2024-2025

DEPARTMENT OF PHYSICS GRADUATE STUDENT HANDBOOK

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WELCOME

Welcome to the Oklahoma State University Department of Physics! Our mission is to advance the knowledge and understanding of Physics and the physical world through nationally and internationally prominent programs of graduate and undergraduate education, research, and service. The graduate program is an important part of the mission of the department, and our graduate students play a key role in our research and teaching efforts. We strive to challenge our students to reach their full potential as professional scientists, and work with them to help accomplish their career goals. These goals include developing a broad and sophisticated knowledge of physics, acquiring a deep and thorough understanding of a specialized research area, and preparing a foundation for a successful career using their graduate training.

We are home to internationally known research in atomic and optical physics, biological physics, condensed matter physics, high energy physics, and radiation physics. Students in the PhD programs in Physics and Photonics have done dissertations in these areas.

This handbook is a compilation of information for incoming and prospective graduate students as well as advisors. It details information regarding the nature and duration of examinations, descriptions of courses, and the assignments and responsibilities of graduate assistants.

Our department has a long history of providing students with a great educational and research experience that pays dividends in their future careers. Apart from academic matters, we are interested in the development and personal well-being of our students. Please let the faculty or staff in our department know if you need help.

Graduate students are expected to be aware of and satisfy all regulations governing their study as well as work at the university. This handbook provides an overview of the policies, rules, and procedures for the graduate program in the Department of Physics and is intended to aid the student and graduate advisor with respect to questions regarding curriculum, examinations, financial support, and other related areas. The Department Graduate Program is subject to rules established by Oklahoma State University and the Graduate College, and these rules take precedence in case of conflict with any policies stated in this handbook.

Listed below is the contact information for the Department Head and Graduate Coordinator. Feel free to contact them, or any other faculty member, if you have questions or concerns.

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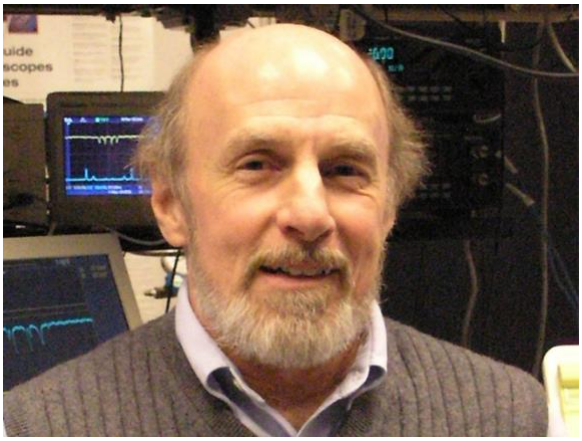

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ABOUT STILLWATER

Stillwater, Oklahoma will be your hometown for the duration of your graduate studies. Stillwater is located in central Oklahoma, equidistant from both Oklahoma City and Tulsa, about 60 miles away from each. Stillwater has an airport with convenient connections to and from Dallas, TX. While primarily a college town, Stillwater has a diverse economy with a foundation in aerospace, agribusiness, biotechnology, optoelectronics, printing and publishing, and software and standard manufacturing. Based on FBI crime statistics the city of Stillwater is one of the safest cities in the country.

The city has complete, up to date medical facilities. Local recreational facilities include numerous parks, three golf courses and five lakes with a full range of boating, camping, fishing, hiking, mountain biking and water-skiing activities. The university maintains an outstanding Botanical Garden. There are museums of art, science, and history in town. The McKnight Center for the Performing Arts hosts several musical events and theater productions throughout the year. The Colvin Recreation Center is the home for physical education, intramural sports, and swimming at OSU. The complex is 240,000 square feet in size and includes an outdoor pool, indoor pools, basketball, racquetball, and tennis courts, fitness rooms, a multipurpose activity gym and a 4-lane indoor jogging track. Students can also visit the Seretean Wellness Center, which provides comprehensive wellness awareness and education initiatives. Their staff will work with you to help achieve a healthy and happy lifestyle.

Stillwater is known as the home of red dirt music, a mixture of folk, country, blues and rock. Garth Brooks, Other Lives, and The All-American Rejects got their start playing the local bars like Willie’s Saloon, Tumbleweed Dance Hall and Concert Arena, and Eskimo Joe’s. As a college town, Stillwater is home to the Oklahoma State Cowboys and Cowgirls. Oklahoma State University teams have won 54 NCAA National Championships. Stillwater also offers a wide variety of community and university based performing arts programming.

Oklahoma relies on an economic base of aviation, energy, telecommunications, and biotechnology. In 2007, it had one of the fastest-growing economies in the United States, ranking among the top states in per capita income growth and gross domestic product growth. With small mountain ranges, prairie, mesas, and eastern forests, most

of Oklahoma lies in the Great Plains, Cross Timbers and the U.S. Interior Highlands. In addition to having a prevalence of English, German, Scottish, Scotch-Irish, and Native American ancestry, more than 25 Native American languages are spoken in Oklahoma, second only to California. Oklahoma is located on a confluence of three major American cultural regions and historically served as a route for cattle drives, a destination for southern settlers, and a government-sanctioned territory for Native Americans.

GRADUATE PROGRAMS

The Graduate Programs in Physics and Photonics at Oklahoma State University provide an excellent mix of both pure and applied research on a wide variety of significant problems ranging from developing new optical materials to unraveling the mysteries of neutrinos. There are approximately fifty graduate students, in addition to several postdoctoral fellows and approximately forty undergraduate majors in the Physics Department. The Department is large enough to do first-class research, yet small enough to pay close attention to each individual.

We offer two doctorate degrees: The Physics Ph.D. and the Photonics Ph.D. In addition, there are two Master of Science program options. This document summarizes the departmental policies of the Physics Department for students pursuing doctoral and masters degrees. Since this document does not include the general University policies, in order to be completely informed of the overall policies you must consult the Graduate Catalog and/or the appropriate University Regulations. It is the responsibility of each Graduate Student to ensure that they have met all Departmental, Graduate, and University requirements for their degree.

Important links

Below are some important links and other links will be provided throughout this document:

Graduate Catalog

University Regulations

Physics Department (Student Resources, People, Research)

GRADUATE FACULTY

Graduate Faculty and Their Areas of Research (T = Theoretical; E = Experimental)

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Drexel University, 1984
Atomic Physics and Optics (T)
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Assistant Professor
University of Cambridge, 2016
Atomic & Condensed Matter Physics (T)
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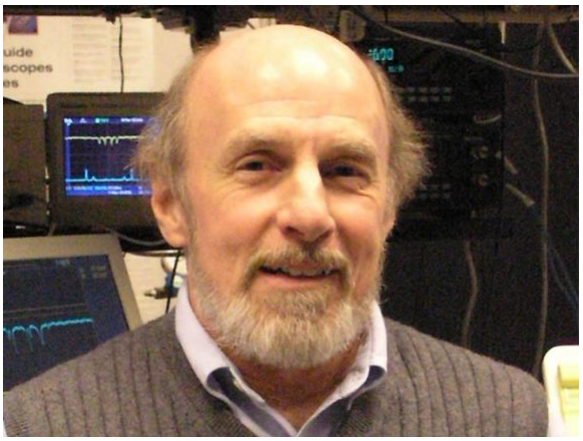

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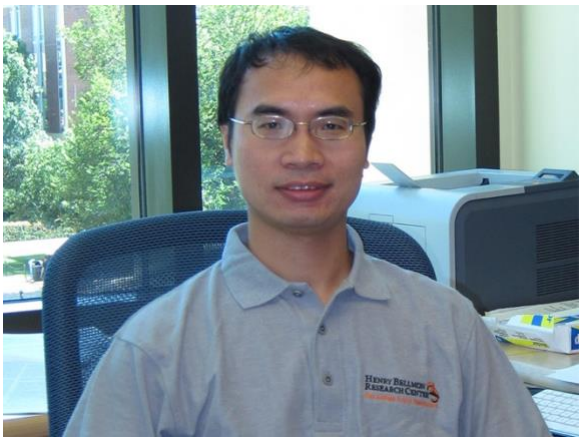

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APPLICATION AND ADMISSION

Application

Prospective students in the Physics or Photonics graduate programs must apply for graduate admission to the Department of Physics online through the Graduate College web site. The online application procedure and information on how to apply can be found in both the Graduate College web site and the Department of Physics web page.

Note that applications are made to the Ph.D. programs only. Students are awarded the M.S. degree along the way when they have satisfied the M.S. requirements. Students who wish to stop with the M.S. degree may do so but must apply to the Ph.D. program.

Graduate College admissions

Physics Graduate Programs

Applications are accepted for admission during the Fall semester only. Applications will be accepted starting June 1 and the deadline is February 1.

The entire application, including recommendation letters, can now be completed online through the Graduate College. Applicants will be able to upload all required documents and recommenders will be contacted directly by the system.

A complete description of the documents required for the Graduate College application can be found at the links above.

Admission

As an overview, we list the main documents that will be required to be submitted to the Graduate College and some of the minimum qualifications for admission:

- Transcripts: Transcript from each college or university attended (unofficial ok).

- Resume/Vitae: A Resume or Curriculum Vitae of your academic and professional background and experiences (1-2 pages).
- Statement of Purpose: Submit a statement, in your own words, of your background, academic preparation, reasons for pursuing a degree in Physics or Photonics at OSU, and career aspirations (1-2 pages).
- Contact Information for Recommendation Letter Writers: The contact information of three persons that are familiar with your academic preparation and/or job-related skills in these fields.
- GRE Scores: It is strongly recommended that applicants submit both general and subject test (Physics) GRE scores, but they are not required. These scores will help us to determine the distribution of assistantships with tuition waivers. We will review applications with self-reported scores, but applicants should be aware that official scores may be requested before admission is formally offered. There are no minimum score requirements. OSU's GRE institution code is 6546.
- English Proficiency (for International Students): All persons for whom English is a second language are required to present proof of English competency. An official TOEFL score of at least 90 (internet-based test) is required to be admitted. The TOEFL institution code for OSU is 6546. Alternatively, an official IELTS, academic stream, examination with a minimum overall band score of 7.0 will satisfy the English proficiency requirements for admission to a graduate program, as will an official PTE score of at least 61. Outstanding applicants with official TOEFL scores of 79-90 or IELTS scores of 6.5-7.0 or PTE scores of 53-60 will also be considered for admission into the graduate programs. The examination must have been taken within the last two years. We can evaluate your application with unofficial English scores, but an admission offer cannot be made until official scores are submitted. Although the Graduate College does not require proof of English proficiency for an applicant who has or will have completed a baccalaureate or graduate degree from a college or university where English is the primary teaching language, and which is located in a country where English is a primary language, the applicant may still need to submit a TOEFL or IELTS score to the Physics Department for employment as a Teaching Assistant.

Please check the complete requirement description at Graduate College's International Student web page.

Additionally, the Physics Department may request other documents with the purpose of selecting candidates who will be offered Research or Teaching Assistantships.

ASSISTANTSHIPS

A majority of the selected candidates seeking admission to the graduate programs in Physics or Photonics (through Physics) at Oklahoma State University will be offered a teaching or research assistantship with admission. All students on assistantships receive a waiver for all tuition when enrolled in at least six credit hours of qualifying courses (for details, see https://gradcollege.okstate.edu/prospective-students/financing-your-graduate-education/assistantships.html and click on the “Tuition Waiver Information and Eligibility” submenu for OSU Graduate Student Tuition Waiver Benefit Information). Fees are not waived and amount to approximately $240 per credit hour. The assistantship also provides a monthly stipend and subsidizes single-person health insurance. All assistantships are provided on a semester-by-semester basis. A small number of graduate students may be admitted without a teaching or research assistantship.

An assistantship allows the graduate student to gain valuable research and teaching experiences, enhances knowledge of physics, and provides a means of support during graduate studies. It is usually valuable for a graduate student to hold a teaching assistantship for at least one semester. This allows the student to deepen their undergraduate physics knowledge and helps prepare for a possible career that involves teaching. Research Assistantships are provided by a graduate faculty member who supervises the student in a research project, based on the qualifications of the student, availability of funds, and mutual agreement.

The initial appointment to a teaching assistantship is made by the Department Head on the recommendation of the Graduate Coordinator and the Committee on Admissions. The Physics Department will give preference for continuation of teaching assistantships to students within five years of initial enrollment. The criteria for appointment as a teaching assistant include:

- Excellent academic record in an undergraduate physics program, as a graduate student in physics, or other evidence of mastery of undergraduate physics.
- Ability to communicate effectively with undergraduate students. This includes but is not limited to proficiency in oral and written English.
- Good standing as a graduate student in the Physics Department.
- Satisfactory performance as a teaching assistant or research assistant.
- Demonstrated progress towards degree.

- Satisfactory record in Departmental Colloquium attendance and participation.

When several candidates are qualified according to the preceding criteria and when teaching assistantships cannot meet the demand, the Department Head in consultation with the Graduate Coordinator and the Graduate Studies Committee will give preference to those students that show most promise for Ph.D. research and who are making progress in their Ph.D. research. The appointment as a teaching assistant is made on a semester basis. Teaching assistants are evaluated every semester and during their yearly progress report. Reappointments are made by the Department Head following the criteria outlined above. It is expected that all students reappointed as teaching assistants are making satisfactory academic progress and have previously performed their teaching duties adequately.

The teaching assistant position is usually a half-time assignment. Students holding a teaching assistant position are customarily enrolled in six to nine hours of graduate course work per semester. Appointments at less than half-time may be used to meet the needs of an individual or to cover some (often last minute) teaching assignments but are not eligible for a tuition waiver. Teaching assistants are expected to support the Department of Physics teaching responsibilities primarily in the introductory physics courses. The assignments and duties of a half-time teaching assistant are:

- Recitation: Lead discussions in no more than eight recitation sessions per week. Recitations are 50-minutes weekly discussion sessions that reinforce concepts from lecture and help students develop problem solving skills. The TA will usually prepare and administer a quiz in the discussion session. The duties also include limited grading (midterm and final exams, for example), proctoring exams, attending TA meetings, and holding office hours.
- Grading: Grade homework, weekly quizzes, and exams. The duties also include help with classroom demonstrations and facilitation of discussion sessions, proctor exams, attend TA meetings, and hold office hours.
- Lab: Lead no more than four lab sessions per week. Labs are two-hour weekly laboratory sessions that reinforce concepts from lecture and help students develop problem solving skills. The TA will prepare and administer a lab quiz. The duties also include grading laboratory reports and quizzes, proctoring exams, attending lab TA meetings, and holding office hours.

The teaching performance of each teaching assistant is evaluated every semester by the students taking the classes (lab and recitation evaluations) and by the instructor overseeing the course assigned to the teaching assistant. A summary of the results of the evaluation is given to each teaching assistant and a copy is maintained by the department. The appointments of the teaching assistants who are repeatedly given unsatisfactory evaluations may not be renewed. Failure to perform duties as a teaching assistant in a responsible fashion will lead to non-renewal of assistantship.

During the Annual Physics Banquet the Best Research Assistants, one in Theory and one in Experiment, and Outstanding teaching assistants are recognized with departmental awards. Outstanding RAs and TAs will also be nominated for university-wide awards.

The stipend for teaching assistants in effect as of August 2023 is $2,356 per month. It is the policy of the Department that most, if not all, teaching assistants will have the opportunity to serve in all three aspects of TA instruction: as graders, lab TAs, and recitation TAs.

The Physics Department provides fewer teaching assistant positions during the two-month Summer terms. Students receiving a teaching assistantship during the Fall/Spring semester should not count on a Summer teaching assistantship. First-year graduate students have priority for Summer assistantships.

RULES AND REGULATIONS OF THE GRADUATE COLLEGE

Candidates seeking admission to the graduate programs in Physics or Photonics should read closely the Oklahoma State University Catalog.

There are many rules and regulations affecting graduate enrollment, tenure, examinations, theses, and dissertations that are made by the Graduate Faculty of Oklahoma State University rather than the Physics Department. Among the rules students should familiarize themselves with are those governing academic dishonesty

or misconduct, especially those dealing with plagiarism. It is the student's responsibility to become informed about all Physics Department, Graduate College, and University regulations. Finally, all students should also pay special attention to the various deadlines associated with graduation (see links to Graduate College Academic Calendar on p. 18). Some particular guidelines to be aware of are listed below, with links to where more information can be found.

First, some general guidelines for graduate education:

- Graduate education
- Graduate program structure
- Theses and dissertations
- Graduate advisory committee membership

Graduate Education Links

- OSU Guidelines for Best Practices in Graduate Education Student Link
- OSU Guidelines for Best Practices in Graduate Education Faculty Link
- OSU Best Practices for Theses and Dissertations Student Link
- OSU Best Practices for Theses and Dissertations Faculty Link

Application process (including language proficiency), assistantships and tuition waiver

- Graduate College Application Process
- Graduate College Assistantships
- International Teaching Assistant Test
- Tuition Waiver Policy and Forms Student Link
- Tuition Waiver Policy and Forms Faculty Link

Student Health Insurance

University Health Services

Graduate College Resources and Enrollment Guide

- Student Resources

- Faculty Resources
- Prospective Students Enrollment Guide

Student Code of Conduct, Academic Integrity Policy and Appeals Policy

- Student Code of Conduct
- Academic Integrity Policy
- Graduate Student Appeals Student Link
- Graduate Student Appeals Faculty Link
- Grade Appeals Policy

Plan of Study

Before the end of a student's third semester, an advisor and advisory committee must be chosen, and a plan of study filed with the Graduate College (choose the hour option and fill it in up to 72 hours, or 60 if you have a US Master's). See the Best Practices link in the previous page for advisory committee guidelines. For further information, consult the Graduate College Round-Up website or the plan of study, including the Graduate Faculty database.

- Graduate College Round-Up Student Link
- Graduate College Round-Up Faculty Link

Responsible Conduct of Research Training

Before submitting a Plan of Study, every student must complete Responsible Conduct of Research (RCR) training. This is described at the link below; since it is so important the Department of Physics imposes an earlier deadline: our students must complete it within ten weeks of their first enrollment. Students should also be aware of lab safety guidelines and specific training is available for areas such as radiation safety, laser safety, etc.

- RCR Policies and Training
- General Safety Manuals
- Radiation Safety Program
- Laser Safety Program
- Biosafety Program
- Appropriate Use of Animals in Research

- Appropriate Use of Human Subjects in Research

Checklists, Templates and Leave of Absence Policy

- Doctoral Students Student Checklist
- Doctoral Students Faculty Checklist
- Master's Students Student Checklist
- Master's Students Faculty Checklist
- Thesis/Dissertation Student Guidelines
- Thesis/Dissertation Faculty Guidelines
- Leave of Absence Student Policy
- Leave of Absence Faculty Policy

Academic Progress Review

Each year, all graduate students must submit an evaluation of their progress during the year; the student completes a form and forwards it to his/her advisor, who adds comments and indicates whether sufficient progress has been made. Satisfactory progress means that, in the judgement of the student's advisor, the student is on track to complete all degree requirements by the student's planned graduation date (usually as listed on the Plan of Study). One additional component in the Department of Physics of this evaluation involves attendance at weekly departmental colloquia. The department has its own form, but here is the general policy.

Scholarships and Awards

Here is a list of some of the scholarships and awards available through the Graduate College and the benefit received by 2024 winners:

- Graduate College Awards Students Link
- Graduate College Awards Faculty Link
- Commencement Marshal ($1,000)
- Distinguished Graduate Fellowships ($2,500)
- GPSGA Travel Awards
- OSU Graduate Research Excellence Awards
- Phoenix Awards ($350)
- Robberson Summer Dissertation Fellowships ($8,000)

Additional Resources and Opportunities

- Dissertation Writing Workshop
- 360 Degree Critical Skills for Career Success
- Graduate College Academic Calendar Student Link
- Graduate College Academic Calendar Faculty Link

DEPARTMENTAL POLICIES

Dismissal from the Graduate Program

Graduate students may be dismissed from their program for failure to meet academic standards, academic integrity violations, student misconduct, or serious violations of professional behavior. Examples include failure to maintain a B average in coursework as explained later in this handbook, consecutive semesters of unsatisfactory research (UR) grades in PHYS 5000/6000, deficiencies in required training such as RCR and laser safety, an unsatisfactory progress evaluation on the annual review, cheating on coursework, inappropriate behavior as a teaching assistant, failure to find an advisor, and unwillingness to work to resolve conflicts. Students facing dismissal will be notified of the intent to dismiss by the Graduate Studies Committee and informed of their rights for due process and appeal (see below). A student who decides to appeal will be allowed to maintain enrollment and continue working toward the graduate degree, but continuous enrollment is not required to appeal. The decision of the appropriate appeals panel will be final.

Conflict Resolution

As noted in the section on Research & Your Advisor, the student is responsible for finding an advisor. If a conflict arises between a student and the advisor, advisory committee, or teaching assistant supervisor, in most cases the conflict should be able to be resolved by direct communication among the parties involved. If this proves difficult, the Graduate Coordinator can serve as a mediator. If this is insufficient, the Graduate Studies Committee will try to achieve a resolution. Failing this, the Department Head will attempt to resolve the case before passing it on up to the Graduate Dean. If the student is not satisfied with the resolution, the appeals process outlined below can be initiated.

Appeals Process

Students have the right to appeal conflict resolution in any of the situations that could lead to dismissal, even if an intent to dismiss has not been issued (see the links in the previous section for student code of conduct, academic integrity policy, and appeals policy). When a decision has been made that the student has the right to appeal, notice will be given, and the student will have 10 calendar days to file an appeal. Intradepartmental appeals will be heard by the Graduate Studies Committee in conjunction with the Graduate Coordinator; if necessary, further appeal will go to the Department Head, whose decision is final (unless further appeal to the Graduate College is permitted, then to the Graduate Dean – see those same links).

For international students, ISS will be advised and may be involved in any action described in this section.

PHYSICS DEGREE PROGRAMS

Degree Options

The department offers four different graduate degrees and options: Ph.D. in Physics, Ph.D. in Photonics, M.S. in Physics, and M.S. in Physics with option in Photonics. Details for the graduate programs can be found on the Physics website.

Transfer of Previous Graduate Credit

The degree requirements specified on the following pages are for students entering with no previous graduate credit, or no previous graduate credit beyond the M.S. In other cases, some adjustment of the degree requirements may be possible; all adjustments are subject to approval by the Department and by the Graduate College.

For example, a student may transfer up to nine credit hours of coursework completed elsewhere, provided those courses did not count toward a previous graduate degree. Some other considerations are listed below.

A Ph.D. student who has completed an approved M.S. degree elsewhere enters the 60-hour Ph.D. program; completion of the M.S. allows reduction of the credit hour

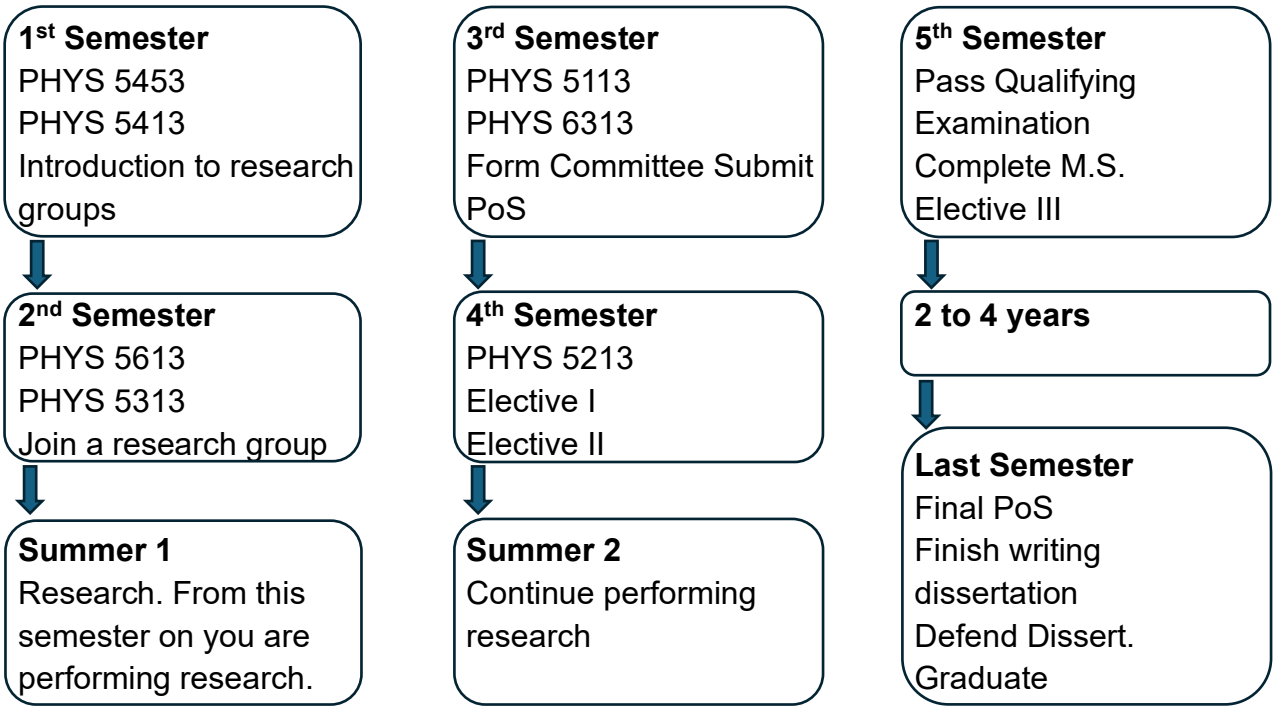
requirement from 72 hours to 60. Ph.D. students in either the 72-hour or 60-hour program with previous graduate credit may be able to transfer more than 9 credit hours of the 30-hour coursework requirement, provided the courses were not counted toward a previous degree, and were taken in a department that offered the Ph.D. In general, however, coursework amounting to at least one-fourth of the program hours must be completed at Oklahoma State University (18 hours for the 72-hour Ph.D., 15 for the 60-hour Ph.D.). Some very special circumstances, such as students following their Ph.D. advisor to his/her new faculty position at OSU, might allow for further consideration, but in any case, a minimum of 30 credit hours must be completed at OSU.

PROGRESS TOWARDS PH.D.

There are three stages in the Ph.D. degree:

1. Completing Ph.D. coursework
2. Ph.D. Qualification
3. Ph.D. Candidacy

Progress Flow Chart for Physics Ph.D.



Ph.D. Qualification

There are two ways for Ph.D. students to reach qualified status and both require students to enroll in the four core courses:

- PHYS 5113 Statistical Thermodynamics and Kinetic Theory
- PHYS 5313 Electromagnetic Theory
- PHYS 5413 Classical Mechanics
- PHYS 5613 Quantum Mechanics I

If the student has obtained a grade of “B” or better on the four core courses, then she or he has achieved Ph.D. qualification in Physics. This is in addition to the Graduate College requirement that the average of all coursework appearing on the degree plan should correspond to a “B” average (3.0 GPA) and that the cumulative GPA should be at a minimum 3.0 or “B” average. Most entering students enroll in Mathematical Methods for Physicists and one of these core courses in their first Fall semester followed by two more core courses in the Spring semester and the last one in their second Fall semester. Thus, all core courses must be completed at the latest by the end of the fourth semester of the student’s program. It is a requirement of the department that students on departmental support complete their core courses before taking elective courses, except for electives taken as a third course while completing the core sequence, or electives that are only rarely offered.

The first time that a student does not achieve the required grade of “B” or better in one of the core courses, then the student has two options:

- Enroll in the course for the second time and obtain a grade of “B” or better (note that repeated courses do not qualify for the tuition waver);
- Pass an oral examination that will be administered on the topics covered in the course in question at the beginning of the following semester (August for unsatisfactory Spring classes and January for inadequate Fall classes).

The oral examination will be administered by faculty members that are part of the Graduate Studies Committee. Students that fail to achieve the grade of “B” or pass the oral examination will not continue in the Ph.D. program and will be allowed to work towards an M.S. in Physics degree for one semester.

A student that does not achieve the required grade of “B” or better in a second core courses but has completed successfully one of the two options above for another core course, will also have the two options for this second course. Students that obtain grades below “B” in three core courses will not continue in the Ph.D. program and will be allowed to work towards an M.S. in Physics degree for one semester.

While completing the Ph.D. coursework you should form your Advisory Committee. The Advisory Committee is composed of a chair, normally the research advisor, and at least two Graduate Faculty members from the Department and one from outside the Department, for a total of at least four members. The Graduate Catalog requires that this committee be selected, and a Plan of Study approved prior to registration (or preregistration) by the end of your third semester, excluding summers, and no later than 90 days prior to the qualifying examination. Otherwise, you will be unable to register for the fourth semester, including summer term; however, the Department encourages students to select an advisory committee as early in their studies as is possible. The first step in selecting a committee is the choice of a research advisor and chair who may then assist in the selection of the other committee members. The committee should be closely involved in all aspects of the graduate student’s classroom accomplishments, education, and research achievements. The functions of the committee include approval of the Plan of Study and research proposal, overseeing progress in research, administration of the qualifying and final examinations, and approval of the thesis or dissertation.

Once a student has obtained a grade of “B” or better on all four core courses and successfully formed an advisory committee, they have completed the first stage in the Ph.D. degree.

Reaching Physics Ph.D. Candidacy

The qualifying exam is one of the requirements for the Ph.D. degree. The Graduate College rules for the examination, including the allowable timing of the exam, can be found on the Admission to Doctoral Candidacy form, available through Round-Up on the Grad College website.

- Student Resources
- Faculty Resources

However, it is to everyone's benefit (particularly the graduate student's) to take the qualifying exam early, rather than waiting until the last permissible date. A timely sequence would include taking the qualifying exam in the second or third year.

The qualifying exam is composed of a required oral examination and an optional written document. The oral portion of the exam is administered by the Advisory Committee, and normally focuses upon the student's defense of the proposed dissertation topic(s). The research advisor may require the student to provide a written document of the content of the presentation. The content of the examination should be prepared in consultation with the research advisor and the written draft should be distributed to the committee in advance of the oral exam. Ordinarily, the exam begins with a 1-hour (at most) presentation covering a subject in the student's chosen area of research. The presentation is then followed by a question-and-answer period intended to assess the student's background knowledge and research potential.

Additional topics for the oral exam may include more fundamental questions on Physics related to the proposed dissertation research.

If the qualifying exam is failed for the first time, it may be repeated once and it must be scheduled before the end of the next semester. Students that fail the second qualifying examination will not continue in the Ph.D. program and will be allowed to work towards an M.S. in Physics degree for one semester. Students will receive Ph.D. candidacy status once they successfully pass the oral qualifying exam, and the Advisory Committee approves the written portion of the examination.

Ph.D. Candidacy

Prior to reaching Ph.D. candidate status, a student holding a regular half-time teaching or research assistantship is expected to register for at least six credits during the fall and spring semesters and two credit hours during the summer semester. All students (US and International) who have achieved Ph.D. candidate status can maintain full-time status by registering for a minimum of two credit hours (typically PHYS 6000, research credit in Physics, but can be upper-level courses related to research with advisor approval) each semester. Students who are Ph.D. candidates are expected to be vigorously involved in research.

Dissertation Defense

The final step for the Ph.D. candidate is to write a dissertation and pass a Final Examination. The Final Examination is an oral defense of the dissertation and must be taken at least six months from passing the Qualifying Examination. The final exam is taken after the written dissertation is completed. A typical sequence would be for the student to write the dissertation, work with their research advisor to refine it, then distribute the completed dissertation to the Advisory Committee to review in advance of the final exam. Sufficient time should be given to the Advisory Committee members to review the written dissertation. The final oral exam will include a presentation of the dissertation results with questions from the Advisory Committee. The presentation segment of the Ph.D. dissertation defense is open to the public and is usually advertised within the department. The Committee must separately approve the written dissertation (before or after the oral exam). Note that although University rules do not specify the ordering in which these events occur, in the Physics Department, the Committee will almost always expect to review the dissertation a couple of weeks prior to the oral exam as described here.

To remain in good standing at all stages, a student must maintain a “B” average in course work. A “B” average on all coursework and a “B” average on all courses on the Degree Plan are required for any graduate degree in Physics. If a student makes a grade of “C” or lower in a course that is on his or her Degree Plan, it is recommended that the student repeat that course and attain a grade of “A” or “B” (again, be advised that repeated courses are not eligible for the tuition waver).

RESEARCH AND YOUR ADVISOR

The Ph.D. is a research degree and is awarded for substantial original research, presented in the form of a dissertation. The requirements listed in the previous pages are for the purpose of expediting your contributions to research in physics. The responsibility to acquire (choose and be accepted by) a professor (advisor) is entirely with you. Acceptance for Ph.D. research by a professor depends on the professor’s appraisal of your potential for research and on the ability of the professor to accept a student at that time. Usually, the professor will be able to offer support in the form of a research assistantship, but this is not always the case, and occasionally a student may need to work as a teaching assistant while performing dissertation research. It is not uncommon for a physics or photonics Ph.D. student to work outside the department, especially in Summer terms, when teaching assistantships are at a premium. Graduate

students should begin research work as early as possible. Students are encouraged to find an advisor during their second semester and begin research by the end of the second semester. Summer is the ideal time to begin research unencumbered by course work.

It is recommended that the advisor and student agree on a syllabus for the thesis/dissertation research course, PHYS 5000/6000, each semester. This syllabus will specify what expectations the advisor has of the student and indicate what accomplishments will suffice for the student to earn a grade of SR (satisfactory research).

Faculty link to sample templates for these syllabi

PHYSICS PH.D. COURSEWORK

Graduate students holding a half-time teaching or research assistantship are expected to register for at least six credits (two courses) per semester to qualify for full-time status prior to becoming a Ph.D. candidate. Those who have reached Ph.D. candidate status are required to register for two credits per semester. To remain in good standing students must maintain at least a B average in coursework.

The Ph.D. degree is the highest degree available in physics, and represents professional preparation for a career in research, development, or education. The requirements for the Doctorate (Ph.D.) in Physics Degree include the completion of 72 semester credit hours beyond the B.S. degree (60 semester credit hours beyond the M.S. degree) and the submission of an acceptable dissertation based on original and independent research. Usually, completing the Ph.D. program takes from four to six years beyond the BS degree. Entering graduate students should check that their undergraduate work was equivalent to a complete physics major. The detailed program for each Ph.D. candidate is determined in consultation with his or her Advisory Committee and is formalized on a Plan of Study. The specific courses listed on the following pages must be included on the Plan of Study, if they have not already been completed in an earlier program.

A description of the M.S. degree program follows later, but for now note that for students entering without a prior M.S. degree, coursework hours can be counted twice, both towards the M.S. degree and towards the Ph.D. degree.

PHYS 5113 Statistical Thermodynamics and Kinetic Theory

Catalog description: Fundamental concepts of thermodynamics: first, second and third laws; thermodynamic potentials. Statistical physics: Maxwell-Boltzmann, Fermi-Dirac, Bose-Einstein distribution functions. Kinetic theory: transport phenomena, Boltzmann H Theorem, the approach to thermodynamic equilibrium.

Prerequisite: PHYS 3113 Thermal Physics

Sample Syllabus: The standard textbook for this course is Thermodynamics and Introduction to Thermostatics, H. B. Callen, 2nd edition (John Wiley & Sons, 1985), ISBN-10: 0471862568.

Expected topics to be covered:

- Basic concepts in thermodynamics
- Equilibrium conditions
- Model applications
- Reversible processes and maximum work theorem
- Legendre transformation method
- Maxwell relations
- Stability of thermodynamic systems
- First and second order phase transitions
- Statistical mechanics in the microcanonical formalism
- The canonical formalism and Helmholtz representation
- Entropy
- Quantum fluids
- Bose-Einstein and Fermi-Dirac Distributions

PHYS 5213 Statistical Mechanics

Catalog description: Classical and quantum mechanical distribution functions for independent particles; interacting classical and quantum systems, superfluidity, phase transitions and critical phenomena, approximation methods.

Prerequisites: PHYS 5113 and PHYS 5613 or consent of instructor.

Sample Syllabus: The standard textbook for this course is Statistical Mechanics, R.K. Pathria and P.D. Beale, 3rd edition (Published by Elsevier). Other textbooks used include: Equilibrium Statistical Physics, M. Plischke and B. Bergersen, 2nd edition (Published by World Scientific).

Expected topics to be covered:

- Elements of Ensemble Theory
- The Microcanonical Ensemble
- The Canonical Ensemble
- The Grand Canonical Ensemble
- Formulation of Quantum Statistics
- Theory of Simple Gases
- Ideal Bose Systems
- Ideal Fermi Systems
- Statistical Mechanics of Interacting Systems: 2nd Quantization (as time permits)

PHYS 5313 Electromagnetic Theory

Catalog description: Electric and magnetic fields in free space and in matter. Boundary value problems, Green's functions, stress tensors, multipole expansions, thermodynamics; electromagnetic waves.

Prerequisite: PHYS 5453.

Sample Syllabus: The standard textbook for this course is Classical Electrodynamics, J. D. Jackson, 3rd edition (Published by Wiley).

Expected topics to be covered:

- Basic electrostatics
- Boundary-value problems in electrostatics
- Electrostatics of macroscopic media and dielectrics
- Magnetostatics and Faraday’s Law
- Maxwell’s equations
- Macroscopic electromagnetism and conservation laws
- Plane electromagnetic waves and wave propagation
- Vector calculus, Green functions, and several types of special functions (Legendre, Bessel, etc.).
- Waveguides, resonant cavities, and optical fibers (as time permits)

PHYS 5413 Classical Mechanics

Catalog description: Generalized coordinates and advanced dynamics; coupled systems, wave motion; theory of elasticity.

Prerequisites: PHYS 4423 Mechanics II or consent of instructor.

Sample Syllabus: The standard textbook for this course is Classical Mechanics, H. Goldstein, C. P. Poole Jr., J. L. Safko, 3rd edition (Published by Pearson).

Expected topics to be covered:

- Survey of the Elementary Principles
- Variational Principles and Lagrange's Equations
- The Central Force Problem
- The Kinematics of Rigid Body Motion
- The Rigid Body Equations of Motion
- Oscillations & Canonical Perturbation Theory
- The Classical Mechanics of the Special Theory of Relativity
- The Hamiltonian Equations of Motion
- Canonical Transformations

- Introduction to Lagrangian and Hamiltonian Formulations for Continuous Systems and Fields
- Hamilton-Jacobi Theory and Action Angle Variables (as time permits)

PHYS 5453 Mathematical Methods for Physicists

Catalog description: Introduction to the various methods and techniques used in theoretical physics.

Prerequisite: PHYS 3513 Mathematical Physics.

Sample Syllabus: The standard textbook for this course is Mathematical Methods of Physics, J. Mathews and R.L. Walker, 2nd edition (Published by Addison-Wesley), ISBN#0-8053-7002-1.

Expected topics to be covered are:

- Ordinary differential equations (closed form, power series, approximation methods)
- Infinite series (convergence, transformations)
- Evaluation of definite integrals (elementary methods, symmetry arguments)
- Complex variables (Cauchy's theorem, Laurent Series, Singularities, Contour Integration)
- Integral transforms (Fourier, Laplace)
- Vectors and matrices (vector space, linear operators, coordinate transformations, Eigenvalue problems, Hilbert space)
- Special functions (Legendre, Bessel, Hypergeometric)
- Partial differential equations (wave equations, diffusion equations, integral transform method)
- Eigenfunctions, eigenvalues and Green's function
- Tensor analysis (as time permits)

PHYS 5613 Quantum Mechanics I

Catalog description: Postulates of quantum mechanics. Operators, commutation relations, eigenfunctions. Schrödinger, Heisenberg and interaction formalisms, angular momentum and central field problems; nondegenerate perturbation theory.

Prerequisite: PHYS 5453.

Sample Syllabus: The standard textbook for this course is Quantum Mechanics, E. Merzbacher, 3rd edition (Published by Addison-Wesley), ISBN#0-8053-7002-1.

Expected topics to be covered:

- Introduction to Quantum Mechanics
- Wave Packets, Free Particle Motion, and the Wave Equation
- The Schrödinger Equation, the Wave Function, and Operator Algebra
- The Principles of Wave Mechanics
- The Linear Harmonic Oscillator
- Sectionally Constant Potentials in One Dimension
- Vector Spaces in Quantum Mechanics
- Eigenvalues and Eigenvectors of Operators, the Uncertainty Relations, and the Harmonic Oscillator
- Angular Momentum in Quantum Mechanics
- Spherically Symmetric Potentials
- The Principles of Quantum Dynamics
- The Quantum Dynamics of a Particle
- The Spin

PHYS 6313 Quantum Mechanics II

Catalog description: Scattering theory, many-particle quantum mechanics and application to atomic and molecular systems; degenerate and time-dependent perturbation theory.

Prerequisite: PHYS 5613.

Sample Syllabus: The standard textbook for this course is Quantum Mechanics, E. Merzbacher, 3rd edition (Published by Addison-Wesley), ISBN#0-8053-7002-1.

Expected topics to be covered:

- Rotations and Other Symmetry Operations
- The WKB Approximation
- Variational Methods and Simple Perturbation Theory
- Bound-State Perturbation Theory
- Time-Dependent Perturbation Theory
- Scattering (including polarization and scattering)
- The Formal Theory of Scattering
- Identical Particles
- Applications to Many-Body Systems
- Photons and the Electromagnetic Field
- Relativistic Electron Theory

ADDITIONAL COURSEWORK

The minimal requirement for the Ph.D. degree is completing three additional elective courses at the 5000 or 6000 level, with at least one course not in the student's area of specialization. These graduate level classes should be in physics or in an allied field such as chemistry, electrical engineering, or mathematics, and the student’s Ph.D. Advisory Committee has to approve that the class will satisfy the elective course requirement. Additional courses reflecting the candidate's specialization may be required by the advisory committee. Classes that may satisfy this requirement (check with your committee) recently offered are:

- PHYS 5123 – Geometrical Optics
- PHYS 5133 – Laser Spectroscopy
- PHYS 5163 – Lasers
- PHYS 5263 – Particle Physics
- PHYS 5303 – Physical Optics
- PHYS 5523 – Radiation Detection and Measurement
- PHYS 5533 – Dosimetry and Radiation Protection

- PHYS 5573 – Radiation Biophysics
- PHYS 5583 – Physics of Medical Imaging
- PHYS 5593 – Physics of Radiation Therapy
- PHYS 5663 – Solid State Physics I
- PHYS 6323 – Quantum Field Theory
- PHYS 6413 – Nonlinear Optics
- PHYS 6423 – Quantum Optics

The course work requirement for the Ph.D. degree includes the PHYS 6000 Doctoral Dissertation Research. Each graduate student conducts an original, independent research project under the direction of his or her research advisor. For more on this see the following sections. The number of required PHYS 6000 credit hours depends on the student's qualifications when enrolling in the Ph.D. program. Seventy-two semester hours of credit beyond the bachelor's degree, or sixty semester hours of credit beyond the master's degree are required; PHYS 6000 can make up no more than 75% of these total hours. A minimum of two-thirds of the graduate course credits must be in physics. Courses taken at another institution will be evaluated by a faculty committee to determine whether they satisfy any requirements.

PHOTONICS DOCTORATE DEGREE

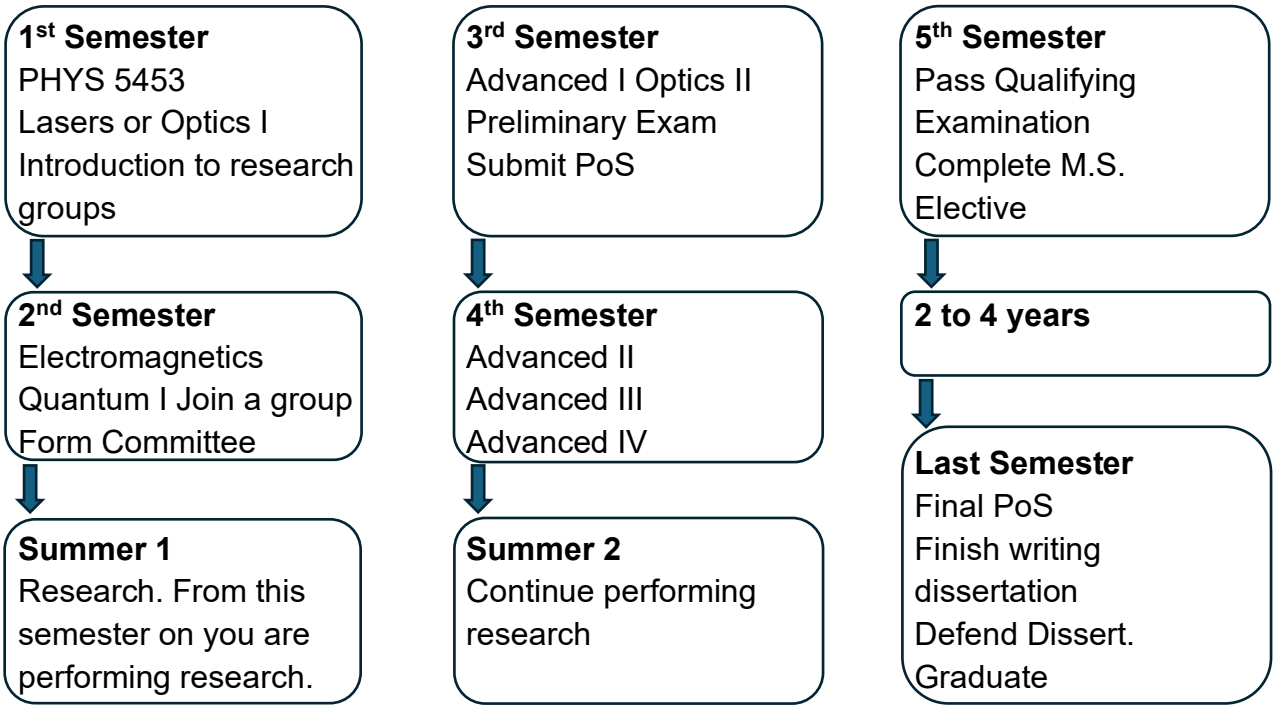
Progress Towards the Photonics Ph.D. Degree

There are four stages in the Ph.D. degree:

- Completing Ph.D. coursework
- Preliminary examination
- Ph.D. Qualification
- Ph.D. Candidacy

Progress Flow Chart for Photonics Ph.D.

The following progression is recommended for most Photonics Ph.D. students but the progression may vary depending on the preparation of the student.



Steps to a Photonics Ph.D. Degree

Within the first year after admission to the Photonics Ph.D. program a student forms a Preliminary Advisory Committee for guidance through the initial stages of coursework and preparation for the Preliminary Examination which must be completed by the end of the second year.

The Plan of Study of a Photonics Ph.D. student should include coursework as suggested below. Additional coursework approved by the student's Advisory Committee along with research credits directed by a particular faculty member will also appear on the Plan of Study. The Photonics Ph.D. program requires 72 credit hours past the baccalaureate degree or 60 hours past the Master's degree. At least thirty credit hours must be in multidisciplinary course work with the remaining hours in Doctoral Dissertation Research credits (PHYS 6000).

Courses:

- Mathematical Methods (required)
    - PHYS 5453 Mathematical Methods for Physicists

- Area I: Electromagnetics (1 required)
    - PHYS 5313 Electromagnetic Theory
    - ECEN 5613 Electromagnetic Theory
- Area II: Lasers (1 required)
    - PHYS 5163 Lasers
    - ECEN 5080 Design of Lasers and Systems
- Area III: Optics (2 required)
    - PHYS 5123/ECEN 5803 Geometrical Optics
    - PHYS 5303/ECEN 5823 Physical Optics
- Area IV: Quantum Mechanics (1 required)
    - PHYS 5613 Quantum Mechanics I
    - PHYS 6313 Quantum Mechanics II
- Area V: Advanced Topics (4 required) Optoelectronics
    - ECEN 5853 Ultrafast Optoelectronics
- Spectroscopy
    - PHYS 5133 Laser Spectroscopy
- Quantum and Nonlinear Optics
    - PHYS 6413 Nonlinear Optics
    - PHYS 6423 Quantum Optics
- Solid State
    - PHYS 5663 Solid State Physics I
    - PHYS 6243 Semiconductors I
    - ECEN 5333 Semiconductor Devices
- Photonics Systems
    - ECEN 5833 Fiber-Optic Communication Systems
- Electromagnetics
    - PHYS 6713 Advanced Electromagnetic Radiation
- Bio/Nano Photonics and Special Topics
    - For students pursuing the bio/nano photonics option, additional courses from departments other than ECEN and PHYS may be included. Special topics courses are occasionally offered under PHYS 5110, PHYS 6010, ECEN 5080, and other course numbers.
- Additional Laboratory Courses
    - PHYS/ECEN 68X0 Photonics Lab courses: Topics Vary (Lab)
    - ECEN 5843 Microelectronic Fabrication

Completing Photonics Ph.D. Coursework

Photonics Ph.D. students should complete at least one course in each of the Areas I - IV (see required courses above) with a grade of “B” or higher. These courses serve as the core courses in the degree, and should be completed before taking the Preliminary Exam. (Subject to availability of course offerings.)

Reaching Photonics Ph.D. Qualification

To advance to qualified status students in the Photonics Ph.D. program successfully pass the Preliminary Exam. With the successful completion of the Preliminary Exam, the student works with the Advisory Committee to finalize the Plan of Study and complete the Qualifying Exam for admission to Ph.D. candidacy.

The oral portion of the Preliminary Exam is administered by the Advisory Committee, and normally focuses upon a presentation of a topic of interest that is related to the research that the student will be performing but may not be completely overlapping with the dissertation topic(s). A paper on this topic should be prepared in consultation with the research advisor and distributed to the committee in advance of the exam. The presentation is then followed by a question-and-answer period intended to assess the student’s background knowledge and research potential. Additional topics for the oral exam may include more fundamental questions related to the paper.

If this exam is failed for the first time, it may be repeated once, and it must be scheduled before the end of the next semester. Students that fail the second examination will not continue in the Ph.D. program and will be allowed to work towards an M.S. in Physics (option in Optics and Photonics) degree for one semester.

Ph.D. Candidacy

Students will receive Ph.D. candidacy status once they successfully pass the oral qualifying exam and the Advisory Committee approves the written portion of the examination. The Qualifying Exam should be taken within a year after passing the Preliminary Exam and must be completed at least six months prior to the dissertation defense. The student conducts research under the guidance of his or her chosen faculty research advisor and presents a Ph.D. dissertation which she or he defends before their Graduate Research Committee. The qualifying exam is one of the requirements for the Ph.D. degree. The Graduate College rules for the examination, including the allowable

timing of the exam, can be found on the Admission to Doctoral Candidacy form, available through Round-Up on the Grad College website:

- Student Resources
- Faculty Resources

However, it is to everyone’s benefit (particularly the graduate student's) to take the qualifying exam early, rather than waiting until the last permissible date.

Prior to reaching Ph.D. candidate status, a student holding a regular half-time teaching or research assistantship is expected to register for at least six credits during the fall and spring semesters and two credit hours during the summer semester. All students (US and International) who have achieved Ph.D. candidate status can maintain full-time status by registering for a minimum of two credit hours (typically research credits but can be upper-level courses related to research with advisor approval) each semester. Students that are Ph.D. candidates are expected to be vigorously involved in research.

Dissertation Defense

The final steps for the Ph.D. candidate is to write a dissertation and pass a final examination. The Final Examination is an oral defense of the dissertation, and must be taken at least six months from passing the Qualifying Examination. The final exam is taken after the written dissertation is completed. A typical sequence would be for the student to write the dissertation, work with their research advisor to refine it, then distribute the completed dissertation to the Advisory Committee to review in advance of the final exam. The final oral exam will include a presentation of the dissertation results with questions from the Advisory Committee. The Committee must separately approve the written dissertation (before or after the oral exam).

Note that although University rules do not specify the ordering in which these events occur, in the Physics Department, the Committee will almost always expect to review the dissertation a couple of weeks prior to the oral exam as explained here.

To remain in good standing at all stages, a student must maintain a “B” average in course work. A “B” average on all coursework and a “B” average on all courses on the Degree Plan are required for any graduate degree in Physics. If a student makes a

grade of “C” or lower in a basic course that is on his or her Degree Plan, it is recommended that the student repeat that course and attain a grade of “A” or “B” (again, be advised that repeated courses are not eligible for the tuition waiver).

M.S. DEGREES

The Master of Science (M.S.) in Physics

The requirements for the Master of Science (M.S.) in Physics Degree include the completion of 30 semester credit hours beyond the B.S. and the submission of an acceptable thesis based on original and independent research. This program normally takes no more than two years to complete.

The following specific courses must be taken:

- PHYS 5113 Statistical Thermodynamics and Kinetic Theory
- PHYS 5313 Electromagnetic Theory
- PHYS 5413 Classical Mechanics
- PHYS 5453 Mathematical Methods for Physicists
- PHYS 5613 Quantum Mechanics I

In addition, nine semester credit hours of electives must be completed in physics, mathematics, or an allied field. These must be chosen in consultation with one's advisor. For example, an advanced course in the Mathematics Department along with Solid State I and II in the Physics Department might be reasonable choices for someone interested in a Materials Science specialization. For others, one or more courses from the Electrical Engineering Department might be preferable. The remaining six semester hours must be thesis research credits designated as PHYS 5000.

Besides the Thesis-Track Master of Science (M.S.) in Physics, we offer the Non-Thesis-Track Master of Science (M.S.) in Physics Degree. The Non-Thesis M.S. requires completion of the five courses listed above. In addition, fifteen elective graduate credit hours are required in Physics or a related field. However, the Thesis is replaced by a 2-credit hour report.

Either track is acceptable for the M.S. enroute to the Ph.D. When ready, the student requests admission to the M.S. program, submits the M.S. Plan of Study, and, in the Non-Thesis case, submits the formal report approval form to the Graduate College. The qualifying exam report is often used as the formal report; unlike the Thesis, it does not have to be submitted to the Graduate College.

M.S. in Physics, Option in Photonics

The Master of Science (M.S.) in Physics, Option in Photonics offers both a Thesis Track and a Report Track. The requirements for each of these two degree tracks are described below.

Thesis Track

30 credit hours required past baccalaureate degree. Two required PHYS courses:

- PHYS 5453 Mathematical Methods for Physicists
- PHYS 5613 Quantum Mechanics I

Three Photonics core courses chosen from the following list with advisor approval:

- PHYS 5163 Lasers
- PHYS 5123 Geometrical Optics (cross-listed as ECEN 5803)
- PHYS 5303 Physical Optics (cross-listed as ECEN 5823)
- ECEN 5080 Design of Lasers and Systems
- ECEN 5833 Fiber-optic Communication Systems

Three or more advanced PHYS or ECEN courses at the graduate level from the two groups of electives given below. A minimum of one course and a maximum of two will be taken from Group I. Courses at the graduate level from other departments may be substituted for electives in Group II with Physics Department permission, but alternate courses must have a strong connection to optics and photonics.

GROUP I

- PHYS 5313 Electromagnetic Theory
- PHYS 6713 Advanced Electromagnetic Radiation
- ECEN 5613 Electromagnetic Theory

GROUP II

- PHYS 5133 Laser Spectroscopy
- PHYS 5663 Solid State I
- PHYS 6313 Quantum Mechanics II
- PHYS 6413 Nonlinear Optics
- PHYS 6423 Quantum Optics
- ECEN 5843 Microelectronic Fabrication
- ECEN 5853 Ultrafast Optoelectronics
- ECEN 5793 Digital Image Processing

6 credit hours (or more) of supervised research (PHYS 5000, or equivalent), with submission of an approved thesis. Flexibility in course choice is allowed with permission of the Physics Department.

Report Track

The report option requires two additional advanced courses at the graduate level, for a total of 30 credit hours of course work and complete a 2-credit hour report. These courses can be in other departments, but must have a strong connection to optics and photonics.

Both of these options are aimed at students who intend to take either the M.S. in Physics with Optics/Photonics Option as a terminal degree, or for the M.S. enroute to the Photonics Ph.D. The process is the same as described on the previous page.

DEPARTMENT/COLLEGE/UNIVERSITY RESOURCES

Purpose: This section is intended to provide graduate students with a comprehensive list of resources that are available to them through their program, the Graduate College, as well as the University.

- Department of Physics

Graduate College Links

- Graduate College
- OSU Catalog
- Academic Calendar
- Fall/Spring/Summer Enrollment Guidelines
- Graduate Assistantships
- Graduate College Academic Calendar Student Link
- Graduate College Academic Calendar Faculty Link
- Graduate College Plan of Study and Graduate Faculty Database Student Link
- Graduate College Plan of Study and Graduate Faculty Database Faculty Link
- Graduate Student Appeals Policy Student Link
- Graduate Student Appeals Policy Faculty Link
- Graduate and Professional Student Government Association (GPSGA)
- Graduate College Forms Student Link
- Graduate College Forms Faculty Link
- Doctoral Degree Graduation Checklist Student Link
- Doctoral Degree Graduation Checklist Faculty Link
- Master's Degree Graduation Checklist Student Link
- Master's Degree Graduation Checklist Faculty Link
- International Teaching Assistant Test
- Leave of Absence Policy Student Link
- Leave of Absence Policy Faculty Link
- OSU Guidelines for Best Practices in Graduate Education Student Link
- OSU Guidelines for Best Practices in Graduate Education Faculty Link
- OSU Best Practices for Theses and Dissertations Student Link
- OSU Best Practices for Theses and Dissertations Student Link
- English Proficiency

University Links

- Career Services
- Edmon Low Library
- Family Resource Center
- Health Insurance (Student)
- Information Technology
- Institute for Teaching and Learning Excellence (ITLE)
- International Students and Scholars Office

- Office of Multicultural Affairs
- OSU High Performance Computing Center
- OSU Writing Center
- Residential Life
- Responsible Conduct of Research Training
- OSU Research Compliance
    - Appropriate Use of Human Subjects in Research
    - Appropriate Use of Animals in Research
    - Biosafety Program
    - Radiation Safety Program
    - Laser Safety Program
- Seretean Wellness Center
- Student Accessibility Services
- Student Affairs
- Student Support and Conduct
- The OSU Student Union
- University Counseling Services
- University Health Services
- University Parking Services

SURVIVAL SKILLS FOR GRADUATE STUDENTS

Graduate school represents a new educational experience. Students are faced with a large amount of complex information and are expected to be more independent. Graduate school can be a stressful experience for students. There are numerous online sources that provide information for students to help them not only survive but thrive in graduate school. A few examples are provided below.

- UCLA Graduate School Survival Guide
- PhDs.org Succeeding in Graduate School
    - What Predicts Graduate School Success
    - Ten Simple Rules for Graduate Students
    - Your First Year in a Ph.D. Program
    - The Successful Graduate Student: A Review of the Factors for Success
- A Brief Survival Guide for New Graduate Teaching Assistants at UNC Charlotte