<td>OPTI 508</td>
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<td><strong>OPTI 570</strong></td>
</tr>
<tr>
<td>1. Electromagnetic Waves</td>
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<td><strong>OPTI 501</strong></td>
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<td>2. Geometrical Optics</td>
<td><strong>OPTI 502</strong></td>
<td><strong>OPTI 502</strong></td>
<td><strong>OPTI 502</strong></td>
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<td>3. Quantum Optics</td>
<td><strong>OPTI 511R</strong></td>
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<td><strong>OPTI 511R</strong></td>
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<td>4. Physical Optics</td>
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<td><strong>OPTI 505</strong></td>
<td><strong>OPTI 505</strong></td>
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<tr>
<td>5. Solid-State Optics</td>
<td>  OPTI 507 OR OPTI 537</td>
<td>OPTI 537</td>
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<tr>
<td>6. Specialization Area</td>
<td>  OPTI 503 OR OPTI 506</td>
<td>OPTI 536</td>
<td>OPTI 510</td>
<td><strong>OPTI 600G</strong></td>
</tr>
</tbody>
</table>

**Bold:** tested in qualifying exam  

Lab courses with the same number as a core course, eg 502L, do not need to be taken concurrently.
# Ph.D. in Optical Sciences

## PH.D. SUGGESTED SCHEDULE

### 1ST SEMESTER
- **GRAD PATH:** Responsible Conduct of Research Statement
- **Complete Key Request Form:** Complete form and submit to OGC, Rm. 645. Bring your CatCard. Form can be found at: [www.optics.arizona.edu/about/staff/forms](http://www.optics.arizona.edu/about/staff/forms)
- **Sign Up for OPTI 792 Directed Introductory Graduate Research** (Optional but highly recommended for 1st & 2nd semester) Form can be found at: [www.optics.arizona.edu/academic/course/opti-792](http://www.optics.arizona.edu/academic/course/opti-792)

### 2ND SEMESTER
- **Submit First-Year Graduate Student Progress** Form can be found at: [bit.ly/gradforms](http://bit.ly/gradforms)
- **Complete the First-Year Graduate Student Survey** Form can be found at: [bit.ly/gradforms](http://bit.ly/gradforms)

### 3RD SEMESTER
- **GRAD PATH:** Plan of Study Form can be found at: [bit.ly/gradforms](http://bit.ly/gradforms)
- **Commence Qualifying & Comprehensive Exams**
  - Take the Qualifying Exam. (Students will be notified of the two-day exam date, set in August)
  - Must have completed 20 units of coursework and courses: OPTI 591, 592, 595, and 598 or 584/600G
  - Complete the comprehensive exam committee request form (bit.ly/gradforms) must have passed the qualifying exam, completed the core curriculum and 30 units of coursework.
- **GRAD PATH:** Comp Exam Committee Appointment Form.

### WHEN READY FOR ORAL COMPREHENSIVE EXAM
- **GRAD PATH:** Announcement of Doctoral Comprehensive Exam.
- **GRAD PATH:** Announcement of Oral Comprehensive Exam.
- **Graduate College will charge a $55 candidacy fee at that time.**

## AFTER COMPLETING REQUIRED COURSEWORK
- **GRAD PATH:** Doctoral Dissertation Committee Appointment
- **Get Dissertation Proposal Exam Summary signed by advisor** (bit.ly/gradforms)

## LAST SEMESTER
- **GRAD PATH:** Announcement of Final Oral Defense. Submit at least 10 business days before the defense.
- **Email a 2-4 Paragraph Dissertation abstract to the Graduate Coordinator for your Defense announcement.**
- **Defend Your Dissertation.** (It is customary to provide snacks/drinks for committee).
- **Check Grad College Important Dates and Deadlines for recommended latest exam date**

## AFTER PASSING DISSERTATION DEFENSE
- **Submit Dissertation to the Graduate College**
- **Complete the OSC Clearance Form** Form can be found at: [bit.ly/gradforms](http://bit.ly/gradforms)
- **Update Mailing Address in UAccess to Receive Diploma**
- **Celebrate! RSVP for OSC Convocation Ceremony**
First-Year Ph.D. Coursework

Fall Semester (10-12 units)

• Completion of OPTI 501 (EM Waves; Group II)
• Completion of OPTI 502 (Geometrical Optics; Group II)
• Completion of OPTI 512R (Linear Systems and Fourier Transforms) or OPTI 570 (Quantum Mechanics) – (Group I) both can be used as prerequisites for OPTI 505R
• Register for at least 1 additional credit of graded coursework. 792 recommended.

Spring Semester (10-12 units)

• Completion of OPTI 505R (Diffraction & Interferometry; Group II)
• Completion of OPTI 511R (Optical Physics & Lasers) OR OPTI 544 (Foundations of Quantum Mechanics) and OPTI 600G (Laser Beams and Resonators) (Group II)
• Completion of an additional 4 hours of graded coursework if enrolled in OPTI 511R OR 3 hours graded coursework if enrolled in OPTI 544 and OPTI 600G (Elective). 792 recommended.
First Year Ph.D. Research Course

- Directed Graduate Research: OPTI 792
  - **GOAL**: Find a Ph.D. research adviser in year 1
  - **For first year Ph.D. Student only**
  - 1-3 units possible in each semester
  - Counts towards 20-credit-hour requirement for first year Ph.D. students
  - The course is graded – based on task list
    - Expected hours per task
    - Target completion date for each task
    - Points possible for each task
  - Sign up with professor(s) of your choice (online form is within the course description)
  - Jini Kandyil will enroll you in OPTI 792 when your form is complete

Strongly Encouraged to do this In both the Fall & Spring Analogous to lab rotations
Ph.D. Qualifying Exam

Expectations and Date

• A qualifying exam will be administered once each year at the beginning of the fall semester during the week before classes start
• It was held Monday and Tuesday of this week

Eligibility

• All first-year Ph.D. students must take it
• Non-Ph.D. graduate students who have just been admitted to the Ph.D. program may take it too
Format of Ph.D. Qualifying Exam

**Written Qualifying Exam**

- Be a uniform, written examination that covers 501, 502, 505, and 511R/570/544/600G
- Be given in 2.5-hour sessions on two consecutive days
- Day one will have one question from each of the four classes
- Day two will have another question from each of the four classes

**Oral Retest of Qualifying Exam**

If you fail no more than one area on the written test, you may opt to take an oral retest in that area:

- Common committee for each of the four course areas
- This oral examination will occur just before or near the start of the spring semester following the written exam
Ph.D. Comprehensive Exams

Written Comprehensive Exam
You will prepare in advance a written report of not more than 10 double-spaced pages that demonstrates synergy among the broad areas of optics as applicable to your individual research.

Oral Comprehensive Exam
You will prepare a 15- to 25-minute presentation that discusses your written report.
- Questions will gauge your understanding of the basic principles of optics and the ability to synthesize across the field of optics.
- Faculty committee will be comprised of at least 3 of the 4 OpSci Divisions.

The written and oral portions of the Comprehensive Exam must both be taken before the end of the academic year that follows the academic year in which the Qualifying Exam is passed.
Advancing to Ph.D. Candidacy

Eligibility

• 32 credit hours of course work
• Good academic standing with the University
• Completion of the Comprehensive Examination
• Completion of a minimum of two years in the college graduate program

Upon Candidacy

• Upon advancing to candidacy for a Ph.D. in Optical Sciences, a student is eligible for the rank of Graduate Research Associate
• Student has the option of receiving the M.S. degree in Optical Sciences by completing a one-page form
Dissertation

• You with your advisor are encouraged to identify the dissertation committee as soon as possible after advancing to candidacy.
• Complete a dissertation proposal
• Approval of research direction will be left to the discretion of individual dissertation committees
• Dissertation defense:
  • Three member committee
  • Typical duration is 2-3 hours
  • Public presentation followed by committee questions
QUESTIONS?

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