



THE UNIVERSITY OF ARIZONA

Wyant College  
of Optical Sciences

## GRADUATE STUDENT HANDBOOK

version 2022.10.04

The Wyant College of Optical Sciences Graduate Student Handbook is a detailed resource for Optical Sciences graduate students, and for faculty and advisors who work with Optical Sciences graduate students. This Graduate Student Handbook conveys common practices, procedures, policies, requirements, and traditions of the University of Arizona (UA) Wyant College of Optical Sciences (OSC) and supplements the enrollment, academic, and degree completion requirements of the UA Graduate College. In matters of practices, procedures, and policies, students should first consult this OSC Graduate Student Handbook, and then consult UA Graduate College policy when questions arise or in regards to policies and procedures that are in place for all UA graduate students. This Graduate Student Handbook may update, expand upon, or add to the general UA Graduate College policy, or address approved exceptions to UA Graduate College policies.

The Wyant College of Optical Sciences reserves the right to modify or replace any OSC policy or requirement listed in this Handbook at any time. The information listed in this version of the Handbook supersedes all prior versions and applies to all OSC graduate students, regardless of admission year, unless otherwise noted. Students are responsible for understanding and adhering to all policies and procedures outlined in this Handbook.

This Handbook is organized as follows. The first section after the Table of Contents contains contact information and links to websites that are of primary relevance to the content of this Handbook. The second section contains general information relevant to all OSC graduate students regardless of OSC graduate programs. The remaining sections each contain information specific to individual OSC graduate programs.

Questions about the information contained in this Handbook should be directed to the OSC Graduate Advisor at [grad-advising@optics.arizona.edu](mailto:grad-advising@optics.arizona.edu), or 520-621-8418, or the OSC Academic Programs Office, Meinel 403D. Concerns or questions may also be directed to the Associate Dean of Graduate Academic Affairs. In all situations where the Associate Dean of Graduate Academic Affairs is unavailable for consultation or consideration of a situation that needs immediate attention, the Associate Dean for Undergraduate Academic Affairs is authorized to act on behalf of the Associate Dean for Graduate Academic Affairs.



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# I. Contact Information and Website Links

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## A. OSC WEBPAGES: QUICK ACCESS

[\[Jump back to TOC\]](#)

- Academic Programs Staff Directory: <http://www.optics.arizona.edu/our-college/full-directory/staff/academic-programs>
- Forms for Graduate Students: <http://www.optics.arizona.edu/osc-students/graduate-student-resources/graduate-forms>
- General OSC Forms, Files, and Resources: <http://www.optics.arizona.edu/resources>
- Graduate Programs Resources: <http://www.optics.arizona.edu/osc-students/graduate-student-resources>
- OSC Courses: <http://www.optics.arizona.edu/osc-students/courses>
- Student Clubs and Societies: <https://www.optics.arizona.edu/osc-students/student-clubs-societies>
- Tuition, Fees & Funding: <http://www.optics.arizona.edu/osc-students/scholarships-funding>
- Wyant College of Optical Sciences: <http://www.optics.arizona.edu>

## B. UA WEBPAGES: QUICK ACCESS

[\[Jump back to TOC\]](#)

- Bursar: <https://bursar.arizona.edu>
- Campus Health: <https://health.arizona.edu>
- Graduate College: <https://grad.arizona.edu>
- Graduate Student Academic Services: <https://grad.arizona.edu/gsas>
- Graduate Student Policies and Procedures: <https://grad.arizona.edu/policies>
- Graduate College and GradPath Forms: <https://grad.arizona.edu/forms/gsas>
- Graduate & Professional Student Council (GPSC): <https://gpsc.arizona.edu>
- Office of the Registrar: <https://www.registrar.arizona.edu>
- Registrar Forms: <https://www.registrar.arizona.edu/online-forms-available-from-office-of-the-registrar>
- University of Arizona: <https://www.arizona.edu>

## C. CAMPUS RESOURCES AND UA WEBSITE LINKS

[\[Jump back to TOC\]](#)

- [Bursar's Office](#)  
Student accounts, questions about tuition payments, etc.  
University Services Building, Room 104; 520-621-3232
- [Campus Health](#)  
Check-ups, pharmacy, psychological services, etc.  
Highland Commons, 1224 E. Lowell St. (northwest corner of Highland and 6th Street); 520-621-6490



- [Career Services](#)  
Career counseling, job postings, interview skills and resume writing.  
Student Union Memorial Center, Room 411; 520-621-4224; [careerservices@arizona.edu](mailto:careerservices@arizona.edu)
- [CAPS](#)  
Counseling and Psychological Services offering counseling to students to help them cope with personal and family problems. Licensed professionals provide treatment for anxiety, depression, relationship difficulties, family problems, food and body concerns, alcohol and drug concerns, and other life crises.  
Highland Commons, 1224 E. Lowell St. (northwest corner of Highland and 6th Street); 520-621-3334
- [Child Care and Family Resources](#)  
Provides consultation appointments to assess needs and issues, customized referrals, sick child and emergency back-up care, elder care, financial assistance, etc.
- [Curriculum and Registration](#)  
Class registration, grades, transcripts, forms and policies.  
Administration Building, Room 210; 520-621-3113; [reghelp@arizona.edu](mailto:reghelp@arizona.edu)
- [Disability Resource Center](#)  
Facilitates full access for disabled students, faculty, staff, and visitors through the provision of reasonable accommodations, adaptive athletic and fitness programs, assistive technology, etc.  
1540 East 2nd Street; 520-621-3268; [disability@arizona.edu](mailto:disability@arizona.edu)
- [Graduate College](#)  
The Graduate College monitors academic accomplishments, assures that University and Arizona Board of Regents degree requirements are met, assists in obtaining correct forms and signatures, and files exam results to keep students on the path to graduation.  
Administration Building, Room 316; 520-621-3609
- [Financial Aid Office](#)  
Student loans and work study.  
Administration Building, Room 203; 520-621-1858; [askaid@arizona.edu](mailto:askaid@arizona.edu)
- [International Student Programs and Services](#)  
Represents and advocates for international students; liaisons with academic and other departments as well as state, federal and foreign agencies; provides immigration and tax advising.  
935 North Tyndall Avenue; 520-621-4627
- [Motorist Assistance Program](#)  
Assists with vehicle issues including jump-starts, flat tires and keys accidentally locked in cars; provided free by Parking and Transportation Services.  
520-621-AUTO
- [OASIS](#)  
Works to reduce campus incidences of sexual assault and relationship violence.  
Old Main, Room 228; 520-626-2051; [survivoradvocacy@arizona.edu](mailto:survivoradvocacy@arizona.edu)
- [Off-Campus Housing](#)  
Provides weekly updated off-campus housing, roommate notices and Tucson utility contact information.
- [Ombuds Program](#)  
Help students deal with problems they might have with the University; provides informal means of problem resolution in cases of University-related disputes. The Graduate College website states the Graduate College [Grievance Policy](#), and provides a [Summary of Grievances Types and Responsible Parties](#).  
President's Office, Administration Building, Room 712; 520-626-5589



- [Child Care Subsidies and Family Friendly Information](#)  
The Graduate College is dedicated to promoting and strengthening family relationships. Many resources have been designed to help graduate students balance and manage family, work, and school. These include Graduate Assistant/Associate Parental Leave, Temporary Alternative Duty Assignments (TADA) for Teaching Assistants/Associates, Extension of Time-to-Degree Policy, Life & Work Connections – Child and Elder Care Resources.
- [Parking and Transportation Services](#)  
Provides parking options and promotes transportation alternatives and shuttle routes.
- [Residency Classification](#)  
Provides instructions for obtaining Arizona residency for tuition purposes.  
Education Building, Room 122; 520-621-3636
- [Strategic Alternative Learning Techniques Center](#)  
Provides enhanced, for-fee services for students with documented learning disabilities.  
1010 North Highland Avenue; 520-621-1242
- [UA Police Department](#)  
1852 East First Street; 520-621-8273; for emergencies dial 911
- [Women & Gender Resource Center](#)  
Organization devoted to providing resources and information about gender and women's issues.  
Located among the ASUA offices, 3rd floor of the Student Union next to the bookstore; 520-621-3919
- [Veterans Education and Transition Services](#)  
Offers information and services related to the Montgomery GI Bill benefits from the Department of Veteran Affairs. Administration Building, Room 313; 520-621-9501



## II. GENERAL INFORMATION:

### ALL GRADUATE STUDENTS, MULTIPLE OSC PROGRAMS

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#### A. ACADEMIC INTEGRITY

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Integrity is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own. This principle is furthered by the student [Code of Conduct](#) and disciplinary procedures established by ABOR Policies 5-308 through 5-403, all provisions of which apply to all University of Arizona students. Conduct prohibited by the Code consists of all forms of academic dishonesty, including but not limited to: cheating, fabrication, facilitating academic dishonesty and plagiarism.

#### B. BUILDING KEYS AND KEYLESS BUILDING ENTRY

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OSC graduate students will be provided with keyless building entry to the Meinel Building. After obtaining your [CatCard](#) and enrolling in courses you will need to complete a [key request form](#) and submit it using the instructions provided on the form. For lab or office key entry, the student's faculty advisor/supervisor must sign the form. For building entry, the Graduate Advisor must give approval by signing the Graduate Student Entry Form available at the OSC [Student Forms](#) webpage.

#### C. BURSAR'S OFFICE

[\[Jump back to TOC\]](#)

The [Bursar's Office](#) at the University of Arizona is responsible for providing student account information; receiving payments for tuition, registration fees and miscellaneous campus charges; collection of delinquent accounts; and delivering refunds and financial aid proceeds. The Bursar's Office is located in the University Services Building, 888 N. Euclid Avenue.

The University of Arizona offers a tuition payment plan for fall and spring semesters.

Note: To avoid repaying the tuition waiver, registration deduction and student health insurance premium for a semester in which a student resigns their research or teaching assistantship position, the student must officially graduate prior to resigning their position. Graduation can happen anytime during the semester, as long as the official graduation occurs before resignation. The definition of "official" graduation is submission of all degree completion documents to [Graduate Student Academic Services](#).





#### **D. CATCARD**

[\[Jump back to TOC\]](#)

The [CatCard](#) is the single, common and recognizable identification card for people who are affiliated with the University of Arizona. Amongst other uses, it is required to obtain keyless Meinel Building entry. In addition, the CatCard is used for: identification and status, library access, recreation center access, meal plan access, photocopying and printing services, vending machine purchases, parking payment at campus garages, and small dollar purchases at the UA BookStores and U-Mart convenience store.

#### **E. CHANGE OF CLASS SCHEDULE: DROPPING AND ADDING UNITS**

[\[Jump back to TOC\]](#)

To make changes to their semester schedule by adding or dropping a class, students must complete a [change of schedule form](#). However, changes such as switching to an audit or dropping a course to replace it with dissertation units may incur extra charges, including tuition fees, late fees and other mandatory fees. In addition, a W grade will be issued if a course is dropped after the University deadline to drop without penalty.

Please note: An audited course does not meet enrollment requirements for students receiving funding, or other UA or OSC enrollment requirements related to maintaining satisfactory academic progress. Funded graduate research and teaching support positions require enrollment in at least six units. If you have other financial aid funding, you should confirm the number of units you are required to be enrolled in each semester. When adding graded units, the Registrar's Office may request that the form be approved by the Graduate College's dean (not the Dean of the Wyant College of Optical Sciences). To obtain the signature of the Graduate College's Dean, students should go to the third floor of the Administration Building, and then return to the Registrar's Office on the second floor.

#### **F. CLASS ATTENDANCE AND PARTICIPATION POLICIES**

[\[Jump back to TOC\]](#)

The Wyant College of Optical Sciences adheres to the University of Arizona's [Class Attendance and Participation policies](#), which states "Students are expected to be regular and punctual in class attendance and to fully participate in the course. The University believes that students themselves are primarily responsible for attendance and class participation. Since students may be permitted to add classes beyond the official start date, instructors should be attentive to student enrollment dates when assessing adequate participation for the purposes of administrative drop."

For in-person graduate (and undergraduate) classes, "Excessive or extended absence from class is sufficient reason for the instructor to administratively drop the student from the course." Furthermore, "The date the administrative drop is posted on the class roster in the UAccess Instructor Center will determine how it affects the student's academic record. If the administrative drop is completed by the first drop deadline, it will result in cancellation of registration in the course." The first and second drop deadlines are defined according to whether the class is an undergraduate or graduate course. OSC class and attendance policies are as follows:



For Optical Sciences undergraduate and graduate in-person courses, instructor permission is needed for a student to register for or remain in a course whenever

- the student is enrolled in another class that has complete or partial overlap in time, for all or part of a semester, with the Optical Sciences course. In some cases, the Academic Programs staff may be able to resolve class overlap problems when the two classes in question are Optical Sciences courses;
- the student is enrolled in another class (or has another regular schedule commitment) that meets immediately before the Optical Sciences class, but is sufficiently far away that the student will not be able to arrive at the Optical Sciences class on time on a regular basis;
- the student is enrolled in another class (or has another regular schedule commitment) that meets immediately after the Optical Sciences class, but is sufficiently far away that the student will not be able to remain in the Optical Sciences class for the full duration of the class period on a regular basis;
- the student has a known travel schedule due to work or research (or other activity) that will cause the student to miss an excessive number of classes. The instructor of the course may determine what is considered excessive;
- Nominally, and unless otherwise stated by the course instructor, known or planned absences totaling more than 10%-15% of the class periods are considered excessive and the student must discuss the situation with the instructor and receive explicit permission from the instructor prior to taking the course;
- an emergency situation arises after the start of the semester that will cause the student to miss an excessive number of classes. In emergency situations, such as student or family illness, or a death in the family (or other reasons), OSC asks the instructor to work with the student to find reasonable accommodations for either completing the course or taking an incomplete in the course. In some graduate courses, for instance, the student may be able to watch recorded lectures;
- due to schedule conflicts, the student will not be able to participate in required or expected activities out of the usual classroom meeting times, such as required outreach events (for outreach classes).

The Wyant College of Optical Sciences considers class participation to be an essential component of the educational process. Each instructor may involve class participation in their grading policies, or in otherwise evaluating whether or not a student making sufficient academic progress. "Class participation" may involve some or all of the following:

- students answering questions asked by the instructor, when called upon, or voluntarily;
- students adhering to the schedule set by the professor, including turning in homework on time, taking in-class quizzes, participating in group activities, etc.;
- students refraining from making distracting comments or asking distracting questions during class, or other distracting behavior, such that other students in the class are not able to effectively learn or participate in the class. If a student makes frequent comments that the instructor determines to be distracting, the instructor should make the student aware that their comments are distracting or out of place, and help the student understand why the comments or questions are distracting. If such behavior continues, the instructor should again ask the student to refrain from such comments in an email message, also sent to one of the Optical Sciences Associate Deans for Academic Affairs (Undergraduate, or Graduate) prior to taking any further action (such as grade reduction or administrative drop);
- a student with substantially inadequate preparation (such as the absence of prerequisite courses or technical background and math skills) may hinder the student's ability to adequately participate in the class. The instructor may then choose to administratively drop the student from the course



after consultation with one of the Optical Sciences Associate Deans for Academic Affairs, after notifying the student via email of the situation, and after the student has been given an opportunity to demonstrate adequate preparation (such as showing a transcript with sufficient grades received in prerequisite courses). The instructor should make every effort inform the student of such a concern prior to the first drop deadline, if there is adequate means of making such an assessment early in the semester. Substantially inadequate preparation, coupled with inadequate class participation, may become excessively time consuming for the instructor and student, and may be a distraction to other students in the class.

The policies stated above are the default policies pertaining to Optical Science classes. Instructors may supplement these policies, or determine what is considered "excessive" in terms of course attendance and absences, and communicate their policies to the class prior to the first drop deadline for the class. Students that do not adhere to the policies described above, or who do not receive appropriate instructor permissions for enrolling in or remaining in the class, may be administratively dropped from the class by the instructor.

## **G. COMMENCEMENT AND DIPLOMAS**

[\*\[Jump back to TOC\]\*](#)

The University of Arizona celebrates graduate degree completion in May. The Wyant College of Optical Sciences holds two Pre-Commencement Celebrations, one in December and one in May, prior to the UA commencement ceremony. Invitations and information are emailed to anticipated graduates around mid-October and mid-March.

Diplomas are not given out at commencement. Diplomas are ordered individually for each student after the final degree audit of their academic record is completed. You should receive your diploma about four weeks after the Pre-Commencement Celebration. The diploma will be mailed to the address you have listed on UAccess Student as your "permanent" address. If you do not want it sent to your "permanent" address you should create a "diploma" address and it will be mailed there instead. Diplomas are printed and mailed from out of state; therefore students are not able to pick them up here on campus.

If you complete degree requirements early in the semester and need to provide proof of your degree, please make a request to the Degree Counselor at the Graduate College.

## **H. COMMUNICATION AND CONTACT INFORMATION**

[\*\[Jump back to TOC\]\*](#)

The primary means of communication with students is email. Your @arizona.edu email address serves as your official UA email address and is your means of receiving official UA correspondence. You can forward the correspondence received at this address to other addresses, such as your @optics.arizona.edu email account if you have one. It is your responsibility to check your email regularly, including your @arizona.edu account.



Each on-campus OSC student will be assigned a shared mailbox in the Meinel Building. The mailroom is located on the fourth floor in Room 426.

It is your responsibility to promptly submit new contact information (email address, mailing address, campus location, telephone number) to the Academic Programs office. You will also need to update any change in contact information in UAccess Student.

## **I. CONTINUOUS ENROLLMENT**

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Graduate students must meet the [continuous enrollment policy](#). Master's degree and doctoral students hired on an assistantship must be enrolled in at least six units. Auditing a class does not count toward meeting the unit requirement. Graduate assistants/associates are not required to be enrolled during the first or second summer semester unless they are graduating in August. If you are unable to enroll in fall or spring semester, you must submit a [leave of absence form](#) through the petition section in GradPath to maintain your status. If you fail to meet the continuous enrollment policy and do not register, you will need to reapply to the Graduate College and be approved for readmission by the Associate Dean for Graduate Academic Affairs in Optical Sciences. Students with scholarships or financial aid may be required to be enrolled in more than six units. Note: When all course and dissertation/thesis/master's report units have been fulfilled, only one unit of enrollment per semester is required with approved [Application for Advanced Status](#).

Doctoral students finishing in the summer who have maintained continuous enrollment and completed all other degree requirements as well as the 18 units of dissertation may defend in the summer without enrolling or registering. Students should verify eligibility with the Graduate Advisor or [Graduate Student Academic Services](#) degree counselor.

**Notice for international students:** Please check with the [International Student Services](#) (ISS) to be sure you are in compliance with your visa obligations since you may be required to be enrolled in additional units to maintain your full-time student status. Nine units is considered full-time status for non-funded international students. Upon completion of all course work, it is possible to request a waiver of the nine-unit requirement from ISS so that you can enroll in only three units.

## **J. CUBICLES**

[\[Jump back to TOC\]](#)

Graduate student cubicle are assigned for one year at a time at the beginning of each fall semester, after email notice from OSC Academic Programs staff to all graduate students inviting requests for cubicle space. The assignment of cubicle space is not guaranteed, but College staff makes every effort to accommodate students who have submitted a cubicle request. Cubicle spaces are intended to be used as places for students to go to work on academic coursework primarily, rather than research related activities, and therefore newer graduate students taking many courses are given priority when spaces are assigned. Cubicles are not to be used as storage spaces, especially for valuable personal or research items, or as places to work on laboratory activities. Cubicles must be kept neat and free of trash and laboratory



equipment, personal items must be contained to the space of the assigned cubicle only, and every student in a cubicle space must be respectful of others in the cubicle space and help keep the space relatively quiet as a place to study and work on academic assignments. Students must abide by all instructions from College staff regarding the use of cubicle space in order to keep it a viable shared space, including relocation of items when the space is to be cleaned by custodians, or due to other planned modifications. Violations of these rules will result in the rescindment or reassignment of individual assigned cubicle spaces, and may result in the removal or relocation of items by College staff if the student does not remove or relocate items from cubicle space when requested to do so. Cubicle space is not secure and the Wyant College of Optical Sciences, or its staff, are not responsible for stolen, lost, or damaged items for any reasons.

## **K. GRADES AND GPA**

[\[Jump back to TOC\]](#)

Unless the student's major professor approves one C-graded course per M.S. or Ph.D. degree, only grades of A or B are accepted toward degree requirements. Prior to graduation, students may repeat — only once — a graduate-level course in which they received a grade of C, D or E. Both grades will be used toward calculation of GPA.

Graduate students must maintain a GPA of 3.0. Students who have a cumulative GPA of less than 3.0 will be placed on [academic probation](#). Probationary status may impact current or future funding opportunities. Students whose GPA is below 3.0 for two consecutive semesters are dismissed from their program.

OSC Grading Scale for Graduate Classes:

- **A: Excellent** – has demonstrated a more than acceptable understanding of the material; exceptional performance; exceeds expectations.
- **B: Good** – has demonstrated an acceptable understanding of the material; adequate performance; meets expectations.
- **C: Average** – has not demonstrated an acceptable understanding of the material; inadequate performance; does not meet expectations.
- **D: Poor** – little to no demonstrated understanding of the material; exceptionally weak performance.
- **E: Failure** – usually reserved for non-attendance or non-completion.

## **L. GRADUATE COLLEGE THESIS AND DISSERTATION TUITION SCHOLARSHIPS**

[\[Jump back to TOC\]](#)

The Graduate College [Thesis and Dissertation Tuition Scholarships](#) are for non-resident students who are within two years of completing their degree and only working on their thesis or dissertation. The scholarship reduces tuition to the resident tuition rate. Students on appointment as graduate research assistants or associates, or graduate teaching assistants or associates, already receive a reduction of nonresident tuition to resident rates as a benefit of the appointment. Students enrolled in UA Online programs are not eligible.



Students must be enrolled for 1 to 6 units of 900-level units only for the term of the award and must have a cumulative GPA of 3.0 or higher. To be considered for a tuition scholarship, contact the Graduate Advisor in the Academic Programs office; students may not apply directly for a scholarship. The deadline for submission of an approved waiver is one week in advance of the Bursar's Office tuition payment deadline.

## **M. IMMUNIZATION REQUIREMENT AND HEALTH INSURANCE**

*[\[Jump back to TOC\]](#)*

Before newly admitted graduate students can register, they must [submit proof](#) of measles, mumps, and rubella immunizations. Graduate students who require student health insurance must enroll for student health insurance in UAccess Student in the fall semester. Those who enroll in the fall semester will be automatically enrolled for spring semester health insurance when they register for spring classes. Online students do not need to register for health insurance; however, Online M.S. students will need to submit immunization records prior to spending a semester on campus.

Note: Graduate students finishing in May who enroll in the spring-semester health insurance are covered through mid-August.

## **N. INCOMPLETE GRADES**

*[\[Jump back to TOC\]](#)*

The Wyant College of Optical Sciences adheres to the University of Arizona's Incomplete policy as stated on the [UA Report of Incomplete Grade form](#). As stated on this form, "This form is to be completed by the instructor issuing the "I" grade, signed by all parties, and filed in the department with a copy to the student."

The UA policy on the submission of "incomplete" for a course grade is stated on the Report of Incomplete Grade form as follows:

The University policy for issuing an "Incomplete" grade is stated in the University Catalogs. An "Incomplete" can only be awarded at the end of the semester when all but a minor portion of the course has been satisfactorily completed, and when the student is unable to finish due to extremely unusual circumstances and/or exceptional hardship. The grade of "I" is not to be awarded in place of a failing grade or when a student is expected to repeat the course; in such a case, the appropriate grade must be assigned. Students should make arrangements with the instructor to receive an "Incomplete" grade before the end of the semester. After the course work is completed, the instructor will assign the appropriate grade through the Instructor Center Grade Roster system.

Consistent with University policy and for additional clarification, the Wyant College of Optical Sciences suggests the following additional items for instructors and students to consider when determining whether or not to submit or accept a grade of incomplete for a course:





- The Report of Incomplete Grade form has important rules regarding incomplete grades that must be read and agreed to by the student and the instructor. The form must be filled out and submitted to the Wyant College of Optical Sciences graduate advisor when an incomplete is submitted for a student at the end of a semester.
- In the above policy statement, "extremely unusual circumstances and/or exceptional hardship" should be taken seriously. Such examples would be if the student falls seriously ill, is in an accident, or has a family emergency during the semester, either near the end of the course and is unable to complete the course due to illness, or earlier in the semester and is unable to catch up (but still completes most coursework).
- The instructor should consistently apply their criteria for submitting an incomplete to all students in the class. If many students all fall seriously ill at the end of the semester, for example, and cannot take the final exam, the instructor should be consistent in their use of the incomplete for all of these students.
- A grade of incomplete will typically not be used in cases where a student has not endured unusual hardship, and would simply like additional time to complete coursework such as extra time to prepare for the final exam. The instructor should keep in mind that if such a request is granted to this one student, the same request would need to be granted to all students in the class if requested.
- In instances where a grade of incomplete is submitted for a student, and the student does not submit all graded course materials or does not take one or more exams for the course, the instructor may insist that the student take the exams or complete the work in the following year's course instead (without registering for the course). If this approach is to be taken, the instructor and the student should discuss an alternate plan if the course is not offered the following year. The instructor is also not obligated to give the student the same exams at a later date as were given when the student took the course, OR to create new equivalent exams for the student, but the instructor may choose to pursue either option.
- While certain circumstances such as serious illness, accident, or family emergency may be examples of when an incomplete grade may be submitted at the discretion of the instructor, consistent with university policy, many other cases may be more in a "gray zone." The instructor has discretion over the incomplete policy for their classes, and whether or not to submit an incomplete; the instructor is not obligated to submit a grade of incomplete at the request of a student, and alternative actions may also be considered. In cases of illness immediately before the final exam, for example, rather than submitting an incomplete an instructor may opt to use the average of previous exam grades as the final exam grade in order to submit a final course grade on time as required by university policy. In all cases, the course instructor must ensure that grading policies are consistently applied across their class.
- Special considerations regarding Incompletes for Non-degree Seeking Graduate Students enrolled in OPTI courses: It is the policy of the Wyant College of Optical Sciences that non-degree seeking students must obtain instructor permission to enroll in OPTI courses. Most graduate courses also require departmental permission, and non-degree seeking students must enroll through the OSC Graduate Advisor. Additionally, if a non-degree seeking student has received a grade of C or lower in any two OPTI graduate-level courses, or a grade of D or lower in a single OPTI graduate-level course, the student must also obtain the permission of the OSC Associate Dean for Graduate Academic Affairs to enroll in further OPTI graduate courses. The student must also obtain such permission if they have an unresolved incomplete in an OPTI course, in which case the Associate Dean may discuss the student's situation with the course instructor in order to help determine continued permission to take OPTI courses until the incomplete is resolved.



## **O. INDEPENDENT STUDY: OPTI 599**

[\[Jump back to TOC\]](#)

OPTI 599: Independent Study units must meet Graduate College policy and be approved by the Associate Dean for Graduate Academic Affairs. Before enrolling in OPTI 599, you must complete an [independent study proposal form](#) and submit it to the Academic Programs office in Meinel 403 for the approval of the Associate Dean of Academic Programs. Once approved, you will be registered for OPTI 599 by the Graduate Advisor.

## **P. JOB SEARCHES AND EMPLOYMENT OPPORTUNITIES**

[\[Jump back to TOC\]](#)

Employment opportunities may be announced in the OSC weekly newsletter, Watts Up! See also the [employment section of the OSC website](#).

## **Q. LABORATORY COURSE REQUIREMENTS AND LIST OF LAB COURSES**

[\[Jump back to TOC\]](#)

All Ph.D. and M.S. students must include at least **two introductory optics laboratory courses** as part of their plan of study. These classes provide hands-on or computation-based experiences to help the students learn the fundamentals that are taught in the core lecture classes. While two lab courses are required, additional laboratory courses are strongly recommended.

In some circumstances, a student may qualify to have one lab requirement waived by the Associate Dean for Graduate Academic Affairs. M.S. Distance Learning students working in the optics industry commonly qualify to have one lab requirement waived based on their industry experience.

For Ph.D. students, lab waivers are rare. One lab requirement may be waved if:

- Student graduated from an undergraduate program specializing in Optics or Photonics or similar (but not physics or engineering, etc) AND
- Received As or Bs in most labs taken as an undergraduate (may need to submit transcript if undergrad degree was not from UA) AND
- Completed an optics lab-related experience other than a lab course while a graduate student at UA or after completing their undergrad degree, in an area sufficiently different from that of the student's Ph.D. research. This could be serving as a TA for an optics lab, approved laboratory or outreach mentorship, a summer internship involving lab work that is not also related to the student's Ph.D. research, or an M.S. degree at UA in an area distinctly different than their Ph.D. research area AND
- Has a statement of support (email to Associate Dean is fine) from Ph.D. advisor.

OR

- Student completed a Master's degree with thesis in Optics or Photonics or a related program elsewhere AND





- Their Master's degree research topic is in an area distinctly different than their Ph.D. research area AND
- Earned As or Bs in at least two optics labs from their Master's program AND
- Has a statement of support (email to Associate Dean is fine) from Ph.D. advisor.

OR

- Student has previously worked full time for at least one year in an optics-related industry position, involving hands-on laboratory methods that are distinctly different than their Ph.D. research area AND
- Completed an optics lab-related experience other than a lab course while a graduate student at UA, in an area sufficiently different from that of the student's Ph.D. research. This could be serving as a TA for an optics lab, approved laboratory or outreach mentorship, a summer internship involving lab work that is not also related to the student's Ph.D. research, or an M.S. degree at UA in an area distinctly different than their Ph.D. research area AND
- Has a statement of support (email to Associate Dean is fine) from Ph.D. advisor.

A waiver of a lab requirement does not reduce the overall total number of units required for the degree. Students should complete the [Lab Waiver Form](#) if they would like to petition for the waiver.

Without a waiver, Arizona Online/Distance Learning students are also required to complete two labs. If applicable, online students can apply for a waiver of one of the lab requirements, particularly if they have been involved in substantial optics-related work in industry. There is also the option to contract with an OSC faculty member to complete an [OPTI 599 Independent Study](#) with a laboratory focus that includes breadth of laboratory or computational experiences in a particular area of optics. Students should specify on the form that they would like for it to count toward their lab requirement.

The classes that satisfy the laboratory requirement are listed in [Section VIII.F](#).

Of the two lab courses required of Ph.D. students, one of the lab courses must involve hands-on laboratory work. Because of this, a Ph.D. student may include only one of OPTI 512L, OPTI 571L, or OPTI 586L on their Plan of Study.

## **R. LEAVE OF ABSENCE**

*[\[Jump back to TOC\]](#)*

Students who need to take a semester or an academic year off from their program must submit a [petition for a leave of absence](#) with the Graduate College. The student should select their faculty advisor's name as the Major Advisor. If the student has not identified a faculty advisor, the Associate Dean for Graduate Academic Affairs will be entered instead of the advisor. Students who do not enroll and who also do not submit a leave of absence will be dropped from the program by the Graduate College and will need to reapply.



## **S. PLAN OF STUDY: OSC REQUIREMENTS AND RESTRICTIONS**

*[Jump back to TOC]*

### **Overview**

- A student's Plan of Study is the complete set of courses and research units that are taken to satisfy degree requirements. Every student will have a different Plan of Study.
- The approvals in Grad Path of the Plan of Study by the student's faculty advisor, the Associate Dean for Graduate Academic Affairs, and the UA Graduate College are the official acknowledgements that the Plan of Study submitted by the student is properly constructed to satisfy degree requirements. The Associate Dean serves as and should be listed as the advisor on the Plan of Study for students pursuing the M.S. Technical Writing option (ie, not completing a thesis or report) and the Certificate program; however, the Associate Dean is not the default chair of the M.S. committee, and M.S. students pursuing the Technical Writing option must find other faculty members to serve as the chair and members of their M.S. oral exam.
- Any exceptions to the Optical Sciences Plan of Study permissions and restrictions listed below must be pre-approved in writing/email by the Associate Dean for Graduate Academic Affairs, and when requested by the Associate Dean, by written approval of the student's faculty advisor / committee chair.

### **General Permissions and Restrictions**

- OSC Plan of Study restrictions for the different graduate programs are summarized in [Section VIII.C.](#)
- Non-OPTI courses may be allowed on a plan of study with the approvals of the faculty advisor and the Associate Dean for Graduate Academic Affairs. Generally, approval is usually given for technical/STEM courses offered by another department that are considered by the student and faculty advisor as being important or beneficial to the student's area of research and career goals. Typically, at least half of the coursework units on a student's plan of study need to be in courses offered by Optical Sciences.
- Business, Ethics, and Fellowship courses, or other non-STEM and non-Optical Sciences courses are allowed on M.S. and Ph.D. Plans of Study as long as the courses in this category appear on the approved list of such courses in the OSC Graduate Handbook, or are pre-approved in writing/email by the Associate Dean for Graduate Academic Affairs, are later approved by the faculty advisor (for Ph.D. and M.S. Thesis and Report students), and are within the course unit limitations listed below.
- All transfer units from another university must first be approved by the Graduate College as being suitable for consideration as transfer units at UA, and may then be pre-approved by the Associate Dean for Graduate Academic Affairs as being acceptable as transfer units on an Optics degree Plan of Study. The student's faculty advisor or committee chair (Ph.D. and M.S. thesis/report students only) must provide their approval of the transfer units on the plan of study, when it is submitted. The Associate Dean then provides their approval of the transfer units.
- For the Graduate College to approve transfer units from another institution, the courses must have been: (1) taken at an accredited institution; (2) graduate level courses; (3) not counted towards undergraduate degree requirements; (4) letter graded, with a grade of 'A' or 'B' earned. The Graduate College will also compare credit hour definitions and apply credit conversion if needed. The websites the Graduate College uses to check accreditation are <http://chea.org> (domestic institutions) and <http://whed.net> (international institutions).
- OPTI courses with a number in the 500 - 699 range may be taken only once for credit and used on the plan of study, with the following exceptions:



- OPTI 571L: may be taken twice for credit, but can be used to satisfy only one lab requirement for M.S. and Ph.D. degrees. For Ph.D. students, the other lab requirement must be satisfied with a hands-on lab (ie, not computation-based lab courses such as OPTI 512L and OPTI 586L).
- OPTI 595A: may be taken twice for credit for the Ph.D., or once for credit for M.S. and Certificate students. See additional limitations below regarding the Plan of Study for specific graduate degrees.
- OPTI 599 or 599 units from other departments: unlimited course credit is possible, however, see additional limitations below regarding the Plan of Study for specific graduate degrees. OPTI 599 Independent Study units are approved by the Associate Dean for Graduate Academic Affairs prior to OPTI 599 enrollment. Because 599 units taken through other departments are not similarly pre-approved by the Associate Dean, a student must obtain in writing pre-approval of the use of non-OPTI 599 units on a Plan of Study. 599 units are not to be used in place of Ph.D. dissertation, M.S. thesis, or M.S. report research units, and 599 credits are not to be used for performing research that is part of the thesis or dissertation. However, 599 units may be used to explore possible research interests that may eventually lead to or help develop a dissertation, thesis, or report.
- Generally, grades below 'C' may not appear on a Plan of Study for Minor, Certificate, M.S., or Ph.D. degrees. However, a single course with a grade of 'C' may appear on a Minor, M.S. (except for students in the M.S.+MBA dual degree program), or Ph.D. plan of study, with faculty advisor approval. A Certificate Plan of Study must only consist of courses with grades of 'A' or 'B'. If a student receives a grade of 'C' or lower in a course, the student may re-take the course to try to earn a higher grade and then include the course on the Plan of Study. For Ph.D. students, specific core courses must be listed on a Plan of Study with letter grades, so it may be the case that at least one course *must* be repeated if the student has two or more core courses with a grade of 'C' or lower.

### **Degree-specific Permissions and Restrictions**

- In addition to the General Permissions and Restrictions listed above, the tables in [Section VIII.C](#) list course permissions and restrictions for specific degrees.
- If a Ph.D. student first obtains an Optical Sciences M.S. degree, only 30 coursework units from the M.S. Plan of Study may appear on the Ph.D. Plan of Study. For a Ph.D. student obtaining the M.S. degree by passing of the Ph.D. comprehensive exam (by this path, 35 coursework units are required on the M.S. Plan of Study), at least 5 coursework units from the M.S. Plan of Study must not also be listed on the Ph.D. Plan of Study. However, these units will be nevertheless considered as contributing to the Optical Sciences Ph.D. course requirements, except for courses numbered 900, 909, or 910. This also means that a course with a grade of 'C' that is not technically shared with the Ph.D. Plan of Study will be the only grade of 'C' allowed to count towards satisfying Ph.D. course requirements.
- A lab waiver obtained for the M.S. degree does not automatically extend to the Ph.D..
- TABLE 1 of [Section VIII.C](#) lists minimum coursework units required for a degree, and the additional minimum number of required specialty units (dissertation, thesis, report, or technical writing) required for Ph.D. and M.S. degrees (M.S. subplan requirements are not included).
- TABLE 2 of [Section VIII.C](#) contains a list of courses that are further restricted on a plan of study. The first row of the table indicates the total number of units that a Plan of Study may have from all courses in this category. The remaining rows of the table list additional course unit restrictions for each course number.
- TABLE 3 of [Section VIII.C](#) lists additional restrictions that apply to each degree's Plan of Study.



## **T. PLAN OF STUDY: NON-OSC COURSES, TRANSFER COURSES**

[\[Jump back to TOC\]](#)

### **Pre-approved Ethics courses**

University of Arizona graduate-level ethics courses may count toward the M.S. in Optical Sciences and Ph.D. in Optical Sciences programs at the Wyant College of Optical Sciences, with approval from the student's faculty advisor. For courses not on the pre-approved list below, pre-approval is needed from the Associate Dean for Graduate Academic Affairs. The following pre-approved courses may be considered. Generally, one or two courses may be approved on a Ph.D. plan of study, and one course may be approved on a M.S. plan of study (see also previous section):

- ARC 559: Ethics and Practice
- BNAD 509A: Business Law, Governance and Corporate Ethics
- BNAD 510: Business Foundations for Scientists
- CPH 516: Ethics, Values and Public Health Policy
- CBA 479/579 Art of Scientific Discovery
- EDL 626: Leadership for Social Justice: Ethics and Law
- ENTO/EIS 548: Environmental Sciences Meets People: The Interplay of Ecology and Ethics
- ENTR 500: Technology, Entrepreneurship and Commercialization
- EPID 651: Bioethics, Regulations and Repercussions in Research
- IRLS 520: Ethics for Library and Information Professionals
- JOUR 539: Ethics and the News Media
- LAW 654: Bioethics and Medical Litigation
- LAW 654A: Bioethics and Law
- LAW 654C: Reproductive Law
- LAW 655D: Courtroom Ethics
- LAW 662C: Legal Ethics for Criminal Lawyers
- LAW 696F: Legal Ethics
- MCB 695E: Science, Society and Ethics
- NURS 503: Human Diversity and Ethics
- PA 516: Health, Ethics and Public Policy
- PA 544: Ethics in Private and Public Organizations
- PHCL 595B: Scientific Writing Strategies, Skills and Ethics (may meet non-thesis writing course option)
- PHIL 596A: Ethics
- SERP 548: Ethics and Professional Identify in School Counseling
- SERP 595K: Group Processes and Ethics
- SERP 696C: Professional Standards, Ethics and Issues in School Psychology
- SIE 596E: Ethics for Engineers
- SPH 649: Survival Skills and Ethics

### **Transfer Credit from Other Universities**

Courses eligible for transfer must meet the following minimum criteria:

- The student received a grade of A or B in these courses;
- The course(s) are comparable to a UA course(s), in topic and/or workload;
- The courses are graduate level courses;



- The courses were not applied toward an undergraduate degree.

Additionally, OSC requires that transfer credits used towards an Optics degree be either optics courses, or courses closely related to the students research area or career goals. Waivers to these OSC requirements may be granted by the Associate Dean for Graduate Academic Affairs, when determined to be in the best interest of the student and the College. The student's dissertation director will often be consulted prior to granting a waiver, and will ultimately need to approve the use of the transfer units on the students Plan of Study. All such waivers must be in accordance with the policies of the University of Arizona.

Students must complete the following steps for the application of transfer credit to their Ph.D. Plan of Study:

1. Submit a Transfer Credit Form in GradPath so that the Graduate College can determine if your courses are eligible for transfer (based on institution, graduate level, and grade).
2. Once the Graduate College has deemed the courses eligible for transfer, students must submit the [College Transfer Credit Form](#) and all related course syllabi to the Optical Science Academic Programs Office. This form must be submitted in the student's first semester in their graduate program. The College Transfer Credit Form facilitates the evaluation of transfer credit form for approval by the Associate Dean (based on course content and appropriateness for inclusion in the plan of study).
3. Once the courses are pre-approved by the Associate Dean, they may be selected into the student's Ph.D. Plan of Study in GradPath for final approval by the student's advisor and the Associate Dean.

### **Transfer Credit from Other University of Arizona Graduate Programs**

#### *From M.S. programs*

The Graduate College will permit up to 30 units of credit counted toward an M.S. degree earned in a relevant field at UA to be counted toward the Ph.D. requirements. If a student counts credits from a UA master's degree toward their Ph.D., additional transfer credit from other institutions will be limited to ensure that the maximum of 30 units is not exceeded. Thesis or Master's Report credits used for a master's degree cannot count toward the Ph.D. course credit requirements. Per Graduate College policy, no course may be counted toward the requirements for more than two degrees (earned at UA or elsewhere).

#### *From Ph.D. programs*

A student earning two UA doctoral degrees may use up to 9 units of coursework toward both doctoral degrees (as long as courses were not used toward any other degree).

#### *From Certificate programs*

All coursework units, with grades of A or B, taken through the Optical Sciences Certificate program will be counted towards the Optical Sciences M.S. degree, as long as those units have not been counted towards another graduate degree.

#### *From Non-Degree Seeking Graduate studies*

Students who have completed graduate non-degree coursework at UA may count no more than 12 units of non-degree credit toward the Ph.D. requirements, with approval from the Graduate College.



Students who wish to apply graduate coursework applied toward another UA degree or completed under non-degree status do not have to submit a Transfer Credit Form in GradPath or the Optical Sciences College Transfer Credit Form. These may be selected into the student's plan of study for final approval by the student's advisor and the Associate Dean (based on course content and appropriateness for inclusion in the plan of study).

## **U. PROGRAM WITHDRAWAL**

*[\[Jump back to TOC\]](#)*

A student who elects to withdraw from the University by dropping all classes after having paid registration fees must initiate such a procedure by contacting the [Dean of Student's Office](#). A withdrawal may not be initiated after the last day of classes of any semester and must be completed before the beginning of final examination period. If a student requests a medical withdrawal and would like to petition for a tuition refund, he or she must contact the [Campus Health Service](#) and provide medical documentation. If a student withdraws for medical reasons and is beyond a tuition and fees refund period, medical documentation is not required.

## **V. TEACHING ASSISTANT POLICY**

*[\[Jump back to TOC\]](#)*

To obtain a position as a teaching assistant (TA), a student must enter their name, email address, and course(s) to the Academic Programs office when the call goes out via email each semester for TA positions that are available the following semester. The list of courses needing a teaching assistant for a given semester will be announced in this email message. Generally, Ph.D. students are given priority for TA positions over M.S. students. TA assignments are dependent on course enrollments and are generally made a few weeks before the start of the semester.

All students are limited to a total of 1.0 FTE in teaching appointments during their academic career. Ph.D. students are allowed to TA courses up to this limit automatically. Exceptions to this limit will be considered on a case-by-case basis for Ph.D. students. To be considered for an exception, the student and their faculty advisor must submit a [petition](#) for each semester beyond the 1.0 FTE limit in all cases. Completion of the petition does not guarantee that a TA position will be assigned to the student. It is expected that Ph.D. students are generally supported on research assistantship positions during their time in the Ph.D. program, with TA positions available in the occasional circumstances when support on a research assistantship is temporarily not available. Ph.D. students are also subject to the following limits and restrictions on TA support:

- After 7 full years (a total of 14 full-time semesters) in the Ph.D. program, Ph.D. students are no longer prioritized for TA positions and are not guaranteed TA support.
- Students who have been in the Ph.D. program for 8 years or longer, regardless of the number of semesters of full-time status or leaves of absence, will no longer be permitted to hold TA positions.
- Exceptions to the above situations will be considered for unusual circumstances, such as an advisor leaving and the student needing to change groups after they have been in the Ph.D. program for a few years. However, students who have been in the program for 7 or 8 years, or





longer, are expected to be supported on RA positions (or other means of support) so that they can conclude their Ph.D. with utmost efficiency.

- A Ph.D. student who is on academic probation, whether imposed by the Graduate College or Optical Sciences, is not permitted to hold a TA position for a semester in which they are on probation. If an offer of a TA position has already been extended and the student later enters probation, the TA offer will be rescinded and a different TA will be found.

## **W. TRANSFER COURSES**

[\*\[Jump back to TOC\]\*](#)

Approved courses for transfer are listed in the transfer section on the plan of study. Official English-language transcripts for all transfer courses must be submitted in GradPath to Graduate Student Academic Services during the first semester of the student's graduate program. The Graduate College will determine if the courses are eligible to be transferred. Once the Graduate College has determined that the courses are eligible for transfer, the student must submit an Optical Sciences [transfer credit form](#) online along with all related course syllabi. The Associate Dean for Graduate Academic Affairs will determine which courses will then count towards the completion of the graduate degree in Optical Sciences. Master's degree students can transfer in up to six units towards their degree completion. Ph.D. students can transfer in up to 30 units towards their degree completion according to Graduate College policy, although only in exceptional circumstances will approval be given for Ph.D. students to use up to or more than 18 transfer units to be used on a Ph.D. Plan of Study. Certificate students can use up to three transfer units towards their certificate completion with the Associate Dean's approval.

## **X. TIME TO DEGREE COMPLETION**

[\*\[Jump back to TOC\]\*](#)

Ph.D. students are allowed 5 years after passing the comprehensive exams to complete their degree. After 10 total years in the Ph.D. program, Ph.D. students will need to either re-complete and pass the Ph.D. qualifying exam to remain in the Ph.D. program, or in the case of exceptional situations, explain their situation and receive approval from the Associate Dean for Graduate Academic Affairs to remain in the Ph.D. program for one additional year. M.S. students are allowed a total of 6 years to complete their degree. A student who must exceed the time limits specified by the Graduate College must submit a program extension petition in GradPath to the Graduate College.

## **Y. UACCESS STUDENT**

[\*\[Jump back to TOC\]\*](#)

[UAccess Student](#) is a password-protected service that allows you to access your personal information and student account balance. You will need your NetID and PIN. Your PIN on your official University of Arizona Certificate of Admissions. If you lose your PIN, you must seek assistance from the Graduate College Admissions Office in Admin 322.



It is important you verify your student account information before the payment deadline each semester and each time you change your course schedule. Your account balance must be paid in full by the payment deadline date each semester in order to avoid late payment penalties. Additional penalties are charged on the 21st day of each semester.

## **Z. WIRELESS INTERNET ACCESS**

*[\[Jump back to TOC\]](#)*

To join the UA wireless network, you have three options, described at the [webpage of the OSC Technology Management Group](#).





### III. PHD IN OPTICAL SCIENCES

[\[Jump back to TOC\]](#)

The Doctor of Philosophy in Optical Sciences program prepares students for extraordinary careers and unlimited opportunities in a fast-changing, high-tech world. The program prepares graduates to serve as scientists or engineers in leadership positions in academia, research and industry. OSC Ph.D. have published scholarly books, headed scientific organizations, advised United States presidents and government agencies, contributed to NASA's space program, devised lifesaving medical technology, directed national and international corporations, and founded successful companies.

#### A. TIMELINE FOR COMPLETION OF PHD DEGREE REQUIREMENTS

[\[Jump back to TOC\]](#)

Admission to the Ph.D. program is offered only in Fall semesters, except in unusual circumstances, and on average, students complete their Ph.D. within 6 years. The following presents a general timeline for completion of degree requirements.

Year	Semester	Requirements/Forms to be completed
Year 1	Fall (F) / Spring (S)	Complete OPTI 501 (F), 502 (F), 505R (S) and <i>EITHER</i> 512R (F) and 511R (S) <i>OR</i> 570 (F) and 544 (S).
		Identify an advisor and/or enroll in OPTI 792 (min 1 unit per fall and spring semester, max 3 units per semester, 6 units total).
		Submit transfer credit for approval, if applicable (F).
		Complete GradPath Responsible Conduct of Research form.
Year 2		Take Qualifying Exams (week before Fall semester starts of Year 2).
		Complete Qualifying Exam Oral Retake, if necessary (S).
		If passed Qualifying Exams, submit GradPath Plan of Study strongly recommended, required prior to Comprehensive Exam.
		Complete Ph.D. core course requirements by end of years 2 or 3, including OPTI 541A (if 3-unit version of OPTI 511R not completed), OPTI 507 or 537, two Group 1 (math-based) courses, the chosen Group 3 (specialty) course, and lab requirements. Strongly recommended, but not strictly required.
Year 3		If Qualifying Exam has been passed, submission of GradPath Plan of Study is now required. Submit 54 Unit or C Grade Waivers, if applicable, with Plan of Study. If first attempt at Qualifying Exam was failed, repeat attempt immediately prior to the start of the Fall semester.
		If Qualifying Exam is passed on the first attempt, prior to Year 2, completed core courses and 32 units of coursework, commence and complete Written Comprehensive Exam by the end of this academic year.
		Once Written Comprehensive Exam document is approved, commence and complete Oral Comprehensive Exam.
		If Oral Comprehensive Exam is passed, advance to candidacy (pay candidacy fees, and complete all courses on Plan of Study).



		If Oral Comprehensive Exam is passed and with minimum 50 units coursework for Ph.D., M.S. degree may be added.
		If 32 units of coursework completed and Comprehensive exam is passed, change to Graduate Research Associate status.
<b>Year 4</b>		Submit Dissertation Proposal Summary form. A dissertation proposal exam is not required.
		Identify Dissertation Committee, submit GradPath Committee Appointment form.
		Complete courses listed on Plan of Study.
<b>Year 5</b>		Schedule Dissertation Defense.
		Email Dissertation Abstract to Graduate Coordinator.
		Must have completed required minimum of 18 units of OPTI 920: Dissertation.
		Complete Defense.
		Submit final Dissertation to Graduate College.
		Confirm participation in graduation ceremonies.
		Email Dissertation to Graduate Coordinator.
		Complete Optical Sciences Exit Survey.
		Update Diploma Mailing Address in UAccess.

## **B. IDENTIFYING AN ADVISOR, FIRST-YEAR PHD ENROLLMENT IN OPTI 792**

[\[Jump back to TOC\]](#)

Ph.D. students are required to confirm a faculty research advisor (Ph.D. advisor) by the end of their third full semester in the Ph.D. program; most students find an advisor by the end of the second semester in the program. Students are to submit a [Faculty Advisor Confirmation](#) form by the end of their second semester in the Ph.D. program. If an advisor has not been confirmed by this time, the student must discuss their situation with the Associate Dean for Graduate Academic Affairs so that they can be given guidance to remain in good standing and find an advisor by the end of the third semester in the program.

Students may enroll in up to 6 units (no more than 3 per semester) of **OPTI 792: Directed Introductory Graduate Research** during the first year of the Optical Sciences Ph.D. program, and beginning Spring 2023 **must enroll in at least 1 unit for each semester unless they have already completed 18 units of graduate coursework towards the Ph.D. (including transfer credits)**. OPTI 792 is designed to aid Ph.D. students in their search and selection of a research area and research advisor by incorporating research activities into the first year. In this course, students select a faculty advisor who will supervise a research project and assign a grade at the end of the semester based on student performance in the course. Students who have already secured a faculty research advisor are also encouraged to enroll in OPTI 792 under their advisor.

Students will register for 1 to 3 credits for each of the fall and spring semesters of the first year of their Ph.D. program. Students who are not enrolled in the Ph.D. program on a full-time basis may submit a request to take this course after their first year of enrollment in the Ph.D. program. Under no conditions will a student be able to receive more than 6 credits in total for this course. To enroll, students must submit the [OPTI 792 Course Registration and Grading Form](#), signed by the student and research



supervisor, to the Graduate Coordinator. The form describes the research-related tasks to be accomplished during the semester, the expected time commitment, and the basis for determining the grade. For their research project, students may select from various options, including (but not limited to):

- assisting with an ongoing research project
- creating and working on their own research project under their supervisor's guidance or the guidance of another mentor (such as a more senior graduate student)
- choosing rotations through multiple research groups (in which case multiple single-credit research courses with different supervisors must be taken in a single semester). For a research rotation option, students would register for a single credit with two or three different supervisors, to be undertaken concurrently throughout the semester or concurrently at different times during the semester.
- theoretical or computational investigation into fundamental aspects of science and engineering that underlie specific research areas or specific projects.
- attending group meetings and reading and discussion research papers to learn more about a research area.

In all cases, the student and supervisor must agree upon the research-related tasks to be accomplished during the semester, the expected time commitment, and the basis for determining the letter grade. The student and advisor must describe these aspects of the course on the [OPTI 792 Registration & Grading Form](#), which must then be submitted to the Optical Sciences Academic Programs Office, whereupon the Graduate Advisor will register the student for OPTI 792.

A course grade may be based upon oral presentations (such as in group meetings or in a seminar-format course), construction of a laboratory project or device, time and effort expended towards the completion of an extended project, numerical simulations in support of an experiment, or a written document describing a laboratory project or aspects fundamental to a research area. The number of course credits that the student registers for must be commensurate with the expected time commitment to be spent on the project during the semester. University of Arizona policy requires a minimum of 45 hours of student work to be expended during the semester per credit hour. This is roughly equivalent to an average of at least 3 hours of work per week per credit hour.

This course is not a replacement for general independent study projects, which are not graded on a letter-grade scale, nor is this course a replacement for traditional laboratory courses or dissertation credits that are allowed after the first year of the Ph.D. program. Unless special approval is otherwise given, this course is only available to students in their first year of the Optical Sciences Ph.D. program. However, the research supervisor may be a faculty member from a department other than Optical Sciences.

## **C. PHD COURSE/UNIT REQUIREMENTS AND EXCEPTIONS**

[\[Jump back to TOC\]](#)

The number of course units of graduate credit required for the Ph.D. in Optical Sciences is **45 to 54 units of academic coursework (including 9-12 units in a Minor area) and 18 units of OPTI 920: Dissertation**. Although the default number of required coursework units is 54, this number is often



reduced to 45-53 units upon submission and approval of a [54-Unit Waiver](#) by the student's faculty advisor.

Course requirements summary:

- Core Course Requirements include 8 or 9 courses across 3 course categories, and include those taken in preparation for the Qualifying Exams (OPTI 501, 502, 505R and *EITHER* 511R OR 570 & 544). See [Sections VIII.A](#) and [VIII.B](#) for a list of Ph.D. core course requirements.
- Minimum 2 Lab courses (most are 1 unit each). All students must include at **least** two introductory optics laboratory courses as part of their academic plan. See [Section II.Q](#) for additional details and [Section VIII.F](#) for a list of laboratory courses.
- 9-12 units in Minor Area (as determined by the Minor department, which may be Optics).
- Additional courses that complete the total number of coursework units needed to graduate. Dissertation units do not count as coursework units. 900, 909, and 910 units are not permitted on a Ph.D. plan of study.
- 18 units of OPTI 920: Dissertation

Optional courses that can be included in the Ph.D. Plan of Study include:

- Maximum of 6 units of OPTI 792: Directed Research
- Maximum of 9 units total of non-technical courses, including OPTI 599: Independent Study units (maximum of 6); OPTI 597B: Technical Writing; OPTI 595A: Current Subjects in Optics (Colloquium); OPTI 589: Outreach; and approved ethics, business, and fellowship courses. See [Section II.S: PLAN OF STUDY: OSC REQUIREMENTS AND RESTRICTIONS](#) for additional details and [Section VIII.C](#) for a table summarizing the restrictions.
- Transfer Units. Ph.D. students can transfer up to 30 units towards their degree completion according to Graduate College policy, although only in exceptional circumstances will approval be given for to use more than 18 units on a Plan of Study for Optical Sciences Ph.D. students. Up to 30 units completed toward a UA M.S. in a relevant field may be counted toward the Ph.D. requirements. A maximum of 12 units completed under UA Non-Degree Seeking Graduate status may be applied toward a Ph.D. Plan of Study.

#### *Core Course Substitutions/Exceptions:*

Substitutions or waivers for core courses may be given in some circumstances. A request for a course substitution or waiver must be pre-approved by the Associate Dean for Graduate Academic Affairs. Students requesting substitutions or waivers must submit a brief petition explaining the request and justification to Academic Programs prior to taking an alternative course or not completing a required course during the first year of the Ph.D., and prior to taking the qualifying exam. Transfer credit or undergraduate coursework that is equivalent to core course requirements must be pre-approved by the Associate Dean for Graduate Academic Affairs.

### **Minor Area Requirement**

The UA requires that all Ph.D. students complete a minor. Most Optical Sciences Ph.D. students both major and minor in optical sciences; however, it is also possible to minor in another department. For example, students interested in the optical physics track of optical sciences may particularly wish to consider a minor in physics. If a student chooses a minor other than Optical Sciences, the UA requires



that a faculty member with an appointment in the minor department represent that area on the student's comprehensive exam. This may mean that the student has a 5-member comprehensive exam committee. The minor department may have additional requirements for their minor, and it is up to the student to determine and satisfy any additional minor requirements.

Students are welcome to take courses in other departments even if they intend to minor in optical sciences; virtually all of the courses in a related minor field may be taken without formally selecting it as a minor. The Associate Dean for Graduate Academic Affairs can advise you if there is any question about whether a specific non-optical sciences course is suitable for your degree program and is likely to satisfy Plan of Study requirements.

#### *Optical Sciences Minor*

A minor in optical sciences requires completion of an additional 9 units of optical sciences courses. These 9 units are counted among the 45-54 units required for the Optical Sciences Ph.D., although they are listed in a separate section of the Plan of Study.

#### *Other Minor Areas*

Students taking courses outside the Wyant College of Optical Sciences for credit toward a minor in that department are responsible for consulting with the graduate advisor of the other department to ensure all requirements for their minor are met. Departments may require 9 or 12 units to complete minor course requirements. Some departments may require minor advisor participation on the student's Dissertation Defense. *Double Minor:* Students who undertake 2 minors may complete 6 units in each minor area.

### **Dissertation Units Requirement**

The Graduate College requires that a minimum of 18 units of dissertation be completed toward a Ph.D. Although students may complete more than the 18 units of OPTI 920: Dissertation over their graduate student career, only 18 units are to be reported on the Ph.D. Plan of Study.

## **D. ADDITIONAL UNITS/COURSES**

[\[Jump back to TOC\]](#)

Students may complete additional units to attain a total of 54 units required (or less if a 54-unit waiver has been approved). For an overview of the types of courses permitted, see Section IIS: Plan of Study: OSC Restrictions and [Section VIII.C.](#)

### **OPTI 792 Units**

Ph.D. students may include up to 6 units of OPTI 792: Directed Introductory Graduate Research taken during the first year of the Optical Sciences Ph.D. program. See the section titled "[Identifying an Advisor and First Year Ph.D. Enrollment in OPTI 792](#)" for full details.

### **Independent Study Units/OPTI 599**

With approval, up to 6 units of OPTI 599: Independent Study can be counted toward degree requirements. See also additional Plan of Study restrictions in Section IIS and [Section VIII.C.](#) OPTI 599: Independent Study units must meet Graduate College policy and be approved by the Associate Dean for Graduate Academic Affairs. To enroll in OPTI 599, you must complete an [Independent Study Proposal Form](#) and



submit it to the Graduate Academic Advisor, for the Associate Dean's approval. Once approved, you will be registered for OPTI 599 by the Graduate Academic Advisor.

### **Ethics Courses**

University of Arizona graduate-level ethics courses may count toward the Ph.D. in Optical Sciences programs at the Wyant College of Optical Sciences, with approval from the Associate Dean for Graduate Academic Affairs. See Section II.T: PLAN OF STUDY: NON-OSC COURSES, TRANSFER COURSES for a list of pre-approved ethics courses.

### **Transfer Credit from Other Institutions**

With approval of the Associate Dean, graduate work completed at another graduate-accredited institution may be transferred and applied to the Ph.D. Plan of Study. The Graduate College allows up to 30 units of transfer credit to be applied towards a Ph.D. The maximum number of transfer credits allowed by Optical Sciences is also 30, but only in exceptional cases will more than 18 units be approved by the Associate Dean. Typically, 12 to 18 units may be transferred (usually from math, physics or engineering courses) and applied to the Ph.D. plan of study. Students completing graduate coursework at another institution offering a graduate degree in optics may often be allowed to transfer in more than 18 units. All transfer units must also be approved by the Ph.D. student's dissertation director. Transfer units will not be included in the calculation of the University of Arizona GPA. See Section II.S: PLAN OF STUDY: NON-OSC COURSES, TRANSFER COURSES for additional information about transfer courses.

## **E. QUALIFYING EXAM**

[\[Jump back to TOC\]](#)

Every Optical Sciences Ph.D. student must take and pass the Ph.D. Qualifying Exam, without exception. Students must take this exam at the start of their second academic year of the Ph.D. program, or earlier if necessary courses have been completed.

The Ph.D. Qualifying Exam tests students in four core subject areas:

- Electromagnetic Waves (OPTI 501)
- Optical Design and Instrumentation (OPTI 502)
- Diffraction and Interferometry (OPTI 505R)
- Optical Physics (OPTI 511R *or* OPTI 570 & OPTI 544). (Students who elect to take OPTI 570 and OPTI 544 instead of OPTI 511R will also answer the OPTI 511R questions; the common topics between these classes that may be on the exam can be found within the [Qualifying and Comprehensive Exam Archive](#) webpage. Note that after Fall 2022, the topics of lasers and optical resonators will no longer appear on the qualifying exam.

Each subject area must be passed in order to pass the exam and proceed to the Ph.D. Comprehensive Exam. A student who does not take the Qualifying Exam as required and without an approved postponement of the exam will be considered to have failed the Qualifying Exam.





In rare cases, a student will be permitted to take the Qualifying Exam without having completed the tested core courses with grades of A or B, particularly if they have had equivalent preparation elsewhere. Such cases, and an accompanying written waiver of the relevant core course requirement, must be approved in advance by the Associate Dean and be in the possession of the student.

### **Timing of Qualifying Exams**

*[\[Jump back to TOC\]](#)*

The written Qualifying Exam is administered once per year at the beginning of each fall semester, in the week prior to the start of classes.

Full-time Ph.D. students must take the written Qualifying Exam in the week immediately before the start of classes for their second year in the Ph.D. program. Students who are not enrolled full-time must consult the Graduate Academic Advisor regarding when the exam must be taken.

Every student who transfers from the Optical Sciences M.S. to Ph.D. program must take the Qualifying Exam by the start of their second academic year of the Ph.D. program, but has the option of taking the exam immediately upon entering the Ph.D. program if they have taken all of the core courses tested on the exam.

If a student (i) is unable to complete a core course during the first year, due to extenuating circumstances; or (ii) receives a grade lower than a C in one tested core course or grades of C or lower in two tested core courses, they will not be permitted to take the exam unless explicitly approved by the Associate Dean in writing. In all of these cases, the student must consult with the Associate Dean, who will determine the appropriate course of action and the year in which the qualifying exam is to be taken by the student. A student who is unable to take the exam a second time due to failing a tested core course will be considered to have failed the exam.

### **Exam Format**

*[\[Jump back to TOC\]](#)*

Qualifying Exams are administered in 150-minute sessions on each of two consecutive days:

- Day 1 will have four questions, one from each of the four areas.
- Day 2 will have four questions, one from each of the four areas.

The exam consists of eight questions, two from each subject area, given over two consecutive days (four questions per day). Each question on the exam is graded on a 10-point scale, then all graded questions are turned in by the faculty graders to the Academic Programs office. Previous exam questions are available on the [Qualifying and Comprehensive Exam Archive webpage](#).

### **Scoring**

*[\[Jump back to TOC\]](#)*

An average score for all students is determined separately for each of the 8 questions on the exam. If the average score for a question is below 7.5, all of the raw scores for that question are scaled up by the same multiplicative factor such that the average of the scaled scores is 7.5. If the average of the raw scores is above 7.5, the raw scores remain unscaled.

For each of the four subject areas, a student's scaled scores on the two questions are averaged together to determine a subject score. If the subject score is above 6.5, the student passes the topic. If the subject



score is below 6.5, the Graduate Exams Committee evaluates the performance of the student, and the overall grades for that topic, to determine whether or not the student passes or fails the topic. The committee may take into account factors such as overall group performance in a given subject area, question difficulty, and individual performance on the two separate questions. Thus it may be the case that students who score slightly below the passing threshold of 6.5 on a topic may be passed on that topic.

Students are notified of Qualifying Exam results by email within the first two weeks of the semester. The three possible outcomes for each exam are Pass, Marginal Performance, and Fail. All students receive copies of their graded answers after the results of the exam have been announced.

### **Result: Pass**

*[\[Jump back to TOC\]](#)*

If a student passes all four subject areas, the exam is passed. Students who receive a Pass then proceed to completing the GradPath Plan of Study, remaining coursework, and preparing for the Comprehensive Exams. Students must take the Comprehensive Exam by the end of the Spring semester of the academic year following their passing of the Qualifying Exams (i.e., the sixth semester of the Ph.D. program for most students).

### **Result: Marginal Performance and Oral Qualifying Exam Retest**

*[\[Jump back to TOC\]](#)*

If a single subject is failed and three other subjects are passed, the student's performance is evaluated as "marginal." The student is given the option of a retest in the failed subject area. A common committee for each of the four course areas is assembled to retest all students who failed that particular area. If a student chooses not to attend an oral exam for that subject area, the student fails that year's exam and must attend the next written Qualifying Exam.

The subject re-test exam is an oral exam that takes place near the beginning of the following (spring) semester, and which is scheduled within the first two weeks after the start of classes in the Spring semester. The exam will typically last between a half-hour and an hour, but may last longer if needed. In all cases, a two-hour block of time is scheduled for the oral exam, but it is not expected that oral exams will last for two hours. In an oral exam, the student will be asked questions pertaining to the topic failed, and will be expected to answer the questions orally and with the aid of writing on a whiteboard. Questions from the committee will likely involve the questions that were given on the written exam, but may involve any other topics covered in the relevant course. Questions may involve significant breadth across the course topics, or depth on a few topics, and may be conceptual or quantitative. Each of the three committee members will ask the student questions.

If the student passes the oral exam, the qualifying exam is then fully passed. If the student fails the oral exam, the student fails the qualifying exam and is permitted a single retest (without petition) of the qualifying exam when it is next offered.

### **Result: Fail**

*[\[Jump back to TOC\]](#)*

If two or more subject areas are failed, the student fails the exam and is permitted a single re-test of the exam over all four areas, when it is offered the following year. A student who fails the Qualifying Exam must re-take the Qualifying Exam when it is next offered. A student who fails the Qualifying Exam twice





may file a petition, with Ph.D. advisor support, to take the exam a third time. Without an approved petition to take the exam a third time, a student who fails the exam twice will be dismissed from the Ph.D. program. Dismissal will be effective at the end of the Fall semester associated with that year's exam.

### **Qualifying Exam Appeal Policy**

[\*\[Jump back to TOC\]\*](#)

#### *Appealing for a Third Attempt*

If a student who has failed the exam twice would like to appeal for a third attempt, they must follow the Written Qualifying Exam Petition Process below. Students must petition the graduate exam committee to seek approval for a third attempt to complete the written qualifying exam if they wish to remain in the Ph.D. program. This petition should be submitted to the Graduate Academic Advisor no later than one month after receiving the exam results. It is the responsibility of the student to ensure all documentation for a petition is completed and submitted for review.

The petition must have following documentation:

- Student Letter: Provide an explanation of why you believe the result in the third attempt would be different than your second attempt.
- Proposed Study Plan: Outline a plan that reflects on the causes of failing the first two attempts (e.g., include a description and quantify study time and technique) and describes a path for assuring success on the third attempt. The plan must quantify how much time you will devote to studying/research in preparation for your third attempt.
- Advisor Letter of Support: A letter from your advisor must confirm their support for your proposed study plan and continuation in the Ph.D. program and in their research group. Your faculty advisor must also detail the level of academic and/or financial support they will provide. The advisor may submit the letter directly to the Graduate Academic Advisor by email.

The graduate exam committee will make the final decision. If your petition is approved, you must also submit an update of your study progress to the graduate advisor before your third attempt. This update should include documentation of your actual study time and must be coordinated with your faculty advisor.

#### *Appealing a Failed Written Qualifying Exam*

In the event a student fails one or more subjects on the written qualifying exam, they may submit an appeal to have a single question re-graded if there is reason to believe that the question was graded incorrectly. Students must follow the Written Qualifying Exam Grading Appeal Process below. The student should feel free to consult with the Associate Dean for Graduate Academic Affairs regarding general exam grading procedures or regarding concerns over the grades that the student received for their answers. In exceptional circumstances a second question may be submitted for regrading only with prior permission of the Associate Dean for Graduate Academic Affairs.

The grade appeal must include the following documentation:

- Student Letter: The letter should indicate the portion(s) of the question that the student wishes to appeal, along with an explanation of why the student thinks a re-grade is necessary.
- Exam Copy: A scan of the graded exam question should be included. This copy may include additional markups or notes in support of the appeal.

The appeal should be directed by email to the Graduate Academic Advisor within two weeks following the student's receipt of a copy of their graded exam. The appeal will be reviewed by the Associate Dean for Graduate Academic Affairs upon consultation with members of the Graduate Exams Committee.



Please note that the question under appeal may be reevaluated in full, and a net loss of points is therefore possible.

The student must not discuss their concerns directly with the faculty members who have graded the exam questions, or members of the Graduate Exams Committee. The right to an appeal will be forfeited if the student makes any attempt to discuss their answers or their grades on a question directly with the question writers or graders for that question. The student may seek advice from their Ph.D. faculty advisor, or (preferably) the Associate Dean for Graduate Academic Affairs, but should not solicit advice or feedback regarding re-grading possibilities or appeals from other faculty members.

The outcome of the appeal – whether or not to send a question to a faculty grader for a regrade – will be decided by the Associate Dean, possibly in consultation with members of the Graduate Exams Committee. If the advisor of a student filing an appeal is a Graduate Exams committee member, the advisor shall not be involved in the appeal process and will be recused from appeal discussions involving the student.

If an appeal is approved, it does not guarantee that the student will receive a pass for the subject area. If the student's score on a question increases over the previously established Pass/Fail threshold, the student's average score in that topic will be recalculated. The Graduate Academic Advisor will notify the student of the appeal results, and of the re-grading and revised pass/fail results if the appeal is approved. A second appeal is not permitted (i.e. a student may not “appeal” the appeal). All appeal decisions are final.

## **F. ADVANCING TO PHD CANDIDACY**

[\[Jump back to TOC\]](#)

In order to advance to candidacy, Ph.D. students must:

- complete all coursework in their approved Plan of Study;
- maintain good academic standing with the University of Arizona;
- complete the Comprehensive Exams, and
- complete at least two years in the Optical Sciences Ph.D. program.

Ph.D. students also have the option of receiving the M.S. degree in Optical Sciences by completing a one-page form after completing their Comprehensive Exam. Students interested in this option should meet with the Graduate Coordinator to discuss, since this option may require up to 5 additional units of coursework and/or resubmission and approval of the Ph.D. plan of study.

Upon completion of 32 units of coursework, students are eligible for the rank of Graduate Research Associate, which can be attained after the Comprehensive Exam is passed. The Comprehensive Exam may be taken during the semester in which a student is completing their first 32 units of coursework.

### **54-Unit and C-Grade Waiver Request**

[\[Jump back to TOC\]](#)



The requirements for the Ph.D. degree include a total of 54 units of graduate-level coursework, or a reduction to at least 45 units with the submission and faculty advisor approval of a [54-Unit and C-Grade Waiver Request](#), plus 18 units of OPTI 920: Dissertation.

**Waiver of 54 unit requirement:** With the approval of the student's dissertation director, the required number of units may be reduced to as few as 45 units, but no lower. Students may reduce to any number of units between 45 and 53; the default requirement is not 45 course units. Students who plan to seek conferral of an M.S. upon completion of their Comprehensive Exam must take at least 50 units of coursework towards their Ph.D., 45 units of which must be listed on their Ph.D. Plan of Study, with an extra 5 units listed on their M.S. plan of study but not on the Ph.D. plan of study.

**Inclusion of a Course with a C Grade:** A grade of B or higher is required for all courses on the plan of study. However, one C-graded course may be listed on the doctoral plan of study if a [C-Grade Waiver Request](#) is approved by the student's faculty advisor.

To request the inclusion of a course in which a grade of C was received in their Ph.D. plan of study, students must submit a [54-unit and C-grade waiver form](#), signed by their advisor, along with their doctoral Plan of Study to the Academic Programs Office.

### **Submitting the Ph.D. Plan of Study**

*[\[Jump back to TOC\]](#)*

Working together with their dissertation director, all doctoral students in the Wyant College of Optical Sciences are required to file a **Ph.D. Plan of Study** in GradPath upon completion of the qualifying exam. This plan specifies the balance between course work and dissertation units for the Ph.D. degree.

The requirements for the plan of study include a minimum of 18 dissertation units, plus a total of 54 units of graduate-level coursework beyond the bachelor's degree. However, this number may be reduced to 45 units of coursework with the submission and approval of a 54 Unit Waiver Form; see previous section.

A grade of B or higher is required for all courses on the plan of study. However, one C-graded course may be listed on the doctoral plan of study with if a [C-Grade Waiver](#) form approved by their dissertation director. See previous section.

A Ph.D. Plan of Study must include the following, among the total units required:

- All required Ph.D. core courses taken for a letter grade: See Section VIII;
- Minimum 2 lab courses;
- 9-12 units in Minor Area;
- 18 units of OPTI 920: Dissertation.

The remaining units on the Plan of Study may be comprised of Optical Sciences and other relevant graduate coursework approved by the dissertation director and the Associate Dean for Graduate Academic Affairs, and transfer units including units from a previously conferred UA M.S. degree (if relevant to Optical Sciences). See Section III.E.

Once the Ph.D. Plan of Study is submitted in GradPath, the Graduate Coordinator will check to make sure that the plan of study follows all requirements. The plan is then sent to the faculty advisor and then the Associate Dean for Graduate Academic Affairs for approval.



## **Written Comprehensive Exam**

[\*\[Jump back to TOC\]\*](#)

The Comprehensive Examination, which consists of a written report and an oral presentation/exam, is intended to test the student's general fundamental knowledge of the fields of the major and minor subjects of study, particularly with respect to the student's area of research, and how the subject relates to optics broadly.

The guidelines below are supplemental to, and in accordance with, the procedures established by the Graduate College. Deviations shall be made only in special cases where the Associate Dean for Graduate Academic Affairs deems appropriate.

### *a. Timing of Comprehensive Exam*

[\*\[Jump back to TOC\]\*](#)

Doctoral students must complete their comprehensive exam by the end of the academic year that follows the academic year in which the qualifying exam is passed. For example, most Ph.D. students will take the Qualifying Exam in the week before the start of their second academic year in the Ph.D. program. If the Qualifying Exam is passed outright at that time (or in the following Spring semester after completion of a single-topic oral exam), the student must take the Comprehensive Exam by the end of the Spring semester of the following academic year (i.e., the sixth semester of the Ph.D. program). If both the written and oral portions of the Comprehensive Exam are not taken within the required time frame, the student will be considered to be making insufficient academic progress, and will be ineligible for graduate assistantships.

Students must also submit comprehensive exam committee request forms by the date specified in the email message that they receive following their passing of the qualifying exam, which notifies the student of comprehensive exam procedures. If this form is not submitted by the necessary date, the student's committee will be assigned without the student's suggestions on committee members.

Students who passed their qualifying exam prior to Fall 2021 must adhere to a modified comprehensive exam timing structure and due dates that have been provided in email messages, but consequences for not adhering to their comprehensive exam due dates are as specified in this Handbook.

The rules governing the timing of the Comprehensive Exam also apply to students who have transferred from the M.S. to the Ph.D. program and who have taken the Qualifying Exam in the week before the start of their first year in the Ph.D. program.

Students with exceptional circumstances should discuss their situation with the Graduate Academic Advisor. Exceptions to the rules governing exam timing will be considered by the Associate Dean for Graduate Academic Affairs and/or the Graduate Exams Committee.

In order to be eligible to complete the comprehensive exam, students must have:

- passed their Qualifying Exams.
- completed 32 credits of coursework toward their Ph.D. Plan of Study. These units must be completed by the end of the semester in which the Comprehensive Exam Committee Form is



filed. In particular, core area courses in Groups I, II, and III must be completed, unless an exception is given by the Associate Dean.

- filed a Ph.D. Plan of Study in GradPath.
- attained a cumulative GPA of 3.00, with no more than one grade of “C” on the Plan of study.
- Students must not be on academic probation.

Doctoral students who have maintained continuous enrollment and are completing the Comprehensive Exam during the summer do not need to register for that summer semester. However, most Comprehensive Exam committees will not agree to meet in the summer, and are not required to; students should not plan on the oral exam being completed in the summer. Students taking the comprehensive exam in the fall or spring semester must be enrolled and registered.

*b. Comprehensive Exam Committee*

*[\[Jump back to TOC\]](#)*

The comprehensive exam committee consists of at least four faculty members. The committee must include members from at least three of the four Optical Sciences Core Areas (Imaging, Optical Engineering, Optical Physics, and Photonics). At least three of the four committee members must be tenured/tenure-eligible (T/TE) faculty members. At least three of the four committee members must have a primary appointment in Optical Sciences or must have served on at least two prior Optical Sciences Comprehensive Exam committees.

- Students must complete a **Comprehensive Exam Committee Request form** to designate the members of their committee. A typical committee is comprised of:
- **Faculty Research Advisor:** The 1<sup>st</sup> committee member is the faculty member serving as the student’s Faculty Research Advisor, i.e., the faculty member who will serve as the student’s dissertation director. Advisors are expected to work closely with students to ensure that a student who takes the exam is prepared to pass the exam.
- **Second member typically in area of expertise (selected by Research Advisor and student):** The 2<sup>nd</sup> member is a faculty member with familiarity with the student’s area of research, and is selected by the student’s Research Advisor and the student. In most cases, this will be someone from the same research core group as the student and research advisor.
- The **third and fourth committee members** are selected by the Associate Dean for Graduate Academic Affairs. The student can suggest specific faculty to serve on the committee on the Comprehensive Exam Committee Request Form. Typically, these two committee members will be selected from two research core areas (chosen by the student) other than the Student Research Core Area.
- If the student is minoring in an area other than Optical Sciences, they will need a committee member who has a faculty appointment in the minor area. This could be one of the first four committee members who is an Optical Sciences faculty member with a joint appointment, or a 5<sup>th</sup> committee member without an Optical Sciences appointment. If a 5<sup>th</sup> member is needed as a minor area representative, the student is responsible for selecting the minor representative and obtaining their agreement to serve on the committee. The name of the minor representative must be indicated on the Comp Exam Committee Request form.

The form should be signed by:

- the student’s Research Advisor (to certify that the student is suitably prepared to successfully complete the comprehensive exam) and



- the second committee member (to acknowledge agreement to serve on the committee).

Once the comprehensive exam committee has been confirmed, students should submit the **Comprehensive Exam Committee Appointment Form** in GradPath.

*c. Written Exam Format and Guidelines*  
[\*\[Jump back to TOC\]\*](#)

Once the student's Comprehensive Exam Committee has been selected and the student notified, he/she must complete the written portion of the comprehensive exam. The research topic is selected in close consultation with the student's Research Advisor. **The comprehensive exam is not a Ph.D. dissertation proposal.**

Requirements and guidelines regarding the preparation of this document are discussed below.

Each committee member may choose more specific requirements for the report through discussions with the student or with input from the student's Research Advisor. Generally, the report is the student's opportunity to help the committee members understand the ways in which various areas of optics relate to the specific research topic so that questions during the oral portion of the exam can be suitably directed.

**Research Topic**

- The written comprehensive exam serves two equally important purposes:
- It examines the student's **ability to present a research topic or area of research** in a complete and convincing manner for a general optics audience.
- It demonstrates the **synergy and synthesis** of this research among the broad areas of optics. The research topic is used as a framework in which to discuss how aspects of the research involve a broad range of optics topics beyond the area of the student's specialization. The discussion of synergy and synthesis of various topics in optics should be fully integrated into the entire report.

The document may involve a description of the student's intended Ph.D. research topic, but this is not required. If a student has not identified their Ph.D. research topic at the time that the exam is taken, the comprehensive exam can be based on:

- a *potential* research topic, or
- a review and analysis of 2 to 4 technically related published papers from the student's research group or other groups.

**Guidelines for Written Document**

[\*\[Jump back to TOC\]\*](#)

The written portion is a report of not more than 10 double-spaced pages, including figures, but not including references. The document is to be written as a comprehensive overview for a broad audience of optical scientists and engineers, not for experts in the field of research of the student. Topics, terms, and equations that are central to the specific research area can be included, but should be explained in terms that would be familiar to any student who has completed the Optical Sciences core courses. This document should not be written as if it were going to be submitted to a specialized journal; rather, it could be written at the level of a graduate research fellowship or scholarship application. There must be a clear motivation for the research topic discussed, which leads into a presentation of specific research activities and research questions relevant to the student's intended Ph.D. research area.





There are two main components of the written document:

- the technical research overview, and
- the demonstration of the relationships between the research topic and the breadth of optics.

The oral comprehensive exam will further address these components through the presentation and questions directed to the student during the oral exam.

The demonstration of synergy and synthesis among various topics in optics is a key component of the written and oral comprehensive exam components. Exactly how this demonstration is accomplished will be different for every student, but the following guidelines can help direct the process:

- (1) Synergy is demonstrated by showing how the integration of a broad range of optics technologies, concepts, and methods are essential to the presented research topic. The way in which the student brings various areas of optics into the discussion is an integral part of the examination. Brief explanations of basic optics principles, methods, or lab components may be needed, but they do not take the place of a discussion of how these concepts are relevant to the research.
- (2) Textbook descriptions, such as how a basic laser works, are typically not appropriate or necessary. Statements such as “lenses are used to focus light” or “lasers are used in the experiment,” or lists of various pieces of equipment used in the research, also do not sufficiently demonstrate synergy. Rather, the discussion might involve which aspects of the lenses or lasers need to be understood to succeed in the research area, and how these items or principles are incorporated into the research.
- (3) The synergy and synthesis discussion will be incorporated into the overall flow of the document, as opposed to isolated subsections that review or explain topics without connection to the research.
- (4) In order to obtain the committee’s approval, the document must provide appropriate discussions of both the research and the synthesis across the relevant areas of optics.
- (5) During the preparation of the document, the committee should provide guidance to the student about its structure and content.

The written document is the primary opportunity for the student to provide input to the committee on which topics across the broad range of optics would be especially suitable for questions. Once the report has been written, and approved by all four committee members, the student schedules an oral exam with the committee members.

Beyond the guidelines given here, there is no specific template for the report. The student must think creatively about how to construct a report with primary guidance from the Research Advisor.

The written portion of the exam must be approved by the committee before the oral portion of the exam is scheduled.

### **Oral Comprehensive Exam**

*[\[Jump back to TOC\]](#)*

Each student must prepare a presentation of about 15 minutes that discusses their research project and/or a topic closely related to their research project or research area. This presentation will reflect the student’s understanding of the core academic principles of the disciplines of optics (as applicable to the student’s research). The format of the presentation (whiteboard, PowerPoint, etc.) will be determined by the student and Research Advisor in consultation with the student’s exam committee.



Questions during the oral exam will address both the breadth and depth of optics, with particular focus on the relationships to the specific research topic presented. Questions from the committee will be primarily oriented towards determining whether or not the student grasps the basic principles of optics that are needed for successful and efficient engagement in research in the student's research area. Questioning will relate the research to other aspects of the core curriculum to show synthesis across the field of optics. Questions are not limited to the syllabi of the core courses. Questioning typically occurs continuously during the presentation, so the exam is expected to last much longer 15 minutes, and a 2-hour time slot should be reserved.

#### *a. Scheduling and Forms*

*[\[Jump back to TOC\]](#)*

To schedule the Oral Comprehensive Exam, students should complete the following steps:

- (1) Complete and submit the **Oral Comprehensive Exam Scheduling** form to the Academic Programs office, along with a PDF version of the Written Comprehensive Exam report.
- (2) The Graduate Coordinator will identify a room for the oral exam and inform the student and committee members of the location once the room is reserved.
- (3) Once the exam is scheduled, students should submit the **Announcement of Doctoral Comprehensive Exam Form** in GradPath.
- (4) The student and each committee member should individually meet to discuss the oral examination and the expectations that the committee members have for the student.

The duration of the oral portion of the exam, including the student's presentation and committee questions, can last up to two hours.

After completion of the oral examination, the committee will assess the student's performance in each of the areas of optics discussed, with special attention paid to the depth of understanding in the student's specialty area.

#### *b. Oral Comprehensive Exam Pass/Fail Policy*

*[\[Jump back to TOC\]](#)*

Determination of pass/fail result will be made on the totality of the student's performance on the oral examination and the written report.

#### *Result of Pass and Option to Add M.S. degree*

If the student attains a Pass, the committee chair will submit the **Results of Comprehensive Exam** in GradPath indicating Pass.

Students may **add an M.S.** to their program upon satisfactory completion of their Comp Exam, without the completion of additional units, if they have **at least 50 units of coursework on their Ph.D. Plan of Study**.

Students who pass the exam must complete the following steps to add an M.S. program **after** the completion of the comprehensive exam:

1. Submit a **Request of Change of Program Form** adding the M.S. program to the graduate coordinator, who will send the form to the Associate Dean for approval. The graduate coordinator will forward the form to the Graduate College.





2. Once the M.S. program has been added, students must submit the following forms in GradPath (see the Ph.D. Plan of Study Guide for step-by-step instructions):
  - **Masters/Specialist Plan of Study:**
    - o under **Thesis/Dissertation Title**, select “No” in response to “Are you doing a thesis?”
    - o under **Expected Graduation Term**, enter the semester in which you passed the Oral Comprehensive Exam;
    - o select **Search Advisor** to find and select your faculty advisor’s name
    - o List **35 units** of graduate coursework (do not list OPTI 910: Thesis or OPTI 909: M.S. Report units).
  - If more than 30 units of coursework reported on the M.S. Plan of Study overlap with units on the Ph.D. Plan of Study, students must **modify their Ph.D. Plan of Study** after submitting the M.S. Plan of Study. The Graduate College will permit only 30 units of overlap between the M.S. and Ph.D. Plans of Study. Therefore, students modify their Ph.D. Plan of Study to remove 5 units of overlap with the M.S. Plan of Study. Total units across both Plans of Study combined will be counted toward students’ Optical Sciences Ph.D. requirements.
  - **Masters/Specialist Committee Appointment Form:**
    - o Under **Expected Graduation Term**, enter the semester in which you passed the Oral Comprehensive Exam;
    - o in response to the question “**Do you have a Master’s Committee?**”, select “No”;
    - o select **Search Advisor** to find and select your faculty advisor’s name
    - o Enter the comment “Completed M.S. through comprehensive exam” before submitting the GradPath form.
3. The Graduate Coordinator will submit the **Completion Request** in GradPath to confer the M.S. degree.

#### *Failure of Comprehensive Exam*

A student shall have two attempts at completing and passing the Comprehensive Exam in order to remain in the Ph.D. program. If the first oral Comprehensive Exam is failed, the committee will document the reasons for failure and ensure that the student understands why the exam was failed. The student must complete the second attempt at the Comprehensive Exam by the end of the next academic year. The same committee shall administer the re-test. After two failures of any nature of the Comprehensive Exam the student is dismissed from the Ph.D. program.

A student who fails the Comprehensive Exam may still be eligible to receive the M.S. degree with the completion of the Comprehensive Exam if the Comprehensive Exam committee believes that the written and oral comprehensive exam, and overall accomplishments in the Ph.D. program, demonstrate satisfactory performance meriting the conferral of the M.S. degree. Alternatively, the Comprehensive Exam committee may decide that such performance does not merit the conferral of the M.S. degree, in which case the student must satisfy M.S. degree requirements with the thesis, report, or the technical writing option in order to have the M.S. degree conferred.

#### *d. Comprehensive Exam Forms Checklist*

*[\[Jump back to TOC\]](#)*

The following forms must be completed during the Comprehensive Exam process:

#### **(1) Comprehensive Exam Committee Request form**



- (2) **GradPath - Comp Exam Committee Appointment Form**
- (3) **Oral Comprehensive Exam Scheduling**
- (4) **GradPath - Announcement of Doctoral Comprehensive Exam Form**
- (5) **Results of Comprehensive Exam** (submitted by chair of committee)
- (6) To add M.S. after completion of the comprehensive exam:
  - a. **Request of Change of Program Form**;
  - b. **GradPath - Masters/Specialist Plan of Study**
  - c. **GradPath - Masters/Specialist Committee Appointment Form**
  - d. **GradPath - Completion Request** (submitted by Graduate Coordinator).

## **G. DISSERTATION COMMITTEE AND PROPOSAL FORMS**

*[\[Jump back to TOC\]](#)*

The centerpiece of a Ph.D. program is research leading to a dissertation, where students demonstrate a capacity for research resulting in an original contribution to scientific knowledge or engineering in Optical Sciences. Students must identify a dissertation topic of appropriate nature and scope with their research advisor.

### **Dissertation Committee**

*[\[Jump back to TOC\]](#)*

The student and advisor should identify a dissertation committee as soon as possible after a Ph.D. student has advanced to candidacy. The dissertation committee consists of the student's dissertation faculty (research) advisor, plus at least two additional faculty members nominated by the student in consultation with his or her advisor. All members must be approved in advance to serve on the committee by the Associate Dean for Graduate Academic Affairs.

The University requires at least three members of the exam committee to be University of Arizona tenured or tenure-eligible faculty, or approved members of the Graduate Faculty. These committee members can also be former University faculty in a tenured or tenure-eligible position who have left employment (such as Emeritus faculty).

**Special Members:** If appropriate, one member of the three-person committee, or a fourth or fifth member, may be approved as a Special Member to serve on the exam committee. The option for one of the three members to be a Special Member is an exception given by the Graduate College to Optical Sciences thesis and dissertation committees, and is not an option generally permitted across UA Ph.D. programs. A Special Member is a person who does not qualify as a Regular or Emeritus member, but whom a department deems qualified to serve on a committee or committees based on academic qualifications and expertise in relevant subject matter. A Special Member must be approved by both the Associate Dean for Graduate Academic Affairs and the Graduate College. Students seeking to add a Special Member to their dissertation committee should speak with the Graduate Academic Advisor regarding this request, as a Special Member Form must be submitted by the College, not by the student.



## **Ph.D. Dissertation Proposal Summary Form**

[\*\[Jump back to TOC\]\*](#)

All doctoral program students are required to have an approved dissertation prospectus/proposal on file within their department, which describes the direction of their dissertation research. To satisfy this requirement in Optical Sciences, students must complete a **Ph.D. Dissertation Proposal Summary** form. This form must be signed by the dissertation director and submitted to the Graduate Coordinator and must include:

- the proposed title of the dissertation;
- a short abstract describing the proposed research;
- anticipated semester and year of Ph.D. completion;
- a list of dissertation committee members.

The abstract should describe a dissertation research plan that outlines the scope of the proposed research and clearly explains its background and motivation. The research described in the proposal should be selected in consultation with the student's dissertation faculty advisor. While the research plan describes the likely scope and content of the dissertation and may set some nominal expectations for the research, ultimate approval of the actual dissertation research rests with the student's dissertation director, together with the dissertation committee members.

## **GradPath Forms – Prospectus/Proposal Confirmation and Doctoral Dissertation Committee Appointment**

[\*\[Jump back to TOC\]\*](#)

Once the Graduate Ph.D. Dissertation Proposal Summary form has been received, the graduate coordinator can submit the **Prospectus/Proposal Confirmation Form** in GradPath.

Once the Prospectus/Proposal Confirmation form has been approved, students should submit the **Doctoral Dissertation Committee Appointment** form in GradPath, which formalizes the dissertation committee.

## **H. DISSERTATION DEFENSE**

[\*\[Jump back to TOC\]\*](#)

### **Enrollment Requirements for Defense**

[\*\[Jump back to TOC\]\*](#)

Doctoral students must be enrolled each fall and spring semester for a minimum of 1 graduate unit, from original matriculation until all course and dissertation requirements (including submission of the dissertation to the Graduate College) are met. Thus, enrollment is required for the semester during which the student plans to complete their defense and degree.

Graduate students who have maintained continuous enrollment, fulfilled all their other degree requirements, and were enrolled in thesis or dissertation unit(s) in the prior semester may defend and file for the degree in the summer or winter term without registration. If, however, students need library



privileges or plan to use other University facilities or need significant faculty time during the summer or winter session, enrollment is required. Enrollment in the non-credit/no fee GRAD 922 to allow access to the Library during the summer or winter terms is available for eligible doctoral students.

### **Steps to Complete Prior to Defense**

*[\[Jump back to TOC\]](#)*

**Important Deadlines:** Students should check the [Graduate College's Important Dates and Deadlines](#) website for 2 important deadlines pertinent to their final oral defense:

- (a) Recommended deadline for completion of Final Oral Examination/Defense for the semester. This deadline is a soft deadline, intended to ensure that students have enough time to complete revisions and formatting of their final dissertation before submission.
- (b) Deadline to Submit Dissertation for the semester. The submission deadline is a hard deadline. Students who defend or submit their dissertation to the Graduate College after the submission deadline, will have their expected graduation term moved to the following semester and will be required to enroll in one unit for that following term if it is a Spring or Fall term. Students whose expected graduation term is moved to Summer or who move their expected graduation term to Winter term are not required to enroll for those terms. Please note that the deadline for submission of final dissertations for doctoral student is generally earlier than submission deadlines for non-doctoral programs.

Students must complete the following steps prior to their defense:

1. Provide each dissertation committee member with a near-complete draft of the dissertation at least 3 weeks prior to the exam, or according to when requested by the dissertation committee member.
2. Submit the Dissertation Committee Appointment Form in GradPath.
3. Consult with dissertation committee members to schedule a date and time for your dissertation defense. Students should schedule their defense, planning for sufficient time to complete revisions in time for the submission deadline for the semester.
4. The Graduate Advisor can assist in scheduling a room for the defense. Conference rooms are equipped with audiovisual equipment. Please be sure to confirm the conference room has everything you need for your final oral exam.
5. Once the defense is scheduled, submit the Announcement of Final Oral Defense form in GradPath. This form should be submitted far enough in advance of the examination that all approvers can grant their approval in time for the form to reach the Graduate College one week prior to the exam. The Graduate College will place an announcement on the UA master calendar to invite the public to attend the candidate's presentation of his or her work. Final Oral Examinations should be scheduled during days when the university is in session and during normal business hours. Permission to hold examinations during University holiday closures or outside of normal university business hours may be granted by Graduate College.
6. After submitting the Announcement of Final Oral Defense, students should email a short abstract (1-3 paragraphs long) describing their dissertation topic to the Graduate Coordinator. The Graduate Coordinator will include the abstract in the OSC Campus announcement of the dissertation defense. The abstract should be emailed to the Graduate Advisor ideally at least two weeks before the defense.
7. Prior to the defense, print (in color) the Dissertation Approval page; templates are available on the [Graduate College website](#). Bring the approval page to the defense.
8. The Graduate College maintains instructions for the final oral exam. These should be reviewed before the final oral exam.



9. If refreshments are provided during the final oral exams, the student is responsible for cleaning up the reserved room following the exam. Coffee-making supplies will be provided by the Academic Programs office upon request. The student should pick up these supplies prior to the exam.

### **Final Oral Defense**

[\*\[Jump back to TOC\]\*](#)

The final oral defense may not exceed 3 hours in duration. Members of the committee must be present for the entire examination, in person or remotely.

The defense is generally conducted in the following sequence:

- A public portion where the candidate presents a summary of the research conducted to a general audience, followed by a brief public question and answer session.
- After the public portion has concluded, the audience will be dismissed and the defense committee will convene with the candidate for a private defense of the research conclusions and dissertation.
- The committee members may then excuse the candidate from the room to evaluate the candidate's performance and confer on the result. The following results are possible:
  - Pass with no revisions;
  - Pass with revisions;
  - Fail.
- If the result is "Pass with no revisions," all of the committee members should sign the printed Doctoral Approval page, with the Dissertation Director signing both the upper and lower sections of the approval page.
- If the result is "Pass with revisions," all of the committee members should sign the upper portion of the printed Doctoral Approval page. The lower portion should be signed by the Dissertation Director once all of the revisions have been completed.
- At the conclusion of the defense, the Dissertation Director will report the outcome of the student's defense on behalf of the entire committee by submitting the **Results of Final Oral Defense** form in GradPath.

### **After the Defense: Electronic Submission of Dissertation**

[\*\[Jump back to TOC\]\*](#)

Once all of the revisions to the dissertation have been approved, students must scan their signed Doctoral Approval page and insert it as page 2 of their dissertation, retaining the original for their own records.

Students will need to complete electronic submission of the dissertation to ProQuest. The Graduate College will conduct a format check after the initial submission of the dissertation to ProQuest. As such, students are encouraged to submit their dissertation for a format check in advance of the deadlines so there is plenty of time for formatting changes. Students should review the Graduate College's [Dissertation Checklist](#) for finishing doctoral requirements and the [Graduate College Dissertations and Theses](#) page for more information about formatting requirements and deadlines.

The Wyant College of Optical Sciences allows published papers to be included in theses and dissertations provided that, in addition to the conditions specified by the Graduate College, the following conditions are met:



- Only papers that have been published, or accepted for publication, in refereed scholarly journals may be included.
- The student must be the primary author of all such included papers. For papers with multiple authors, the determination of who is the primary author will be made by the student's advisor.
- A significant part of the work described in each included paper must have been carried out by the student. This determination will be made by the student's advisor.
- In accordance with existing Wyant College of Optical Sciences policy, the composition of all thesis and dissertation committees must be approved by the Associate Dean for Graduate Academic Affairs.

After the dissertation has been submitted, students should complete the Survey of Earned Doctorates and the Graduate College Exit Survey, as described on the [Dissertation Checklist](#).

In order to post the dissertation in an open access repository, you will also need to complete the Graduate College's [distribution rights form](#), which is then submitted to Graduate Student Academic Services in Admin 316.

The last step before leaving the College of Optical Sciences is to fill out the [OSC Exit Survey](#).



## IV. RIGHTS AND RESPONSIBILITIES OF PH.D. STUDENTS FOR MAINTAINING SATISFACTORY ACADEMIC PROGRESS

*[Jump back to TOC]*

Being in the Optical Sciences Ph.D. program is a privilege and opportunity that is subject to certain criteria that must be satisfied by the student. Students are also afforded rights that ensure they are not unfairly taken advantage of by faculty or dismissed from the Ph.D. program without undue cause. The ultimate awarding of a Ph.D. is not guaranteed to the student simply due to the student having been admitted to the Ph.D. program. The terms “good academic standing” and “satisfactory academic progress” reflect that the student is satisfying minimum criteria for remaining in the Ph.D. program and continuation as a UA Ph.D. student, according to Optical Sciences and the University of Arizona, although satisfying these minimum criteria also does not guarantee that a Ph.D. will be ultimately awarded. Notably, in addition to academic or coursework-based criteria, to be awarded a Ph.D. a student must also complete requirements that include conducting, analyzing, and reporting original research, writing a dissertation, and successfully defending their research in an oral presentation of the research on which the dissertation is based.

As is typical of Ph.D. programs, the Optical Sciences Ph.D. program requires that students maintain a steady progress of accomplishments that includes completion of core coursework, preliminary and comprehensive exams, and securing a faculty mentor who will direct the student’s Ph.D. research. A student who is not meeting the minimum requirements to maintain good academic standing at the UA or Optical Sciences, or who does not meet the criteria set forth for maintaining sufficient academic progress towards the Ph.D. degree as established by UA or Optical Sciences, is notified by email of being in a probationary period. If the student is unable to correct the deficiencies by the end of the probationary period, the student is dismissed from the Ph.D. program. The Graduate College policy on [Academic Probation](#) notes that **“each program has its own criteria by which a student is evaluated on satisfactory academic progress.”** The primary aim of the present section is to clearly elucidate Ph.D. students’ rights, and criteria for an Optical Sciences Ph.D. student to maintain satisfactory academic progress.

Students are also given rights by Optical Sciences and the UA Graduate College that ensure that they are not dismissed from the Ph.D. program without demonstrated cause or without a probationary period in which the student focuses on correcting issues that were previously noted. Except in extreme cases, the student is to be made aware of deficiencies or issues that may hinder their completion of the Ph.D. program as soon as possible, rather than subjecting the student to time unnecessarily spent in a program that will likely not ultimately lead to the completion of a Ph.D. Student rights include being made aware when their progress is unsatisfactory, so that the student has a probationary period to correct deficiencies. Hence, student rights and criteria for satisfactory academic progress go hand-in-hand.

This section addresses both topics of student rights, and criteria for demonstrating satisfactory academic progress, for the UA Wyant College of Optical Sciences Ph.D. program. The Optical Sciences criteria for demonstrating satisfactory academic progress of Ph.D. students is intended to be consistent with [the UA Graduate College policy on Satisfactory Academic Progress](#) for all UA graduate students. In cases where there is a discrepancy between the Graduate College policy and the Optical Sciences policy, the Graduate College policy will be upheld and the Optical Sciences policy will be appropriately modified in consultation with the Graduate College.





## **A. PHD STUDENTS: RIGHTS**

[\[Jump back to TOC\]](#)

### **1. Right to Understand the Criteria for Maintaining Satisfactory Academic Progress.**

[\[Jump back to TOC\]](#)

- Every Ph.D. student has the right to understand the criteria for maintaining satisfactory academic progress. These rights are elucidated in the [Graduate Student Handbook](#) (this document), and are provided to all students on the [Wyant College of Optical Sciences website](#).
- This right includes the right to ask for clarification of policies that are not clear. To exercise the right to clarification, it is strongly recommended that students request clarifications from the Graduate Advisor in writing (email), with an explanation on what is not understood. In cases where the Graduate Academic Advisor is not able to provide clarification, clarification should be sought from the Associate Dean for Graduate Academic Affairs of Optical Sciences.

### **2. Right to be Informed About Probation.**

[\[Jump back to TOC\]](#)

- Every Ph.D. student has the right to be informed by email, using their UA email address, if they are being placed in a probationary period, and what is needed to correct the deficiencies in order to remain in the Ph.D. program past the probationary period.

### **3. Right to Evaluation by Faculty Advisor**

[\[Jump back to TOC\]](#)

- A Ph.D. student has the right to request evaluation by their faculty supervisor regarding the student's research potential or specific skills, or other factors related to dissertation progress. The evaluation may be provided in oral or written form, in a discussion between the student and the advisor or in the form of a written document. If oral evaluation is provided, it is strongly recommended that the student write a brief summary of the discussion and evaluation, and send the summary by email to the faculty advisor for confirmation or correction of the primary points of the evaluation.
- A faculty advisor who assesses that the student is not progressing in a satisfactory manner towards the Ph.D., and is considering whether or not to continue mentoring the student and allowing the student to remain in the research group, must provide the student with an emailed evaluation that outlines the steps that the student needs to take to remain in the group. The student must be given a reasonable amount of time, such as at least half of a semester, to take corrective action and demonstrate satisfactory progress according to the deficiencies described in the evaluation. At the end of this period, the advisor must provide the student with a statement of corrected progress or continued insufficient progress. In the case of continued insufficient progress, the advisor may choose to extend the time to take corrective action, or dismiss the student from the research group. In exceptional cases, the advisor may dismiss the student immediately from the research group or without such an evaluation, but only after consultation with the Dean and the Associate Dean for Graduate Academic Affairs of the Wyant College of Optical Sciences.
- A student's right to be evaluated by their faculty advisor goes hand-in-hand with a faculty advisor's right to set the schedule, plans, and expectations for research related work if the student is supported on a research assistantship (RA), or is or plans to obtain research credits through OPTI 920 or other independent study units with the faculty advisor. The research



work schedule and expectations must be consistent with the criteria set by Graduate College and consistent with UA workload policy for RAs. These criteria include discussing a work schedule, vacation time, and research expectations prior to the student's acceptance of working under the supervision of the advisor or accepting RA support.

#### 4. Right to Petition

[\*\[Jump back to TOC\]\*](#)

- When conditions fall outside the norm, and for issues that fall outside the scope of the cases covered in Criteria for Satisfactory Academic Progress, a Ph.D. student has the right to petition the Associate Dean for Graduate Academic Affairs for a resolution to the student's concerns. To initiate a petition that is not covered by one of the forms on the [Optical Sciences forms webpage](#), a petition can be initiated by email. In this case, the petition:
  1. Must be sent directly to the Associate Dean by email. The petition must clearly outline the student's concerns and all relevant aspects of the attempts towards resolution that the student has sought.
  2. May be directed by the Associate Dean to an appropriate OSC standing or ad-hoc committee for evaluation and feedback, or decision.
  3. May be directed by the Associate Dean to an Associate Dean of the Graduate College or other UA personnel for feedback.
- If the student believes the petition has not been given full consideration, the petition may then be directed to the OSC Dean, along with all relevant communications and evaluations of the case obtained to-date.

#### 5. Right to Review of Grievances

[\*\[Jump back to TOC\]\*](#)

- Students should be aware of the [Graduate College Grievance Policy](#): Should a graduate student feel he or she has been treated unfairly, there are a number of resources available. With few exceptions, students should first attempt to resolve difficulties informally by bringing those concerns directly to the person responsible for the action, or with the student's graduate advisor, the department head, or the immediate supervisor of the person responsible for the action. If the problem cannot be resolved informally, the student may be able to file a formal grievance. ... While the Graduate College is available to discuss any academic concern, only grievances that allege violation of a specific University rule, regulation, policy or practice will be considered for formal review as stated below. A grievance procedure is available to graduate students who have complaints that:
  1. Allege violation of a specific University rule, regulation, policy or practice;
  2. Are not remediable by other university grievance policies and procedures; and
  3. Are within the decision-making jurisdiction of the Graduate College.
- The [Ombuds Program](#) is also available to help students with problems that they might have with the University, and provides informal means of problem resolution in case of University-related disputes.
- The [Office of Institutional Equity](#) (OIE) is responsible for reviewing and, where appropriate, objectively investigating complaints of discrimination and harassment in accordance with the [Nondiscrimination and Anti-harassment Policy](#). Where investigations establish discrimination or harassment, actions are taken to remediate the impact of discriminatory conduct. OIE also objectively addresses and investigates complaints of sex discrimination and sexual harassment (including sexual misconduct) against students.



## **B. CRITERIA FOR SATISFACTORY ACADEMIC PROGRESS AND PROBATION**

[\*\[Jump back to TOC\]\*](#)

All students are expected to understand the criteria for maintaining satisfactory academic progress in Optical Sciences, as described below. If any rules are unclear, the student is expected to request clarity from the Graduate Academic Advisor or the Associate Dean for Graduate Academic Affairs of Optical Sciences.

### **Academic Probation**

Students may be notified of minor policy transgressions without being placed in probation. More significant policy transgressions, as described in this section, will first result in a warning of an impending probation (if discovered early enough), and a request by the Associate Dean for a meeting with the student and faculty advisor (if available) to discuss alternatives to probation if the situation allows. The student may then be placed on probation and so notified.

The UA Graduate College requires graduate students to maintain a GPA of 3.0 or above. If a student's GPA drops below 3.0 at the end of one semester, the student is placed in Academic Probation by the Graduate College for the following semester, during which time the student must bring up their GPA to 3.0 or above. If the student fails to accomplish this, or does not receive an extension for another semester of probation to bring up their GPA, the student will be dismissed from their graduate program by the Graduate College. The notification of such probationary periods are handled by the Graduate College.

The remainder of this section pertains to additional criteria for maintaining satisfactory academic progress within the Wyant College of Optical Science's Ph.D. program, and is determined by Optical Sciences. A student who violates any policies below is subject to being placed in academic probation. A student who enters a probationary period due to unsatisfactory academic progress will be notified by email, with directions on how to emerge out of probation and continue with the Ph.D. The Associate Dean of the Graduate College may also be notified that the student has been placed in probation. A student who subsequently does not correct deficiencies and return to making satisfactory academic progress, or who does not receive an approved petition for an additional semester of probation, may be recommended by the Optical Sciences Associate Dean for Academic Affairs to the Graduate College for dismissal.

The policies below are subject to revision. Where the rules below are in disagreement with the criteria for satisfactory academic progress as specified by the Graduate College, the [criteria set by the Graduate College](#) will stand. Students must adhere to revised policies, rather than the policies that were in place when the student entered the program. However: (1) a student in a probationary period will not be dismissed from the program during the probationary period due only to a revision of policies, and (2) a student will not be suddenly placed on probationary status within a given semester in which criteria have been revised, due only to revision of the criteria.

### **1. Criteria for Maintaining Full-time Status**

[\*\[Jump back to TOC\]\*](#)

- Students on fellowships or who are receiving financial support through university employment or graduate assistantships must maintain full-time participation in the Ph.D. program according to the rules that accompany the source of financial support.
- For students on FoTO scholarships (first-year Ph.D. students only), a minimum of 10 credit hours of coursework per semester is expected. A student may decrease their coursework load to 9 units in a given semester, as long as they will have a total of 20 units of coursework completed



by the end of their first year in the Ph.D. program; these 20 units must be able to count towards the student's degree requirements. Transfer credits and credits completed as a M.S. student (graded coursework only) are included in this total, and in such cases the student may complete fewer than 20 credit hours during their first year in the Ph.D. program. Dissertation units do not count towards this minimum, and should not be used during the first year of the Ph.D. program, unless the student has already completed 20 credit hours of non-dissertation coursework that will count towards the student's Ph.D. degree requirements.

- For students on a graduate assistantship (GA), full-time equates to a minimum of 6 hours of coursework in the semester in which the GA is held. Dissertation units count towards this minimum. Units that are taken via audit, or that are dropped at any point during the semester, do not count towards this minimum.
- For students on other sources of financial support, or no support, full-time is 7 credit-bearing hours per semester for domestic students, and 9 credit-bearing hours per semester for international students. Dissertation units count towards these minima.
- Courses with a grade basis of audit do not count towards degree requirements, and do not count towards the fulfillment of minimum credit hours. If a student who is required to maintain full-time status changes a course to a grade basis of audit or withdraws from a course, and the student completes the semester in violation of the above criteria, the student is in violation of the Optical Sciences minimum credit hour criteria and may be in violation of other UA policies. If the student also completes the following semester in violation of the policy, the student is placed on probation for not making sufficient academic progress at the end of that semester and for the following semester. The student may not hold an Optical Sciences teaching assistantship in a semester in which they are in probation.

## 2. Completion of Core Coursework

[\*\[Jump back to TOC\]\*](#)

- The Optical Sciences Ph.D. Core Coursework requirements are described in Sections III and [Sections VIII.A and B](#).
- All core courses must appear on the Ph.D. Plan of Study with grades of A or B, with the exception that one grade of C is allowed in a single course that is used towards fulfilling Ph.D. course requirements, as long as the student's Ph.D. advisor gives approval prior to the submission of the Ph.D. Plan of Study.
- Exceptions to core course requirements may be considered for students who have completed equivalent work in another graduate program, with or without transfer credit, and in rare cases for coursework completed as part of an undergraduate program. Such exceptions must be discussed in person with the Associate Dean for Graduate Academic Affairs. If tentative approval is given, the exception must then be requested in email from the student to the Associate Dean, with a response provided by email to the student. The student is responsible for ensuring that the Graduate Academic Advisor is provided with the written exception so that the Graduate Academic Advisor can enter a note regarding the exception on the Plan of Study when required. The student is also expected to enter a note on the Plan of Study, when filed, regarding the exception.
- Core courses that are tested on the Ph.D. Qualifying Exam must be completed in the first year of the Ph.D. program. The remaining core coursework must be completed by the end of the semester in which the Oral Comprehensive Exam is taken. However, a single course that is not related to the student's core area or the Comprehensive Exam's topic of discussion may be postponed until after the Comprehensive Exam is completed.



- Lab courses may be taken at any time during the student's graduate career, as long as they are completed by the time the student graduates.
- Any exceptions to the above requirements regarding core coursework must be requested first by discussion with, and then by email petition to, the Associate Dean for Graduate Academic Affairs. An emailed response approving the petition is required for the exception to stand. The student is responsible for ensuring that the Graduate Academic Advisor is aware of any approved exceptions and has the necessary written approvals for notation on the Plan of Study when required.

### 3. OPTI 792

[\*\[Jump back to TOC\]\*](#)

- First-year Ph.D. students must enroll in at least 1 credit of OPTI 792 in each of the first two semesters in the Ph.D. program, beginning Spring 2023. Each student is responsible for identifying and contacting a potential OPTI 792 faculty supervisor, with the intention of identifying early on a research group for the student's Ph.D. project. Each student is expected to continue searching for an OPTI 792 faculty supervisor until an OPTI 792 project is agreed upon between the student and the faculty member. The faculty member is not required to have an appointment in Optical Sciences, but the project and research must related to optics research, and the faculty member must be a member of the UA Graduate Faculty able to supervise Ph.D. students and serve as a Ph.D. committee chair. This policy is effective beginning the Spring 2023 semester.
- Exception to the above rule: If a new Ph.D. student has already joined a research group, and has submitted a confirmation of faculty advisor and/or the faculty advisor has confirmed academic responsibility for serving as the faculty advisor, the student is not required to enroll in OPTI 792 units if the student has already completed at least 18 units of graded optics graduate coursework with grades of A or B. This exception is primarily relevant for Optical Sciences students who complete coursework and begin research as an M.S. student, and then later join the Ph.D. program.
- A student may begin an OPTI 792 project with one faculty member, and then later the student and/or faculty member determine that the student and the research of the group are not a good match. In this case, the student is permitted to withdraw from the OPTI 792 unit(s) with the prior permission of the Associate Dean. However, if this decision occurs in the first half of either semester, the student is required to find another faculty supervisor for at least one credit of OPTI 792 to be completed in the remainder of the semester. The Graduate Advisor will help process the change of supervisor, possibly without dropping the OPTI 792 units in which the student was enrolled.
- If the student is having trouble finding a faculty supervisor for an OPTI 792 project by the end of the 4<sup>th</sup> week of the semester, the student must discuss their situation with one of the Associate Deans in order to receive help or suggestions finding a supervisor or project. Note that projects do not necessarily have to involve hands-on laboratory work. Projects may consist of attending group meetings, reading and discussing papers related to the field of research of the research group, and spending time in a laboratory talking with and learning from graduate students.

### 4. Ph.D. Qualifying Exam

[\*\[Jump back to TOC\]\*](#)

- OSC's Ph.D. Qualifying Exam format, grading methodology, and eligibility requirements are described in Section III.





- Once a Ph.D. student becomes eligible to take the exam, the student must take this exam the next time that it is administered, typically in the week before classes begin for the following Fall semester.
- If an eligible student does not take the exam when required, a failing grade will be recorded for that student, unless that student has obtained permission to delay taking the exam by one year. Such permission, which must be based on exceptional circumstances, must be obtained in writing (email) from one of the OSC Associate Deans for Academic Affairs prior to the exam date. A student may not delay the exam for two years in a row. A student is not placed on academic probation for failing the qualifying exam after they are first eligible.
- A student who fails the qualifying exam twice has the option to petition the Graduate Exams Committee for a third attempt at the Qualifying Exam, according to the policy described in Section III. If a petition is not submitted and approved during the Fall semester after the exam was failed for the second time, the student is placed on probation for the following Spring semester. The student will be dismissed from the Ph.D. program at the conclusion of the semester unless the student submits a petition for an additional attempt that is subsequently approved. Only petitions accompanied by the written support of the student's faculty Ph.D. dissertation advisor will be considered. During a probationary Spring semester, the student is not permitted to hold a teaching assistantship position, and may be subject to payment of their tuition if they do not have financial resources from a research assistantship or other funding.

## 5. Ph.D. Dissertation Advisor (a.k.a. faculty advisor, Ph.D. committee chair)

[\[Jump back to TOC\]](#)

- A Ph.D. student must have a Dissertation Advisor selected, with the advisor's consent, by the end of the student's third full semester of active full-time participation in the Ph.D. program. A leave of absence, medical withdrawal, or an internship off-campus does not count against the student; i.e., if a student takes a leave of absence or internship for an academic semester or year following the student's first year in the Ph.D. program, the student's third full semester in the program will be the semester in which the student returns to the program following the leave of absence or internship.
- Students are expected to select advisors who will make every reasonable effort to support the student on research assistantships (RAs), unless the student has a source of financial support (such as external fellowships, company employment) other than Optical Sciences teaching assistantships (TAs). Advisors will occasionally have gaps in their ability to fully support Ph.D. students on RAs. In these cases, the student may be supported with an Optical Sciences TA position, consistent with the TA policy. Students are not permitted to be solely supported on TA funding throughout their time in the Ph.D. program. The Optical Sciences TA policy is explained in [Section II.V](#).
- A Ph.D. student who has not secured an advisor by the end of the third full semester in the Ph.D. program will be considered as making unsatisfactory academic progress and will be placed on probation, except in unusual situations such as an advisor leaving UA; any exceptional circumstances will be considered by the Associate Dean for Graduate Academic Affairs. The probationary period will continue to the end of the student's fourth full semester in the program. The student will be notified by email that they are on probation. Except in circumstances approved by the Associate Dean for Graduate Academic Affairs, during the probationary semester, the student may not hold a TA position in Optical Sciences, and must focus on finding a faculty advisor as a main priority. Probation may be avoided in some circumstances, including situations in which the student has been dismissed from a research group that was previously joined, or the student's chosen advisor leaves the university or is otherwise no longer able to



serve as the student's advisor. During a probationary period, and without a TA appointment, the student may be responsible for covering their own tuition.

- It is understandable for a student to need to seek a new faculty advisor after one has already been confirmed but is later found to not be a good match for the student or the advisor. Students in this situation must consult with the Associate Dean for Graduate Academic Affairs to obtain advice on how to navigate RA and TA funding issues, as well as how to navigate the potential for being placed on probation and how to maintain satisfactory academic progress. Generally, students will not be penalized for changing faculty advisors as long as they find a new advisor within the duration of a semester, and they will be considered for TA support for the following semester (if needed) if they have not found a new research group by the end of the semester in which they have left their previous group. **The policy stated in this section is not intended to push students into staying with a faculty advisor in a situation that is not beneficial to the student, and is instead intended to stress the importance of finding a faculty advisor to maintain satisfactory research progress as a Ph.D. student, consistent with the Graduate College's statement on Satisfactory Academic Progress. Moreover, the College of Optical Sciences encourages Ph.D. students to find a research group that appears to be a good match, and the Associate Deans for academics encourage students to speak with them about difficulties that they are having finding an advisor, or about concerns regarding a group that they have already joined. In most cases, if the student is keeping the Associate Dean for Graduate Academic Affairs aware of their concerted efforts to find a research group that is a good fit, and the student follows the guidance and requirements set by the Associate Dean, probation will likely be avoided.**
- A student who has not secured a faculty advisor by the end of a probationary period, and who has not followed instructions on how to navigate the probationary period, will be dismissed from the program. Probationary period instructions may include enrolling in OPTI 599 independent study projects with one or two faculty members in order for the student to become familiar with research activities prior to joining a group.

## 6. Comprehensive Exam

*[Jump back to TOC]*

- The Ph.D. Comprehensive Exam format, rules, evaluation criteria, and outcomes are given in Section III.
- The Comprehensive Exam (written and oral components) must be completed by the end of the academic year that follows the academic year in which the qualifying exam is passed. Requests for postponements to this deadline must be requested of, and will be considered by, the Associate Dean for Graduate Academic Affairs. Postponements of a semester are considered for circumstances that include heavy research activity and deadlines (if supported by the advisor), student health issues, and advisor sabbatical.
- Students who take a leave of absence or school-year internship after the passing of their qualifying exam will be given an extension period for completing their Comprehensive Exam that is equivalent in duration of the period of the leave of absence or school-year internship.
- If the Comprehensive Exam is failed, the student is given a second chance to pass the Comprehensive Exam. The second attempt must take place in the semester that follows the semester in which the exam was first failed.
- A student who fails the Comprehensive Exam twice is dismissed from the Ph.D. program at the conclusion of the semester in which the exam was failed for the second time.





## 7. Time Limits in Ph.D. Program

[\*\[Jump back to TOC\]\*](#)

- The Graduate College limits students to 5 years in the Ph.D. program beyond the completion of their Comprehensive Exam. Beyond this limit, program extensions are considered by the Graduate College by petition. For the petition to receive the support of Optical Sciences, the petition must include:
  1. A PDF letter attached by the student to the initial petition. The petition must indicate:
    1. A brief reason for the need for the program extension
    2. A list of milestones and their expected dates of completion remaining for the completion of the Ph.D., including the main research milestones remaining, writing of papers, preparation of draft chapters of the dissertation, conference presentations, etc. Note: do *not* indicate that papers must be accepted for publication as a milestone. Such a requirement for a Ph.D. to be awarded is not permitted by the UA Graduate College.
    3. A list of milestones and expected dates of completion for any remaining GradPath forms that must be submitted, such as the Dissertation Committee Appointment form and Dissertation Prospectus/Proposal.
  2. A statement of support from the Ph.D. advisor, preferably a PDF attached to the petition, entered when the advisor approves the petition. This statement or letter must indicate that the advisor acknowledges and approves of the milestones and proposed timeline, and must indicate the level and type of support that the advisor will provide to the student once the extension is approved.
- In addition to the time limit imposed by the Graduate College, Optical Sciences places a default time limit of 10 total calendar years for a student to remain in the Ph.D. program, beginning with the first semester as a Ph.D. student, regardless of when the Comprehensive Exam was completed. Students who are approaching this threshold will be placed on probation in the final semester of their 10<sup>th</sup> year in the Ph.D. program, or may avoid probation for that semester by meeting with an Associate Dean and Ph.D. advisor to discuss the final steps needed to complete the Ph.D. dissertation. The student's situation will be evaluated on a case-by-case basis, and the student will be required to complete one or both of the following (as determined by the Associate Dean) to extend their time to completion by another semester and avoid probation: (1) regular demonstration of progress towards completion of the dissertation, such as with weekly submissions of reports or dissertation chapters to the advisor and/or an Associate Dean; (2) submission of a petition to the Optical Sciences Associate Dean for Academic Affairs justifying the need for an extension of time in the program, to be approved in unusual circumstances only. The petition must be accompanied by a statement of milestones and expected timeline, and a statement of advisor support, as is needed in Graduate College program extension petitions (see Graduate College time limit, above). If a student fails to meet the requirements set by the Associate Dean, the student will be placed on probation for one semester and must either complete the dissertation before the beginning of the following semester, or to remain in the program may be required to (1) retake the Ph.D. Qualifying Exam the next time it is offered, and pass the exam to remain in the program; (2) retake and pass the Ph.D. Comprehensive Exam; (3) re-apply to the Ph.D. program, with re-admission to be evaluated by Optical Sciences and the Graduate College. The Graduate College may require a retake of the Comprehensive Exam.



## V. M.S. PROGRAMS IN OPTICAL SCIENCES

[\*\[Jump back to TOC\]\*](#)

A Master of Science in Optical Sciences prepares students to enter exciting and challenging careers in industry or to continue their educations in the Ph.D. program. Graduates become engineers, designers and technical managers. They work in hardware design, medical and biomedical technology, lasers and electro-optical systems, fiber optics and communications, measurements, manufacturing, and consumer technology. They work for large corporations, small companies, government agencies, universities, hospitals and research centers. Many even work for themselves, having started successful businesses or gone into consulting.

The Optical Sciences M.S. program has both Main Campus and Arizona Online offerings, although students may choose only one campus and one modality each semester (i.e., students may not enroll in a combination of Main Campus and Arizona Online courses within the same semester). Students may switch from Main Campus to Online Campus (or vice versa) by sending an email request to the Graduate Advisor, who can then submit a Campus Change Request on the student's behalf.

The following M.S. options are currently offered by the Wyant College of Optical Sciences:

- **M.S. in Optical Sciences** (Main Campus and Online). There is no set core curriculum for the Optical Sciences M.S. program. Students may choose any graduate level courses that suit their interests from Optical Sciences, subject to some restrictions as outlined below, as well as relevant courses from other UA departments. Online students may choose the Thesis option (see Industrial Track below), or the non-thesis Report or Technical Writing options, also available to Main Campus students. All options have a final oral exam.
- **M.S. in Optical Sciences – with emphasis in Optomechanical Engineering** (Main Campus and Online): The M.S. in Optical Sciences – Optomechanical Engineering is more structured than the M.S. in Optical Sciences, with 12 units of required core courses, as well as required lab units.
- **M.S. in Optical Sciences – with emphasis in Quantum Information Science and Engineering** (Main Campus): The M.S. in Optical Sciences – Quantum Information Science and Engineering is more structured than the M.S. in Optical Sciences, with 12 units of required core courses, as well as required lab units.
- **M.S. in Optical Sciences - Industrial Track** (Main Campus and Online Campus programs available): The Master of Science in Optical Sciences Industrial Track program is a thesis-only track, requiring 24 units of coursework and additional on-site work experience in industry or other remote facility for the degree.
- **M.S. & MBA Dual Degree with M.S. in Optical Sciences** – The M.S./MBA Dual Degree program requires 74 units of coursework to complete both degrees. The full dual degree program takes an estimated three to four years to complete. The M.S. in Optical Sciences portion requires 35 units of credit; coursework toward the MBA degree makes up the remaining 39 units. The final exam consists of an oral presentation based primarily on the master's report and the MBA summer project.
- **M.S. in Optical Sciences – Accelerated Master's Program (for UA undergraduates only):** This program is only available to current undergraduates pursuing a Bachelor of Science in Optical Sciences and Engineering (BSOE) at the University of Arizona. The Accelerated Master's Program allows undergraduate students who are planning to continue their studies and research in the Wyant College of Optical Sciences' graduate M.S. program to complete both degrees in as few as five years. The Accelerated Master's Program requires completion of 128 undergraduate units of coursework and 35 units of graduate coursework, with 12 units shared between the two degrees. This program is not open to students who have completed a bachelor's



degree or an advanced degree from another institution. The AMP is designed to be a terminal Master's degree: the student's graduate studies end with the completion of their M.S. However, a student in the AMP may decide to apply for a Ph.D. in Optical Sciences while in the AMP. If the student is admitted to the Ph.D. program, the 12 units of graduate courses taken as an AMP student will be counted towards the Ph.D. program's coursework requirements.

#### **A. GENERAL REQUIREMENTS FOR M.S.**

*[\[Jump back to TOC\]](#)*

Outside of the lab requirement, there is no set core curriculum for the Optical Sciences M.S. program, except for students who are completing a subplan in **Optomechanical Engineering** or **Quantum Information Science and Engineering**. Students may choose graduate level courses that suit their interests from Optical Sciences, as well as other relevant courses offered by other departments. As a general rule, at least 50% of courses completed by a student toward an M.S. in Optical Sciences must be Optical Sciences courses, and all courses that will count towards the degree must be approved by the student's faculty advisor and OSC's Associate Dean for Graduate Academic Affairs. [A list of all graduate courses offered by OSC is available online.](#)

#### **Required Labs and Lab Waiver Request**

With the exception of students in the Accelerated Master's Program, all students completing the M.S. program are required to complete **2 lab courses**. (Accelerated Master's Program students are required to complete only 1 lab course.) In some cases, particularly with M.S. students working in the optics industry, a waiver for one lab is possible. Further information about lab classes, including a list of classes that satisfy the lab requirement, can be found in Section IIQ.

#### **OPTI 599: Independent Study Units and other non-technical courses**

M.S. students are restricted in the number of non-technical and OPTI 599 units they can include on a Plan of Study. See Section IIS for description of these restrictions, and Section IX: Appendix C for a table that lists the restrictions.

#### **Transfer Credit**

M.S. students may apply a maximum of 6 units of relevant graduate credit from another institution or another M.S. degree at the UA toward their M.S. requirements. A maximum of 12 units completed under UA Non-Degree Seeking Graduate status may be applied toward a M.S. Plan of Study. All units completed as part of an Optical Sciences Certificate (with grades of A or B) will count towards the Optical Sciences M.S. degree. See Section IIT for further information about transfer credits.



## B. TIMELINE FOR COMPLETION OF M.S. DEGREE REQUIREMENTS

[\[Jump back to TOC\]](#)

Admission to the M.S. program is offered in both the Fall and Spring semesters. Generally, the average time to M.S. degree for full-time students is 2.5 years. Per Graduate College policy, the maximum amount of time for the completion of an M.S. in Optical Sciences is 6 years. Extensions of time to degree beyond the 6 year limit may be granted in exceptional circumstances and by petition to the Graduate College. Students who expect to complete their degree requirements and graduate after more than 6 years due to leaves of absence, part-time status, or non-continuous enrollment must petition to include courses that are over 6 years old in their M.S. Plan of Study. This petition requires approval from the Academic Programs Office, including a verification from the department that the content of the courses the student completed over 6 years ago is still relevant and current.

The following table presents a general timeline for completion of degree requirements for full-time M.S. students.

Year	Requirements/Forms to be completed
Year 1	Complete GradPath Responsible Conduct of Research form
	Identify an advisor and submit a <a href="#">Faculty Advisor Confirmation</a> form.
	Submit transfer credit for approval from Graduate College by submitting the Transfer Credit Form in GradPath.
	Submit transfer credit for approval from Wyant College of Optical Sciences with the <a href="#">College Transfer Credit Form</a> .
	Submit the GradPath Plan of Study, indicating thesis or non-thesis track.
Year 2	Identify Committee for Final Thesis or Report Defense, or Final Oral Exam for Technical Writing track. Submit Master's/Specialist Committee Appointment Form in GradPath.
	Schedule defense/exam date with committee.
	Complete <a href="#">M.S. Final Oral Exam Scheduling Form</a> .
	Complete defense/oral exam.
	Submit final Thesis to Graduate College.
	Email Thesis or Report to Graduate Coordinator.
	Complete Optical Sciences <a href="#">Exit Survey</a> .
	Update Diploma Mailing Address in UAccess.

This timeline may differ significantly for students completing their program remotely or students working full-time while completing the M.S. degree.

## C. THESIS, REPORT, AND TECHNICAL WRITING TRACKS

[\[Jump back to TOC\]](#)

Students seeking an M.S. degree in the Wyant College of Optical Sciences may attain their M.S. by completing research toward a thesis or report, or by completing a coursework-only (Technical Writing) track. Degree requirements differ depending on whether the student is completing a Thesis, a Master's Report, or the Technical Writing option. All options require an oral exam to conclude the M.S. degree.



## **M.S. Thesis Track**

*[\[Jump back to TOC\]](#)*

A master's thesis is a summary of a research project that the student has conducted during the graduate program. The summary will discuss the research along with the results of the study. Research may be conducted in a UA lab or externally. Students completing a thesis toward their M.S. are required to complete the following steps to meet M.S. degree requirements (note that students following the Quantum Information Science & Engineering emphasis area will have different numbers of required units):

1. Complete a minimum **32 total units of enrollment** consisting of:
  - **8 units of OPTI 910: Thesis**, and
  - **24 units of coursework, including 2 labs.** Enrollment in at least 2 optics lab courses is required, although students may request a waiver of one lab. Students may complete any OPTI graduate courses of their choosing to fulfill M.S. degree requirements, subject to advisor approval, and subject to the additional restrictions and course options as described in Sections II.S and II.T, and summarized in [Section VIII.C](#). Exceptions to these rules may be considered and approved by the Associate Dean for Graduate Academic Affairs.
2. **Completion of Thesis:** Theses vary in length, depending on content, and are usually between 50-100 pages. Formatting should follow the Graduate College's guidelines, which can be found at: <https://grad.arizona.edu/gsas/dissertations-theses/dissertation-and-thesis-formatting-guides>. An electronic version of the student's thesis must be distributed to their M.S. thesis committee at least 2 weeks in advance of the defense for initial review and approval, or according to the needs of thesis committee members.
3. **Final Defense:** Students completing a thesis toward an M.S. in Optical Sciences must complete a defense/final oral exam based on the content of the thesis. The defense is typically scheduled for a 2-hour block, but generally lasts 1 to 1.5 hours. After the defense, the advisor and committee will inform the student of the result of the defense and, if the student has passed the defense, provide a list of revisions to the thesis.
4. **Electronic Submission of Thesis to Graduate College:** Once all revisions are completed and the advisor and committee have signed the student's Thesis Approval Page, the thesis must be submitted for archiving to the Graduate College (see <https://grad.arizona.edu/gsas/dissertations-theses/submitting-and-archiving-your-thesis> for details).

## **Master's Report Track**

*[\[Jump back to TOC\]](#)*

A Master's Report is a literature review in which the student selects a topic in optics, collects data from scholarly papers, and summarizes the collected information into a final paper. The paper does not require the student to conduct their own research and report final results, though some M.S. Reports will incorporate some work that a student has done. Students completing a report toward their M.S. are required to complete the following steps to meet M.S. degree requirements (note that students following the Quantum Information Science & Engineering emphasis area will have different numbers of required units):

1. Complete **35 units of enrollment**, including:
  - **3 units of OPTI 909: Masters Report**, and
2. **32 units of coursework, including 2 labs:** Enrollment in at least 2 optics lab courses are required, although students may request waiver of one lab. (Exception: Accelerated Master's Program students are required to complete only 1 lab course.) Students may complete any OPTI



graduate courses of their choosing to fulfill M.S. degree requirements, subject to advisor approval, and subject to the additional restrictions and course options as described in Sections II.S and II.T, and summarized in [Section VIII.C](#).

3. **M.S. Report Requirement:** Papers vary in length depending on content and are usually between 30-60 pages. Formatting is recommended to follow the Graduate College's guidelines, which can be found at: <https://grad.arizona.edu/gsas/dissertations-theses/dissertation-and-thesis-formatting-guides>.
4. **Final Defense:** By mutual agreement between the student and the examination committee, the student's master's report serves as the focus of the student's final oral exam. The defense is typically scheduled for a 2-hour block, but generally lasts 1 to 1.5 hours. The committee will ask any follow up questions and may also ask questions regarding courses completed in the student's graduate program. After the defense, the advisor and committee will inform the student of the result of the defense and, if the student has passed the defense, provide a list of revisions to the report.
5. **Electronic Submission of Report to OSC:** A final PDF version will be submitted to the Graduate Advisor for OSC archival. M.S. Reports do not need to be submitted to the Graduate College.

### **Technical Writing Track**

[\[Jump back to TOC\]](#)

Students completing only coursework with no research toward their M.S. are required to complete the following steps to meet M.S. degree requirements:

1. Complete **35 units of enrollment**, including:
  - **3 units of OPTI 597B: Technical Writing and Communication** or an approved alternative, such as the UA graduate course PHCL 595B: Scientific Writing Strategies, Skills and Ethics. This enrollment in a graduate technical writing course ensures that the student demonstrates competence in written communication. Approved alternative courses are OPTI 585, OPTI 588, and HSD 510.
  - **32 additional units of coursework, including 2 labs:** Enrollment in at least 2 optics lab courses are required, although students may request waiver of one lab. Students may complete any OPTI graduate courses of their choosing to fulfill M.S. degree requirements, subject to advisor approval, and subject to the additional restrictions and course options as described in Sections II.S and II.T, and summarized in [Section VIII.C](#).
2. **Final Exam over Course Content:** For students selecting the Technical-Writing option of the M.S. in Optical Sciences, the final oral examination is based on course subject matter. At least two of the committee members must be Optical Sciences faculty from whom the student has taken classes.

### **D. SUBPLANS AND OTHER M.S. OPTIONS**

[\[Jump back to TOC\]](#)

Students pursuing either the Optomechanical Engineering or the Quantum Information Science & Engineering emphasis areas must complete specific coursework to fulfill the curriculum requirements for that emphasis (subplan).





### **Optomechanical Engineering Subplan (Main Campus and Online)**

*[\[Jump back to TOC\]](#)*

The M.S. in Optical Sciences – Optomechanical Engineering subplan is distinct from the Optical Sciences M.S. program in that it includes **12 units of required core courses**, and additional coursework requirements. Otherwise, the Optomechanical Engineering subplan has all of the same degree completion options and requirements as the Optical Sciences M.S., including the requirement of 2 lab courses. Courses required and course options for the Optomechanical Engineering subplan are listed on the following two pages. See [Section VIII.D](#) for program requirements.

Outside of the required courses, the degree requirements and tracks available to students completing the Optomechanical Engineering subplan are the same as for the Optical Sciences M.S. program.

### **Quantum Information Science & Engineering Subplan (Main Campus)**

*[\[Jump back to TOC\]](#)*

The M.S. in Optical Sciences – Quantum Information Sciences and Engineering (QISE) subplan is distinct from the Optical Sciences M.S. program in that it includes **12 units of required core courses**, and additional coursework requirements, and requires a total of 32 units regardless of degree completion plan (6 units of OPTI 910: Thesis are required for students on the Thesis track). Otherwise, the QISE subplan has all of the same degree completion options and requirements as the Optical Sciences M.S., including the requirement of 2 lab courses. Courses required and course options for the QISE subplan are listed on the following page. See [Section VIII.E](#) for program requirements.

Outside of the required courses, and the number of thesis and coursework units required, the degree requirements and tracks available to students completing the QISE subplan are the same as for the Optical Sciences M.S. program.

### **M.S. in Optical Sciences - Industrial Track**

*[\[Jump back to TOC\]](#)*

Academic requirements for the Industrial-track Master of Science (iMS) program at the Wyant College of Optical Sciences are identical to those of the thesis-based M.S. in Optical Sciences program (including the subplans). The iMS program is an internal designation that indicates a student is working on a thesis project outside of the UA and the thesis project overlaps with activities assigned by the student's employer. There are also some important differences in expected timeline of completion and thesis arrangements, including:

- **iMS students must complete a thesis.** If a subplan is being pursued, the topic of the thesis must be approved as being relevant to the subject of the subplan.
- **The M.S. thesis project is undertaken at a partnering company** rather than on the UA campus,
- **The M.S. student is an employee of the company for the duration of a thesis project** involving an optics-related project or original research, which is envisioned to take about a year to complete.
- The student's employment status and thesis work may result in a **different timeline for completion of degree requirements** than the standard Optical Sciences M.S.





**iMS Thesis Project Assignment Process:** An iMS Thesis project may be assigned in one of two ways:

- (a) **Employee-Initiated Project:** If a student is already working at a company and chooses to pursue a thesis project that overlaps with their work at the company,
- the student and a supervisor submit a Proposal Form describing the project. The student should contact the Graduate Academic Advisor for a template of this form.
  - The proposal is then routed to the Associate Dean for Graduate Academic Affairs for review and approval, in consultation with appropriate faculty if necessary. Once approved, the student may enroll in OPTI 910: Thesis units and begin working on the project after completing all or most of the coursework requirements.
- (b) **Company-Initiated Project:**
- A company may submit a Proposal Form that briefly describes the project, expected skills, and other requirements that candidates for the position must meet. The proposal may describe the project in general terms and emphasize what the student will get out of the project once it has been completed, or describe the project in substantial detail. The Proposal Form should be submitted to the College along with any attachments that help further describe the project.
  - The proposal is reviewed by the Associate Dean for Graduate Academic Affairs, and if necessary, any concerns are discussed with the project contact at the company.
  - The College will distribute the proposal to M.S. students. Interested M.S. students will then return the following materials via email to the Graduate Academic Advisor:
    - i. A CV that lists previous educational experience (schools, degrees, GPAs), relevant coursework involving Optics, research experience, internship or employment in technical areas, and technical goals or a brief statement of general areas of interest.
    - ii. Unofficial transcripts from any UA and any other institutions attended.
    - iii. An information waiver allowing student information on CV and transcripts to be shared with a company.
    - iv. A signed iMS Program Acknowledgement form.
  - Once the student has been assigned a company project and has completed all or most of the coursework requirements, the student may enroll in OPTI 910: Thesis units and begin working on the project.

**iMS Thesis Project Completion Timelines:** The main feature of the iMS program is for the student to complete an M.S. thesis project while an employee at a company. Thus, the required 24 credit hours (minimum) of graduate coursework can be completed on campus or while the student is off campus and enrolled in distance-learning courses. These required units can be completed in two semesters or over a longer period of time, if necessary. However, all or nearly all of the coursework should be completed before the student starts working on the thesis project so that coursework does not significantly interfere with the thesis project or other work that the student is performing for the company. The timelines differ slightly based on the whether the student employee initiates a project or is assigned a project.

- (a) **Timeline for Employee-Initiated Projects:** In this scenario, the student is already an employee at a company prior to enrolling in the M.S. program.

Year 1: Company employees are given a 9-month sabbatical (mid-August to mid-May) from the company to temporarily relocate (if needed) to Tucson, and to join the M.S. program as an on-



campus student. If a student is already working at a company and chooses to pursue a thesis project that overlaps with their work at the company, the student and a supervisor may submit a Proposal Form to jointly describe the project. All, or nearly all of the coursework should be completed in the first year, before the student returns to the company to begin work on the thesis project, so that coursework does not significantly interfere with the thesis project or other work that the student is performing for the company.

Year 2: When coursework is completed, the student dedicates about a year of work to a project that will serve as the M.S. thesis project. At the conclusion of the project, the student completes a thesis defense, with the faculty supervisor serving as the Chair of the defense committee. A company supervisor or member may be invited to serve on the defense committee as a Special Member.

Year	Requirements/Forms to be completed – Employee-Initiated Projects
<b>Year 1</b>	9-month sabbatical (mid-August to mid-May) for company employee/student to temporarily relocate (if needed) to Tucson and join M.S. program as an on-campus student.
	Student submits Proposal Form describing thesis project proposed at home company to Associate Dean for Graduate Academic Affairs for approval.
	Student identifies a faculty advisor to supervise project progress and submits a <a href="#">Faculty Advisor Confirmation</a> form.
	Student completes GradPath Responsible Conduct of Research form
	If applicable, student may submit transfer credit for approval from Graduate College by submitting the Transfer Credit Form in GradPath.
	Student completes Main Campus courses to fulfill <b>all or most of the coursework requirements</b> , including <b>lab requirements (few online labs available)</b> .
	Student submits GradPath Plan of Study for Thesis
<b>Year 2</b>	Student <b>returns to company</b> at the end of the first academic year to begin Thesis research.
	Student enrolls in OPTI 910: Thesis units with on-campus faculty supervisor, and completes any remaining coursework through online classes.
	Student identifies Committee for Final Thesis Defense and submits Master's/Specialist Committee Appointment Form in GradPath.
	Student schedules defense/exam date with committee.
	Student completes <a href="#">M.S. Final Oral Exam Scheduling Form</a> .
	Student completes Thesis Defense.
	Submit final Thesis to Graduate College.
	Student submits electronic PDF file of Thesis to Graduate Coordinator.
	Student completes Optical Sciences Exit Survey.
	Update Diploma Mailing Address in UAccess.

- (b) **Timeline for Company-Initiated Projects:** In this scenario, a company submits a thesis project proposal by mid-September to the Associate Dean for Graduate Academic Affairs. Students apply to and join the M.S. program as on-campus students and completes most or all of the



required coursework during the first year in the M.S. program.

**Year 1:** In the Fall semester of the first year in the program, the student and a partner company negotiate terms of a temporary (approximately 1 year) employment that will allow the student to perform work proposed by and of benefit to the company while drawing a salary and receiving employee benefits. All, or nearly all of the coursework should be completed in the first year, before the student returns to the company to begin work on the thesis project, so that coursework does not significantly interfere with the thesis project or other work that the student is performing for the company. The student joins the company at the end of the first academic year, relocating if needed.

**Year 2:** Work done as an employee of the company will serve as the basis for the student's M.S. thesis. 8 credit hours of M.S. thesis units (OPTI 910) are taken during this time, and any additional coursework is completed through the distance-learning program. The student selects an on-campus advisor for the M.S. thesis. At the conclusion of the project, the student completes a thesis defense, with the faculty supervisor serving as the Chair of the defense committee. A company supervisor or member may be invited to serve on the defense committee as a Special Member. Further employment is up to the student and company to negotiate if desired, but is not required.

<b>Year</b>	<b>Requirements/Forms to be completed – Company-Initiated Projects</b>
<b>Year 1</b>	Fall Semester/September - Partner company submits Proposal Form for thesis project to Associate Dean for Graduate Academic Affairs for approval.
	Approved project proposals are distributed to interested and eligible first-year M.S. students so that they may choose which projects match most closely their areas of interest
	Student is selected for/assigned to company project. Student and partner company negotiate terms of a temporary (approximately 1 year) employment that will allow the student to perform work proposed by and to benefit of the company as a salaried employee receiving employee benefits
	Student identifies a faculty advisor and submits a <a href="#">Faculty Advisor Confirmation</a> form.
	Student completes GradPath Responsible Conduct of Research form
	If applicable, student submits transfer credit for approval from Graduate College by submitting the Transfer Credit Form in GradPath.
	Student completes Main Campus courses to fulfill <b>all or most of the coursework requirements, including lab requirements (few online labs available).</b>
	Student submits GradPath Plan of Study for Thesis
	Student submits the <a href="#">First Year Graduate Student Survey</a> .
<b>Year 2</b>	Student joins the company at the end of the first academic year, relocating if necessary.
	Student enrolls in OPTI 910: Thesis units with on-campus faculty supervisor, and completes any remaining coursework through online classes.
	Student identifies Committee for Final Thesis Defense and submits Master's/Specialist Committee Appointment Form in GradPath.
	Student schedules defense/exam date with committee.
	Student completes <a href="#">M.S. Final Oral Exam Scheduling Form</a> .



	Student completes defense/oral exam.
	Student submits final Thesis to Graduate College.
	Student submits electronic PDF file of Thesis to Graduate Coordinator.
	Student completes Optical Sciences Exit Survey.
	Student updates Diploma Mailing Address in UAccess.
	Further employment is up to the student and company to negotiate if desired, but is not required.

## **M.S. & MBA Dual Degree in Optical Sciences**

[\*\[Jump back to TOC\]\*](#)

The M.S./MBA Dual Degree program allows students to complete an M.S. in Optical Sciences concurrently with a Master's in Business Administration. Students must complete **74 units of coursework to complete both degrees**, taking an estimated three to four years to complete:

- the M.S. in Optical Sciences portion must be completed **as an M.S. Report** and requires 35 units of credit (32 units of coursework + 3 units OPTI 909: Master's Report);
- 39 units of coursework must be completed toward the MBA degree, with **participation in an MBA project** counted toward the completion of an M.S. Report.
- Students must submit **2 separate Plans of Study** for the Optical Sciences M.S. program and the MBA program, but complete one final exam to complete both degrees.
- The **final exam consists of an oral presentation** based primarily on the master's report and MBA project.

## **M.S. in Optical Sciences – Accelerated Master's Program (for UA undergraduates only)**

[\*\[Jump back to TOC\]\*](#)

The Accelerated Master's Program (AMP) is only available to current undergraduates pursuing a Bachelor of Science in Optical Sciences and Engineering (BSOE) at the University of Arizona. The Accelerated Master's Program allows undergraduate students who are planning to continue their studies and research in the Wyant College of Optical Sciences' graduate M.S. program to complete both degrees in as few as five years. The AMP is designed to be a terminal Master's degree: the student's graduate studies end with the completion of their M.S. The Accelerated Master's Program may only be completed with a Master's Report or Technical Writing track option.

Students may apply to the AMP program in their junior year, for admission to the program and completion of 12 units of graduate Optical Sciences courses in their senior year. Students must apply and be admitted to the Optical Sciences M.S. or Optomechanical Engineering subplan following completion of their undergraduate degree in order to complete the M.S.

In total, AMP students must complete **35 units of graduate optics or optics-related courses**, including:

- 12 units completed in the transition (undergraduate) year,
- 23 graduate units upon admission to the M.S. program, including:
  - 1 optics laboratory course, and
  - 3 units of OPTI 909 (Master's Report).
  - Up to 3 units total of OPTI 599: Independent Study; OPTI 597B: Technical Writing, OPTI 595A: Current Subjects in Optics; or OPTI 589: Optics Outreach may be included in the



M.S. Plan of Study. Enrollment in OPTI 599 requires a completion of an [Independent Study Proposal Form](#) and must be approved by the faculty supervisor and the Associate Dean for Graduate Studies. AMP students who are completing their degree with the OPTI 597B: Technical Writing option may also include up to 3 units total of OPTI 599: Independent Study; OPTI 595A: Current Subjects in Optics; or OPTI 589: Optics Outreach in the M.S. Plan of Study. Exceptions to this rule may be considered and approved by the Associate Dean for Graduate Academic Affairs.

The key components of the Accelerated Master's Program are:

- It requires completion of **128 undergraduate units of coursework and 35 units of graduate coursework, with 12 units shared between the two degrees.**
- This program is not open to students with bachelor's degrees or an advanced degrees from other institutions.
- This program is only open to UA undergraduates who meet the following criteria:
  - Declared Optical Sciences and Engineering major.
  - Students must have completed a minimum of 75 undergraduate credit hours at the time of application, with a minimum of 90 undergraduate credit hours completed by their senior year;
  - Students must have a minimum GPA of 3.50 for acceptance into the AMP program, with completion of at least 12 earned undergraduate credits with 3.5 GPA in Optical Sciences (OPTI) courses at the University of Arizona's main campus.
  - Students may have no more than one remaining general education course still required to be completed at the conclusion of their junior year.
  - Students are required to meet with the Associate Dean for Undergraduate Academic Affairs for interview and approval to join the AMP program.
  - The AMP is established as a terminal Master's degree and is intended to **be completed with a Master's Report**, although a thesis may be possible for some students, and the M.S. Technical Writing option is also possible.
  - Unlike the Optical Sciences M.S. program, AMP students are **only required to complete 1 lab course.**

#### AMP Completion Timeline:

The following presents a general timeline for completion of degree requirements. (AMP students who plan to complete the M.S. degree by completion of OPTI 597B: Technical Writing will substitute that course for OPTI 909: Master's Report in the table below).

Year	Requirements/Forms to be completed
<b>Junior Year</b>	Submit Accelerated Master's Program application.
	Schedule interview with Associate Dean for Undergraduate Academic Affairs.
	Admission to AMP.
<b>Senior Year</b>	Complete 12 units of graduate level Optical Sciences courses.
	Apply to Optical Sciences M.S. program for semester following conferral of B.S.
<b>M.S. Year</b>	Accept admission to Optical Sciences M.S. Program.
	Complete GradPath Responsible Conduct of Research form
	Submit the GradPath Plan of Study, indicating M.S. Report track.
	<input type="checkbox"/> Complete 23 units during 5 <sup>th</sup> year including:



	<input type="checkbox"/> 1 unit Lab Course <input type="checkbox"/> 3 units of OPTI 909 - M.S. Report <input type="checkbox"/> 19 units of approved graduate level coursework
	Identify an advisor and Submit a <a href="#">Faculty Advisor Confirmation</a> form.
	Identify Committee for Final Report Defense and submit Master's/Specialist Committee Appointment Form in GradPath.
	Schedule defense/exam date with committee.
	Complete <a href="#">M.S. Final Oral Exam Scheduling Form</a> .
	Complete defense/oral exam.
	Email Report to Graduate Coordinator.
	Complete Optical Sciences Exit Survey.
	Update Diploma Mailing Address in UAccess.

### **AMP Courses Upon M.S. Admission (AMP Second Year):**

AMP students must apply for admission to the M.S. program in the semester following their completion of their undergraduate program. Once they are admitted to M.S. program, AMP students must complete a Master's Plan of Study to indicate the courses that the student has taken already and those he/she is planning to take to complete the Master's degree.

There is no core curriculum for the M.S. degree, and students may choose courses according to their interests. Students are encouraged to seek courses that contain substantial, new material relative to their undergraduate classes. AMP students who complete the undergraduate (400-level) version of a course co-convened with its graduate (500-level) counterpart may not complete the graduate version of the course for graduate credit.

AMP students must complete 23 graduate units upon admission to the M.S. program, assuming the M.S. Report option is followed. The 23 units must include:

- At least 1 optics laboratory course. AMP students are required to complete only 1 lab course. See Section II for classes that satisfy the laboratory requirement.
- 3 units of OPTI 909 (Master's Report)
- 19 units of graduate courses. See Section IIS and Section IX: Appendix C for Plan of Study restrictions.

## **E. SELECTING YOUR FACULTY ADVISOR**

[\[Jump back to TOC\]](#)

All M.S. students must select a faculty advisor who will help prepare them for the M.S. final exam/defense and serve as the chair of their final exam committee. Students are typically able to identify a faculty advisor once they have completed 12-18 units of coursework and had adequate exposure to various topics and faculty projects:

- Students completing an **M.S. Thesis or M.S. Report** should select a faculty advisor within their first year, in order to ensure timely completion of research and the final written work. The advisor will supervise the student's research and lead his/her thesis/report defense committee.





- Students completing the **Technical Writing** track will need to select a faculty member to lead the student's final exam over course content. The advisor and committee members on the Technical Writing should all be faculty with whom the student has completed coursework.

Faculty advisors must meet the following criteria:

- Be an OSC affiliated faculty member
- Be a member of the UA Graduate Faculty (tenured and tenure-track faculty are automatically members of the Graduate Faculty)
- If an Emeritus, must be in Emeritus status for less than one year

A listing of OSC faculty members organized by areas of specialty can be found at the Faculty [Research Specialties](#) page. Additional OSC professors can be found in the [Faculty Directory](#). Students should confirm with faculty that they are members of the Graduate Faculty. Each student should invite a faculty member to serve as their advisor and to discuss research opportunities (if completing a thesis or report). If you plan to complete the Technical Writing option, your advisor will serve as the chair of your oral exam committee. At least two of the committee members must be OSC professors from whom the student has taken classes.

Faculty members have the option to accept or decline an invitation to serve as a student's advisor. If the invitation is declined, students may ask the faculty member for suggestions regarding other faculty who can advise the student. If the faculty member accepts, students may formalize this acceptance by submitting the [Faculty Advisor Confirmation](#) form. Students may change their faculty advisor at any time, but should make sure that your former advisor and new advisor are aware of the change and approve it. You should also submit a new Faculty Advisor Confirmation form if you decide to change advisors. The faculty advisor's name should be selected as the "Faculty Advisor for Major" on all of the student's M.S. GradPath forms. M.S. GradPath forms include:

- the Plan of Study
- the Master's/Specialist Committee Appointment Form

## **F. SUBMITTING THE MS PLAN OF STUDY**

*[Jump back to TOC]*

All M.S. students in the College of Optical Sciences must file a **Plan of Study** in GradPath, which should be done by the beginning of their third semester, or as they near completion of 18 units of coursework.

A grade of B or higher is required for all courses on the plan of study. However, one C-graded course may be listed on the M.S. Plan of Study with if a [C-Grade Waiver](#) form approved by the student's faculty advisor and the Associate Dean for Graduate Academic Affairs is on file.

The M.S. Plan of Study identifies the student's advisor, identifies the coursework the student plans to complete toward their degree, and indicates the student's intention to complete either a thesis, report, of the technical writing option.

- **M.S. Thesis** Plan of Study should include **32 units of enrollment**, including:
  - 8 units of OPTI 910: Thesis, and
  - 24 units of coursework, including 2 lab courses (1 lab course if Lab Waiver is approved).
- **M.S. Report** Plan of Study should include **35 units of enrollment**, including:





- 3 units of OPTI 909: Masters Report, and
- 32 units of coursework, including 2 lab courses (1 lab course if Lab Waiver is approved).
- **Technical Writing** Plan of Study should include **35 units of enrollment**, including:
  - 3 units of OPTI 597B: Technical Writing and Communication or an approved substitute and
  - 32 additional units of coursework, including 2 lab courses (1 lab course if Lab Waiver is approved).

## **G. SELECTING YOUR M.S. EXAM COMMITTEE**

*[\[Jump back to TOC\]](#)*

Students should work with their faculty advisor to identify at least two other faculty members to serve on their M.S. final exam committee. A Master's committee must consist of three members, of which at least two (including the Advisor/Chair) must be current tenured/tenure-track (T/TE), or approved UA graduate faculty members. If the third member is not a current T/TE or approved UA graduate faculty member, that person must be approved as a **Special Member** before he/she can participate on the student's committee. Students seeking to request a Special Member status for an individual must email the OSC Graduate Advisor with the potential Special Member's name and an electronic version of their CV. A Special Member who is not a current tenured, tenure-track or tenure-equivalent faculty member is not eligible to serve as sole chair of the committee. However, he/she can serve as co-chair (with the other co-chair being a current tenured, tenure-track or tenure-equivalent faculty member) if approved to do so by the Graduate College.

Once the M.S. committee has been selected, students must fill out the **Master's/Specialist Committee Appointment Form** in GradPath to formalize the committee. The faculty advisor must be assigned as the Chair (or co-Chair, if another member is also serving as co-Chair). The other members of the committee will be assigned as Member (or Special Member, if applicable). The Graduate College will charge a candidacy fee to your bursar's account after the Master's/Specialist Committee Appointment Form is approved. This fee is a one-time fee, regardless of the any changes to the expected graduation term.

## **H. M.S. FINAL EXAM/DEFENSE**

*[\[Jump back to TOC\]](#)*

### **Enrollment Requirements for Defense**

*[\[Jump back to TOC\]](#)*

M.S. students must be enrolled each fall and spring semester for a minimum of 1 graduate unit, from original matriculation until all course and dissertation requirements (including submission of the dissertation to the Graduate College) are met. Thus, enrollment is required for the semester during which the student plans to complete their defense and degree. Students who have maintained continuous enrollment, fulfilled all their other degree requirements, and were enrolled in thesis unit(s) in the prior semester may defend and file for the degree in the summer or winter term without registration. If, however, students need library privileges or plan to use other University facilities or need significant faculty time during the summer or winter session, enrollment is required. Enrollment in the non-credit/no fee GRAD 922 to allow access to the Library during the summer or winter terms is available for eligible master's students as well as doctoral students.



## **Important Deadlines**

*[\[Jump back to TOC\]](#)*

Students should check the [Graduate College's Important Dates and Deadlines](#) website for 2 important deadlines pertinent to their final oral defense:

- (a) Recommended deadline for completion of Final Oral Examination/Defense for the semester.  
This deadline is a soft deadline, intended to ensure that students who are completing a thesis have enough time to complete revisions and formatting of their final thesis before electronic submission to the Graduate College. Students completing an M.S. Report should also be cognizant of this deadline for completing revisions ahead of submission of their final M.S. Report to the Academic Programs Office.
- (b) Deadline to Submit Thesis for the semester. The submission deadline is a hard deadline for all students, regardless of whether they are completing a thesis, report or the technical writing track. **Students will have their expected graduation term moved to the following semester and will be required to enroll in 1 unit for that following (Spring or Fall) term if:**
  - they defend or submit their thesis to the Graduate College after the submission deadline, or
  - they fail to complete revisions and submit their final report to the Academic Programs Office by the submission deadline, or
  - complete their oral exam for the Technical Writing option after the submission deadline, or fail their oral exam for the Technical Writing option.

Students whose expected graduation term is moved to Summer or who move their expected graduation term to Winter term are not required to enroll for those terms.

## **Scheduling the Defense**

*[\[Jump back to TOC\]](#)*

Students are responsible for working with their advisor and committee members to schedule their thesis/report defense or final oral exam for the Technical Writing track. The final oral defense/exam typically lasts 2 hours. Members of the committee must be present for the entire examination, in-person or remotely.

The Academics Office Assistant can help you reserve a conference room for your exam/defense. It is recommended that students request a room at least 2 weeks in advance of the defense. The room will be reserved for 2 hours for the defense. OSC conference rooms are all equipped with white boards, table space for committee members, and a projector, but no computers. Students must bring their own laptop or check out a laptop from the Academic Programs Office.

Once the date, time and room reservation are set for the final M.S. defense/oral exam, students must:

- submit an [M.S. Final Oral Exam Scheduling Form](#), and
- send an electronic version of their thesis/report to their committee 2 weeks prior to the exam, for initial review and approval. (Hard copies are not required at the final exam/defense).



## **Defense/Final Oral Exam Protocols**

*[\[Jump back to TOC\]](#)*

**Thesis Defense:** A thesis defense is scheduled for a 2-hour block, but generally, the exam will last 1 – 1.5 hours, with students providing a 15-30 minute presentation on their thesis. After the presentation, the committee will ask any follow up questions and may also ask questions regarding the courses that the student took through their graduate program.

Students will need to have the [Thesis Approval/Statement by Author page](#) signed by their advisor for submission of the thesis to the Graduate College. It is advised that students print this form and bring it with them to their defense. Committee members may sign this form at the conclusion of the defense. If revisions are required, the chair/faculty advisor will provide the student a list of revisions. Once the revisions are completed and the thesis is ready for submission to the Graduate College, the chair/faculty advisor should sign the lower half of the Approval page and provide it to the student.

**M.S. Report Defense:** Like the thesis defense, a report defense is scheduled for a 2-hour block, but generally lasts 1 – 1.5 hours. Students provide a 15-30 minute presentation on their report, which is followed by a Q & A session with the committee. The committee may ask follow up questions or questions pertaining to the courses the student completed in their graduate program. If revisions are required, the chair/faculty advisor will provide the student a list of revisions at the conclusion of the defense. Once the revisions are completed and the report is finalized, the chair should notify the Graduate Coordinator, and the student should email the final version of the report, as a PDF file, to the Graduate Coordinator.

**Technical Writing Final Oral Exam:** The final oral exam is scheduled for a 2-hour block, but generally lasts 1 – 1.5 hours. The formatting of the exam will be determined by the student and their advisor. Some students put together a presentation to describe what they have learned during their program for the committee. Others opt to only answer questions from the committee regarding their coursework. The committee is provided a list of the courses that the student took during their degree by the Graduate Coordinator. The committee will ask questions from those classes, so that the student may display their understanding of concepts from those courses. At the conclusion of the exam, the chair of the student's committee should notify the student and the Graduate Coordinator of the result (Pass/Fail).

**Failure Policy:** Students who fail their defense or exam are permitted a second attempt. The student should work with their faculty advisor to better prepare for their second attempt.

## **M.S. Degree Conferral**

*[\[Jump back to TOC\]](#)*

Steps to degree conferral are listed below for students who pass their defense (with a result of Pass or Pass with Revisions) or final oral exam (with a result of Pass):

**Thesis:** The M.S. degree is conferred only after the Graduate Coordinator receives notification from the Graduate College that the thesis has been accepted for publication. Therefore, after passing the defense, the student must submit the final, approved version of the thesis to the [Graduate College](#).

The Graduate College will check the thesis to ensure that it meets formatting guidelines. Guidelines for formatting can be found on the Graduate College's website at: <https://grad.arizona.edu/gsas/dissertations->



[theses/dissertation-and-thesis-formatting-guides](#). Students can also [view examples past OSC students' M.S. theses](#). Formatting corrections may be completed after the submission deadline as long as the initial committee approved thesis is submitted by the deadline. After the Graduate College has approved the final thesis submission, the Graduate Coordinator will enter a Completion Confirmation in GradPath to initiate the process for conferral of the M.S. degree. Students must also send a PDF version of the thesis to the Graduate Coordinator.

**Report:** The M.S. degree is conferred only after the Graduate Coordinator receives notification from the student's advisor that all revisions have been satisfactorily completed.

The student must also submit the final, approved version of the report (as a PDF file) to the Graduate Coordinator. Reports, like theses, must conform to the guidelines found on the Graduate College's website at: <https://grad.arizona.edu/gsas/dissertations-theses/dissertation-and-thesis-formatting-guides>. Students can also reference the OSC Alumni Directory to view examples past M.S. Reports. M.S. Reports should not be submitted to the Graduate College.

After the Graduate Coordinator has received the final approved version of the M.S. Report, she/he will enter a Completion Confirmation in GradPath to initiate the process for conferral of the M.S. degree.

**Technical Writing:** If the student passes the M.S. final exam, the Graduate Coordinator will enter a Completion Confirmation in GradPath to initiate the process for conferral of the M.S. degree.

### **Final Steps to Graduation**

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Students should complete the following steps as they prepare to graduate:

- Update their Diploma Mailing Address in UAccess Student Center;
- Return any keys, books or equipment belonging to OSC to the Academic Programs Office;
- Complete the following exit and clearance forms :
  - the [College of Optical Sciences Exit Survey](#)
  - the [Graduate College Exit Survey](#)



## VI. PROFESSIONAL GRADUATE CERTIFICATE IN OPTICAL SCIENCES

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The Professional Graduate Certificate in Optical Sciences is designed for working professionals who would like to supplement their practical knowledge with formal coursework. The program's rich variety of classes allows students the opportunity to explore the broad fundamentals of optical sciences or to choose courses of particular relevance to their immediate needs.

The Optical Sciences Certificate program may be completed through Main Campus or Online enrollment, although students may choose only one campus and one modality each semester (i.e., students may not enroll in a combination of Main Campus and Online courses within the same semester). Students may switch from Main Campus to Online Campus (or vice versa) by sending an email request to the Graduate Coordinator, who can then submit a Campus Change Request on the student's behalf.

The Graduate Certificate program requires continuous enrollment in at least three units per semester for both Main Campus and Online programs for domestic students. International students completing the Graduate Certificate in a Main Campus program must enroll in nine units, per residency requirements. International students completing the Certificate as an Online program must enroll in at least three units per semester.

### ○ GENERAL REQUIREMENTS FOR CERTIFICATE

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Completion of the Certificate in Optical Sciences requires completion of 15 units of graduate courses in Optical Sciences. [A list of OSC graduate courses is available online.](#) Students may choose any graduate level courses that suit their interests from Optical Sciences, limited to the restrictions described in Section IIS: Plan of Study: OSC Restrictions and summarized in [Section VIII.C](#). In rare cases, up to 3 units of OPTI 599: Independent Study may be allowed with advance approval of the Associate Dean for Graduate Academic Affairs after consultation with the student and the prospective faculty mentor for the OPTI 599 project. This option is not indicated in the tables of [Section VIII.C](#).

Graduate courses from other relevant programs may be included, with advance approval by the Associate Dean for Graduate Academic Affairs.

### **Transfer Credit**

Students may apply a maximum of 3 units of relevant graduate credit from another institution toward their Certificate requirements, and a maximum of 6 units completed under UA Non-Degree Seeking Graduate status toward their Certificate requirements.



## **B. TIMELINE FOR COMPLETION OF CERTIFICATE REQUIREMENTS**

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Admission to the Certificate program is offered for both the Fall and Spring semesters. Per Graduate College policy, the maximum amount of time for the completion of a Certificate in Optical Sciences is 4 years. Exceptions to the 4-year limit may be granted in exceptional circumstances. Students who expect to complete Certificate requirements after the 4 year limit must petition to include courses that are over 4 years old in their Certificate Plan of Study. This petition requires approval from the Academic Programs Office, including a verification from the department that the content of the courses the student completed over 4 years ago is still relevant and current.

## **C. SUBMITTING THE CERTIFICATE PLAN OF STUDY AND GRADUATION**

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Students completing a Certificate in Optical Sciences should file a **Plan of Study** in GradPath in their last semester as they plan to graduate, unless they plan to switch from the Optical Sciences Certificate program to the Optical Sciences M.S. program. Students who wish to continue toward an M.S. are encouraged to apply for admission to the Optical Sciences M.S. program in their last semester of courses for the Certificate. Students who are admitted to the M.S. program while completing the Certificate program may apply all courses completed while active in both programs toward both programs. Conversely, students who are admitted to the M.S. program after they have completed the Certificate program may only apply 12 units completed toward the Certificate toward their M.S. A grade of B or higher is required for all courses on the Certificate plan of study. Students should select the Associate Dean of Graduate Academic Affairs as their faculty advisor on the Certificate Plan of Study. Once the Optical Sciences Certificate Plan of Study has been submitted, no further GradPath forms are required. The Certificate will be conferred upon completion of coursework within the semester of expected graduation.

## **D. FINAL STEPS AFTER GRADUATION**

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Students should complete the following steps as they prepare to graduate:

- Update their Diploma Mailing Address in UAccess Student Center;
- Return any keys, books or equipment belonging to OSC to the Academic Programs Office;
- Complete the following exit and clearance forms :
  - the [College of Optical Sciences Exit Survey](#)
  - the [Graduate College Exit Survey](#)





## VII. MINOR IN OPTICAL SCIENCES

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### **Minor Requirements (Ph.D. students Majoring in Other Disciplines)**

Ph.D. students majoring in other disciplines must complete 12 units of approved Wyant College of Optical Sciences coursework with a grade of B or higher. One Wyant College of Optical Sciences faculty member is required to serve on the minor student's oral comprehensive exam committee (faculty members with a joint appointment in the student's major department are highly recommended).

Plans of Study for students wishing to minor in optical sciences must be approved by the Associate Dean for Graduate Academic Affairs. When completing the Plan of Study in **GradPath**, the student will select Optical Sciences as the minor. If the student's dissertation director has an appointment or a joint appointment in Optical Sciences, the student should select the dissertation director as the minor advisor. Otherwise, the student should select the Optical Sciences Associate Dean for Graduate Academic Affairs as the Minor Advisor. In general, approval will be only given to plans in which at least 9 of the 12 units are courses for which the Wyant College of Optical Sciences is the home department, and for which those 9 units do not include OPTI 599: Independent Study; OPTI 597B: Technical Writing, OPTI 595A: Current Subjects in Optics; OPTI 589: Optics Outreach; or 900-level courses. See also the Plan of Study restrictions described in Section II.S and summarized in [Section VIII.C](#). For OPTI 599 to be used to satisfy the minor coursework, it must not be used to conduct research related to the dissertation or involve laboratory work under the supervision of the student's Ph.D. faculty advisor.

### **Minor Requirements (Ph.D. students Majoring in Optical Sciences)**

The University of Arizona requires all doctorate students to declare a minor. Current OSC Ph.D. students can declare Optical Sciences for both their major and minor or declare a minor with an outside department. The minor in optical sciences requires 9 units, which also count toward the unit major requirement.

When completing the Plan of Study in **GradPath**, the student will select Optical Sciences as the minor and their Ph.D. dissertation director as the Minor Advisor.



## **VIII. TABLES AND LISTS OF COURSE REQUIREMENTS**

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This Section contains the following tables and lists of course requirements and restrictions for graduate programs:

- A. PHD CORE COURSE REQUIREMENTS: FALL 2022 AND LATER**
- B. PHD CORE COURSE REQUIREMENTS: PRIOR TO FALL 2021**
- C. OSC PLAN OF STUDY RESTRICTIONS**
- D. OPTOMECHANICAL ENGINEERING M.S. SUBPLAN REQUIREMENTS**
- E. QUANTUM INFORMATION SCIENCE AND ENGINEERING M.S. SUBPLAN REQUIREMENTS**
- F. LAB COURSES**



## A. PHD CORE COURSE REQUIREMENTS: FALL 2022 AND LATER

[\[Jump back to TOC\]](#)

For students entering the Ph.D. program in **Fall 2022 or later**, a total of 8 or 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



## **B. PHD CORE COURSE REQUIREMENTS: PRIOR TO FALL 2022**

[\*\[Jump back to TOC\]\*](#)

For students entering the Ph.D. program **before Fall 2022**, 8 core courses are required; OPTI 541A is omitted from the core course requirements in this case.

**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 prereq 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)

**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 600G: Laser Beams and Resonators
  - OPTI 541B&C: Laser Systems, Applications, Ultrafast Optics
  - OPTI 595B: Information in a Photon



## C. OSC PLAN OF STUDY RESTRICTIONS

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		PhD	MS: Thesis	MS: Non-thesis (Report or Technical Writing)	MS: PhD Comprehensive Exam Route	MS report + MBA dual degree	Certificate	Optics minor for non-Optics PhD
TABLE 1	Minimum number of coursework units required on Plan of Study (course numbers 500-899) + Other required units	45 to 54 (PhD advisor will determine; 45 units UA minimum) + 18 units OPTI 920	24 + 8 units OPTI 910	32 + 3 units OPTI 909, or a 3-unit approved technical writing course	35 (Max of 30 of the units can also appear on PhD Plan of Study)	32 + 3 units of OPTI 909. (Eller College determines all additional rules for the MBA)	15	12

TABLE 2	Maximum total units (this row) from coursework options in this table. Individual course restrictions listed in each row	9	4	9	6	3 units report + 6 units from required MBA courses	1	3
	OPTI 589: Optics Outreach	1	1	1	1	0	0	0
	OPTI 595A: Currrent Subj. in Optics	2	1	1	1	0	1	0
	OPTI 597B: Tech. Writing and Comm.	3	3	3	3	0	0	0
	OPTI 599 / other 599: Independent Study	6	3	3	3 (or can use 3 units of OPTI 792 instead)	0	0	3 (must be OPTI 599, from Optics faculty other than PhD advisor)
	Approved business, ethics, fellowship, or other non-STEM courses	6	3	6	6	Required: 6 units from two 3-unit MBA courses	0	0
	OPTI 909. Must submit advisor-approved report to OSC Academic Programs to be awarded MS, regardless of MS oral exam type	0	0	3 (must be 0 or 3. 1 or 2 not allowed on plan of study)	0	Required: 3 units of OPTI 909	0	0

TABLE 3	Additional restrictions							
	Number of courses with a grade of C allowed, with faculty advisor approval	1	1	1	1	0	0	1
	Number of courses with a grade below C, failing grade, audit, or withdraw	0	0	0	0	0	0	0
	Maximum optics-related transfer units on Plan of Study, all must have grades of A or B	18 typical maximum. Up to 30, exceptional circumstances only	6	7	7	7	3	0
	Maximum number of OPTI 792 units that can be taken and used on a Plan of Study	6 (3 per semester, first year in PhD program only)	0	0	3 (if no 599 units are listed)	0	0	0
	Maximum number of OPTI 900 units that can be used on a Plan of Study (no limits on number that can be taken)	0	0	0	0	0	0	0
	Maximum number of OPTI 909 units that can be used on a Plan of Study (no Fails; no upper limit on number that can be taken)	0	0	must list exactly 0 or 3 on Plan of Study. 0 only permitted with approved technical writing course	0	must list exactly 3 on Plan of Study	0	0
	Maximum number of OPTI 910 units that can be used on a Plan of Study (no Fails; no upper limit on number that can be taken)	0	must list exactly 8 on Plan of Study	0	0	0	0	0
	Maximum number of OPTI 920 units that can be used on a Plan of Study (no Fails; no upper limit on number that can be taken)	must list exactly 18 on Plan of Study	0	0	0	0	0	0

ADDITIONAL NOTES	
1	See PhD program description for requirements on core courses, lab courses, qualifying exam, comprehensive exam, dissertation, final oral exam
2	See MS program options and descriptions for requirements on lab courses, thesis, report, technical writing courses, final oral exam
3	See MS - Optomechanical Engineering sub-plan program description for all units requirements and restrictions, core course and lab course requirements, elective options, thesis and non-thesis options, final oral exam. Sub-plan does not follow the requirements and restrictions of the other MS program options.
4	See MS - Quantum Information Science and Engineering sub-plan program description for all units requirements and restrictions, core course and lab course requirements, elective options, thesis or report options, final oral exam. Sub-plan does not follow the requirements and restrictions of the other MS program options.



## D. OPTOMECHANICAL ENGINEERING M.S. SUBPLAN REQUIREMENTS

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### WYANT COLLEGE OF OPTICAL SCIENCES

#### OPTOMECHANICAL ENGINEERING SUB-PLAN REQUIREMENTS (version 2022.06.28)

**MS Thesis option: 24 units of coursework + 8 units of OPTI 910: Thesis**

**MS Non-thesis option: 32 units of coursework + 3 units of OPTI 909: Report or an approved technical writing course**

The Associate Dean for Graduate Academic Affairs may approve course substitutions when a required course is not offered.

DL = available for Distance Learning

CORE COURSES - 12 UNITS, REQUIRED OF ALL OME MS SUB-PLAN STUDENTS	Units	Term	DL?	Prereq
OPTI 502 Optical Design & Instrumentation	3	F	yes	
OPTI 521 Introductory Optomechanical Engineering	3	F	yes	optical systems familiarity
OPTI 523 Optomechanical Design & Analysis	3	S	yes	OPTI 521
AME 552 Planar Multi-body Dynamics with Applications	3	F	yes	
AME 561, AME 564A, or AME 550 may be used in place of AME 552				

DESIGN COURSES - 5 UNITS REQUIRED, ANY OF THE FOLLOWING	Units	Term	DL?	Prereq
OPTI 516/ASTR 516, Modern Astronomical Optics	3	S	yes	
OPTI 517 Lens Design	4	F	yes	OPTI 502
OPTI 585 Illumination Engineering	3	S	yes	OPTI 502
OPTI 586 Polarization in Optical Design	3	F	yes	OPTI 502
OPTI 588 Introduction to Display Science and Technology	3	F	yes	OPTI 502
ASTR 518 Instrumentation and Statistics	2	F		

ELECTIVES - 7 UNITS FOR THESIS OR 15 UNITS FOR NON-THESIS				
Any Design Course units (above) beyond 5 will count towards elective units				
ELECTIVE LAB COURSES - AT LEAST TWO ELECTIVES MUST BE LAB COURSES	Units	Term	DL?	Prereq
One lab waived if either OPTI 517 is taken as a Design Course, or for relevant industry experience (with approval by Assoc. Dean)				
OPTI 502L Fundamental & Applied Optics Laboratory	1	F		OPTI 502 (pre or co-req)
OPTI 513L Optical Testing Laboratory	1	S		OPTI 513R (pre or co-req)
OPTI 524A Optical Systems Engineering	4	S		optical systems familiarity
OPTI 569L System Programming for Engineers	2	F	yes	
OPTI 597A Optical Shop Practices	3	S		OPTI 502
Not currently offered:				
OPTI 515L Optical Specifications, Fabrication, and Testing Laboratory	1			
OPTI 521L Introductory Optomechanical Engineering Laboratory	1			
OPTI 523L Optomechanical Engineering Laboratory	2			
OPTI elective courses	Units	Term	DL?	Prereq
OPTI 503 Optical Design and Instrumentation II	3	S	yes	OPTI 502
OPTI 505R Diffraction and Interferometry	3	F	yes	OPTI 512R
OPTI 506 Radiometry, Sources, and Detectors	3	F	yes	
OPTI 512R Linear Systems, Fourier Transforms	3	F	yes	
OPTI 513R Optical Testing	3	S	yes	OPTI 505R
OPTI 518 Introduction to Aberrations	3	S	yes	OPTI 502
OPTI 581A/ENTR 581A Assessing Early Stage Med. Tech. for Commercial Potential	2	S		
OPTI 517 Practical Optical System Design	3	S	yes	OPTI 517
OPTI 530/BME 530 Biomedical Optics and Biophotonics	3	F		optical systems familiarity
OPTI 577 Micro/Nano-Fabrication in Optoelectronics	2	S		photonics systems familiarity
OPTI 596A Advanced Lens Design	3	F	yes	OPTI 517
Not currently offered:				
OPTI 528 Adaptive Optics and Imaging through Random Media	3	F		

(other pre-approved elective courses listed on next page)





Other Pre-approved Elective Courses - check UA course schedule for term, prereqs	Units	Term	DL?	Prereq
AME549 Hybrid Control Systems	3			
AME550 Advanced Dynamics	3			
AME553 Computation Multi-Body Dynamics	3			
AME560 Advanced Vibration	3			
AME561/EM561 Finite Element Methods	3			
AME562 Composite Materials	3			
AME565 Design Optimization	3			
AME588/ABE588/BE588 Micro and Nano Transducer Physics & Design	3			
AME589A/ABE589A/BE589A Fabrication Techniques for Micro- & Nano-dev	3			
BE547 Sensors and Controls	3			
BME517/ECE517 Measurement and Data Analysis in Biomedical Engineering	3			
BME520/DPT520 Biophotonics	3			
BME566 Biomedical Engineering	3			
BME585 Nanoscience & Nanotechnology for Biomedical Engineer	3			
CHEE583 Introduction to Polymeric Materials	3			
ECE504/MSE504 Optical Spectroscopy of Materials	3			
ECE515/CHEE515 Microelectronics Manufacturing and the Environment	3			
ECE529 Digital Signal Processing	3			
ECE532 Digital Image Analysis	3			
ECE533 Digital Image Process	3			
ECE542 Digital Control Systems	3			
ECE556 Optoelectronics	3			
EM502/ECE502 Introduction to Finite Element Methods	3			
EM504 Elasticity Theory and Application	3			
EM534 Advanced Structural Dynamics	3			
SIE506 Quality Engineering	3			
SIE511 Human-Machine Interaction	3			
SIE514 Law for Engineers & Scientists	3			
SIE515 Technical Sales & Marketing	3			
SIE54A Systems Engineering Process	3			
SIE555 Sensor Systems Engineering	3			
SIE556 Fundamentals of Guidance for Aerospace Systems	3			
SIE557 Project Management	3			
SIE558 Model-Based Systems Engineering	3			
SIE563 Integrated Logistics and Distribution Systems	3			
SIE564 Cost Estimation	3			
SIE583 Computer Integrated Manufacturing Systems	3			

See UA course catalog



## E. QUANTUM INFORMATION SCIENCE AND ENGINEERING M.S. SUBPLAN REQUIREMENTS

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### WYANT COLLEGE OF OPTICAL SCIENCES QISE SUB-PLAN REQUIREMENTS (version 2022.06.28)

**MS Thesis option: 26 units of coursework + 6 units of OPTI 910: Thesis**

**MS Report option: 29 units of coursework + 3 units of OPTI 909: Report.**

Total coursework units include Core and Approved Elective units (below) + 3 additional units of any graded OPTI coursework not listed below.

With advisor and Associate Dean approval, up to 3 units of OPTI 599: Independent Study may be taken in place of the same number of units of Approved Electives.

CORE COURSES - COMPLETE ALL COURSES: 12 UNITS	Units	Term	Prereq
OPTI 570 Quantum Mechanics (or other graduate-level Quantum Mechanics course)	3	F	OPTI 511R or undergraduate quantum mechanics
OPTI 544 Foundations of Quantum Optics	3	S	OPTI 570 or equiv
OPTI 646 Introduction to Quantum Information and Computation	3	F	OPTI 570 or equiv
OPTI 560 Quantum Nanophotonics	3	S	E&M (OPTI 501 or equiv), intro. QM (OPTI 511R)

APPROVED ELECTIVES - 11 UNITS FOR MS THESIS OPTION OR 14 UNITS FOR MS REPORT OPTION (includes minimum 2 units of lab courses)			
<i>Thesis and Report options allow for 3 units outside of the approved elective list to satisfy total coursework units requirements.</i>			
<i>With Faculty Advisor and Associate Dean approval, a student may use a suitable course in place of one of the approved electives in this list.</i>			
Elective lab courses - AT LEAST TWO ELECTIVES MUST BE LAB COURSES	Units	Term	Prereq
<i>One lab may be waived for relevant industry experience (with Assoc. Dean approval)</i>			
OPTI 511L Lasers and Solid-State Devices	1	F	OPTI 511R or other QM course; or 507 co-req
OPTI 571L Optical Physics Computational Laboratory	1	F	OPTI 570 or equiv
OPTI 587L Photonics Communications	1	S	
Approved Elective courses	Units	Term	Prereq
OPTI 501 Electromagnetic Waves	3	F	
OPTI 507 Solid-state Optics	3	F	OPTI 511R, OPTI 570, or other QM course
OPTI 508 Probability and Statistics in Optics	3	S	
OPTI 509 Statistical Optics	3	S	OPTI 501, OPTI 508
OPTI 510R Photonics	3	S	basic E&M, OPTI 501 preferred
OPTI 511R Optical Physics and Lasers	3	S	OPTI 501 preferred; linear algebra
OPTI 539A From Photonics Innovation to Marketplace	3	S	
OPTI 553 Nonlinear Photonics	3	F	OPTI 501 or equivalent
OPTI 595B Information in a Photon	3	S	complex numbers, probability, linear algebra
OPTI 600G Laser Beams and Resonators	1	S	OPTI 501
OPTI 600K Cavity Optomechanics I	1	S	OPTI 501. Rec: OPTI 570, OPTI 600G
OPTI 600L Cavity Optomechanics II	1	S	OPTI 501, OPTI 570, OPTI 600K
OPTI/ECE 632: Advanced Optical Communication Systems	3	S	OPTI 530 or equiv
OPTI 647 Photonic Quantum Information Processing	3	F	OPTI 511R or OPTI 544
ECE 501B Linear Systems Theory	3	F	see course catalog
ECE 503 Probability and Random Processes	3	F	see course catalog
ECE 534 Advanced Topics in Optical and Electronic Materials	3	S	see course catalog
ECE 535A Digital Communications Systems I	3	S	see course catalog
ECE 536A Free-space Opt. Comm. Systems	3	S	see course catalog
ECE 537 Digital Communications Systems II	3	F	see course catalog
ECE 571 Fundamentals of Information and Network Security	3	S	see course catalog
ECE 633 Q. Inf. Processing and Q. Error Correction	3	F	see course catalog
ECE 635 Error Correction	3	F	see course catalog
ECE 639 Detection and Estimation	3	S	see course catalog
INFO 520 Ethical Issues in Information	3	F,S	see course catalog
LAW 695 Special topics in the law: The Past and Future Internet	3	S	see course catalog



## F. LAB COURSES

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**A student enrolled in a non-laboratory course is *not* required to also enroll in the laboratory course with the same number.**

The courses that satisfy lab requirements for Ph.D. and M.S. students are:

- OPTI 502L: Fundamentals of Applied Optics Laboratory
  - Prior or concurrent enrollment in OPTI 502 is not required
- OPTI 505L: Fundamentals of Physical Optics Laboratory
  - Prior or concurrent enrollment in OPTI 505R is strongly recommended
- OPTI 511L: Lasers and Solid-State Devices Laboratory
  - Prior or concurrent enrollment in OPTI 511R (3-unit version) or OPTI 541A is required
- OPTI 512L: Mathematical Optics Laboratory
  - Prior or concurrent enrollment in OPTI 512R or OPTI 604, or instructor agreement, is required.
- OPTI 513L: Optical Testing Laboratory
  - Prior or concurrent enrollment in OPTI 513R is required
- OPTI 524A: Optical Systems Engineering (4 credits)
- OPTI 569L: System Programming for Engineers (2 credits)
- OPTI 571L: Optical Physics Computational Laboratory
  - A prior course in Quantum Mechanics is required
- OPTI 586L: Polarization in Optical Design Laboratory
  - Prior or concurrent enrollment in OPTI 586 is required
- OPTI 587L: Photonic Communications Laboratory
- OPTI 597A: Optical Shop Practices (3 credits)
  - Prior completion of OPTI 502 is required

Lab courses that are not currently offered:

- OPTI 515L: Optical Specifications, Fabrication and Testing Laboratory
- OPTI 521L: Introductory Optomechanical Engineering Laboratory
- OPTI 600E: Diffractive Optical Elements: Fabrication and Testing

Of the two lab courses required of Ph.D. students, one of the lab courses must involve hands-on laboratory work. Because of this, a Ph.D. student may include only one of OPTI 512L, OPTI 571L, or OPTI 586L on their Plan of Study.

The lab courses available to students in the Arizona Online/Distance Learning program are:

- OPTI 512L: Mathematical Optics Laboratory
- OPTI 569L: System Programming for Engineers (2 credits)
- OPTI 586L: Polarization in Optical Design Laboratory

