



PHYSICS & ASTRONOMY

THE UNIVERSITY OF NEW MEXICO



Physics & Astronomy Graduate Handbook

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The University of New Mexico

panda.unm.edu

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The **PandA** Department



You have now officially joined our Department. We want you to feel comfortable here, and to have a sense of ownership about this space. Knowing the ins and outs of the department will be useful to you, but there is something else that can contribute to comfort and belonging in a university department: getting to know each other on a personal basis. You and your fellow graduate students come from different states or countries; whether you are a domestic student or an international student, there is bound to be a bit of anxiety upon entering a new university program, so please make an effort to get to know one another. Reach out beyond your own usual group and find out what is interesting about people with other backgrounds, interests, and expertise. Don't just make the easy connections - challenge yourself and take some risks. If you arrived earlier in the summer, share what you already know about the campus and this Department with newcomers. We want this to be a community and only you can make that happen.

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I. Department Facilities

a) The Student/Faculty Commons

The front lobby area has been converted into a social area for students and staff to mingle, teach, problem solve, and exchange ideas. At times, we hold special events such as 'potlucks' (everyone brings an edible specialty) in this area. There might be an occasional chamber music, jazz, or folk tunes presentation in the Commons.

b) Department Library

Books must be formally checked out of our library (Room 188) by the Work Study Student in the front office. Books may be checked out for a maximum of two months, with one renewal possible. Periodicals can be checked out for one week. Some books are kept on reserve (with a restricted loan period) at the request of a faculty member. There is a direct link to the library catalog on the left side of our main page "panda.unm.edu".

c) Student Computer Rooms

The graduate student computer room is located in Room 109, while the undergrads' computer room is #40-A. Because the IBM PC-compatible computers in 109 were purchased, in part, with funds supplied by the Graduate Student Association, permission to use the facilities and equipment must be obtained from the GSA, along with payment of a \$10.00 non-refundable fee (to GSA) for a key. All other computers in the building belong to faculty or staff members, and are not to be used by students without permission. If you have been authorized to use any computer within the confines of the Department and there is a problem with its functioning, please do not attempt to correct the problem on your own...this particularly applies to printers. Wait until a Department computer staff person is available to assist with the problem.

d) Photocopy Room

There are two photocopy machines in Room 2, located just to the right of the front office. (This is also the faculty mail room.) The photocopy room is open between 8:00 a.m. and 5:00 p.m. You may do copying for personal use, homework solutions, or class notes, at a charge of \$.05 per copy, payable at the front office. Alternatively, you may obtain a personal account number that can be entered into the copy machine, and for which you will be billed on a quarterly basis. As a TA/GA/RA, you may have copying needs which the Department will cover; see your faculty supervisor for an appropriate account number. If there are problems with any of the copy machines, please see Panda Staff in the front office for assistance. Do not attempt to fix the problem yourself.

e) Machine Shop

The Department's Machine Shop (Room 154) does projects for both instruction and research. If you have sufficient background and expertise, it may be possible for you to use the equipment for a research project. You must have approval from your professor for this and limit use between 8:00 AM and 5:00 PM. John DeMoss, Machine Shop

Supervisor, will schedule training sessions for new students who are interested in using the shop at some point during the semester. One of the shop machinists must be present whenever the shop equipment is in use.

f) Smoking

Smoking is not allowed anywhere inside the Physics & Astronomy building, or inside any building on campus. You may smoke on the front veranda of this building.

II. Communication/News Sources

a) E-Mail

E-mail is used to communicate department events, general news, policy issues, and to send personal messages to individual students.

b) Mailboxes

Student mailboxes are located in the hallway to the right of the main office. Yours may be grouped with the TA/GA students' mailboxes, or among those of the general student population. Although e-mail is now the primary source of information, all of your personal mail and special announcements will be placed in your mailbox.

c) Panda Propaganda

The Panda is the online departmental newsletter...check regularly for special announcements, the colloquium schedule, and employment opportunities.

d) Panda.unm.edu

Our website is a comprehensive source of Department information: daily/weekly events; student, faculty, and staff descriptions; personal home pages; homework assignments; course listings; and important links.

e) Kiosk

As you enter the lobby, you will see a podium ---a continually updated news stand --- so take note as you enter. There will be announcements about seminars, colloquiums, and other notable events.

f) Lobby Bulletin Boards

You will find listings of students, faculty, and staff along the east wall of the hallway, to the left of the front entrance. There is a photo display of students, faculty, and staff on the opposite hallway wall, and your photograph will be included.

g) Front Office Bulletin Boards

There are two bulletin boards on the left as you enter the front office. The first one is the sign-out board for faculty and staff. A quick glance will tell you whether a particular person is not available, and when he/she will return. The second bulletin board is a schedule board for meetings, events, defense presentations, etc. The purpose of this

board is to avoid double-scheduling rooms, so you are requested to ask a front office staff person to assist you with scheduling an event. There is also a schedule of current semester courses posted in this area.

h) Student Bulletin Boards

There are two student news boards outside of the Academic Advising office, Room 105. You will find course announcements, job postings, scholarship opportunities, and general interest material in these locations. On the opposite wall there is an Academic Calendar highlighting various deadlines and special dates.

i) TA/GA Assignments

The TA/GA assignments are posted on the Advising Office door. These will be updated as changes occur, and the enrollments for each class/lab are included in the posting.

j) Office Supplies

From time to time, you may need supplies for a seminar presentation or a special research project that has been assigned to you by a professor. There are certain materials available in the front office. In order to obtain needed materials, please obtain permission from the appropriate faculty member and then contact Kay Young in the front office.

k) Photocopy Paper

Contact PandA Staff in the front office if the photocopy paper is depleted.



III. The Department Staff

The staff of the Department of Physics and Astronomy is a great group of people, each of whom is happy to assist you. You will get to know everyone well as time goes by and, until you do, here is a brief introduction:

John Behrendt, Electronic Technician John designs, builds and repairs electronic equipment; he will also consult as needed.

John DeMoss, Machine Shop Supervisor /Prototype Machinist John coordinates shop administration, as well as designing and building equipment.

Monica Fishel, Administrator Group Monica works closely with the Principal Investigators in coordinating the Contract and Grant Proposal Process.

TBA, Department Accountant Maintains Department accounts, reconciles and monitors contract and grant funds.

Alisa Gibson, Senior Student Program Advisor Alisa handles all student matters for the Optical Sciences and Engineering Programs, works in an advisory capacity with graduate, undergraduate, and prospective students.

Anthony Gravagne, Machinist Works as a team member in the design and building of lab equipment.

Gary Harrison, Facility Services Manager Gary is responsible for building maintenance, handles the forms to obtain keys, and assigns offices and desks. He also coordinates the process for TAs who need keys for Regener Hall.

Tom Hess, Systems Programmer II Provides computer system administration, user support, and software development and maintenance.

Jaye Jensen, Fiscal Services Technician Jaye handles all purchases for services and equipment, requests for copier codes and mail distribution.

Alisa Gibson, Program Advisement Coordinator Works in an advisory capacity with graduate, undergraduate, and prospective students.

Sandra Ortiz, Administrative Support Supervisor Sandra oversees the daily operations of the main office, supervises the main office staff and student employees.

Steve Portillo, General Services Assistant Steve handles all incoming packages for equipment and supplies, he also assists Gary Harrison with inventory and general Department maintenance.

Lina Sandve, Department Administrator Lina works closely with the Department Chair, overseeing administrative matters.

Daniel Sandoval, Administrative Assistant Daniel coordinates the colloquia, coordinates the text book orders for instructors, and handles all reimbursements for petty cash, travel, and goods.

Cathy Webster, Department Webmaster Cathy provides support in the areas of development and maintenance of <http://panda.unm.edu>, user support, and database programming.

Regener Hall Instructional Staff

Mickey Odom, Lecturer/Lab Director Mickey is responsible for development and oversight of the Department's undergraduate laboratory courses.

Bill Miller, Teaching Lab Supervisor Bill provides technical support for the laboratory classes. He works closely with Mickey Odom and the TAs.

John Gallegos, Coordinator, Lecture Demonstrations John sets up demonstrations for physics classes and maintains equipment and lab facilities.

Undergraduate Workstudy Students There are a number of undergraduate students who serve in valuable positions as research and staff assistants.

Research Centers

There are additional staff persons working for the various research centers housed within our Department. You will get to know these people as you become familiar with the Centers:

- Center for Advanced Studies
- Center for High Performance Computing
- Center for High Technology Materials
- Consortium of the Americas for Interdisciplinary Science
- Information Physics
 - UNM-LANL Partnership in Quantum Information Science
- Institute for Astrophysics
- New Mexico Center for Particle Physics
- Optical Sciences

IV. Maneuvering through the System



a) Important Places on Campus

In time, you'll get to know the entire UNM Campus like the back of your hand. There are a number of buildings that will become of significant importance to you in addition to the Physics & Astronomy building and Regener Hall. You can check the map for these:

Regener Hall (I-3, #35)

If you're a TA, this will be your home-away-from-home! Undergraduate courses and labs are conducted at Regener Hall.

The Student Services Center (H-6, #85)

Domestic & International Admissions, Registrar, Registration Information, and Financial

Aid center. Nearly all of the departments that are essential to the processing of student information are located under one roof.

Office of Graduate Studies – OGS (H-4, #81)

The administrative staff of OGS handles all business related to graduate students: TA, RA, and GA contracts pass through OGS for final approval; candidacy forms and manuscripts must be approved by OGS; academic policies are developed by the Senate Graduate Committee in conjunction with the OGS administrative staff.

Student Union (H-5, #60)

The Student Union is “food central”...everything from breakfast items to hot dinners, with pizza and submarine sandwiches in between. Student government offices, LoboCard photo operations, and various meeting rooms are also located in this building.

Student Health Center (H-5, #73)

Located at the south end of the Mesa Vista row, the Health Center is a comprehensive clinic with physicians, nurse practitioners, and an array of services.

Parking Services

If you are planning to regularly drive and park a car on campus, you must obtain a parking permit. TAs and RAs are already on a waiting list for Lot “M” out side our building.

Johnson Center Gymnasium (H-6, #59)

Libraries

- Centennial Science and Engineering
 - Center for Southwest Research
 - Fine Arts (film library)
 - Government Information
 - Parish Memorial (Business, Econ.)
 - Zimmerman (Educ., Humanities, Social Sci.)
 - Extended University & Distance Education Services
 - Health Sciences Center Library
 - Law Library
 - UNM Special Libraries: Bainbridge Bunting Memorial Slide Library (Arts & Architecture)
- Center for Southwest Research
 - Health Sciences Center Ethics Program and Library
 - Native American Studies Library
 - Tireman Education Resource Center, College of Education, 277-6384, 277-6385
 - University of New Mexico Archives
 - Women's Resource Center Library

There are also several museums and galleries situated throughout the campus, and don't forget to check out the *Observatory (D-4, #208)*!

V. “First Things First” Information

UNM E-Mail Address

You can create an account via the UNM server - go to <http://its.unm.edu/email/index.html> and follow the directions as prompted. E-mail is used to communicate Department events, general news, policy issues, and to send personal messages to individual students.

Class Registration

You should register for classes as soon as you have had an advising session. The schedule of classes and online registration services are available at <http://www.unm.edu/~unmreg/>. If you need a call number that is not listed in the schedule of classes, please email pandainfo@phys.unm.edu.

LoboCard

UNM uses a photo identification card to access many of the facilities and services, such as Johnson Gym Center, the various libraries, student discounts on tickets, etc. You must obtain an ID card at the Student Union in order to begin the registration process. Your photo will be taken and the card issued while you wait.

Keys

There is a Key Policy, a copy of the which can be found in [Appendix A](#). Gary Harrison will assist you in obtaining the various keys you will need for Department facilities.

Parking

Although the Department can issue you a temporary one-day parking permit for lot ‘M’ (adjacent to our building), temporary permits are only provided on a limited basis. You will have to purchase a permanent parking permit at the Parking Facilities Building at the northwest corner of University and Central. They can be reached at 277-3729.

All TA and GA students are already on a priority waiting list at the Parking Facility Office. As a TA/GA, you have the privilege of obtaining an ‘M’ parking permit to use the Panda lot. All other students must wait until after August 13th to request an ‘M’ parking permit. If ‘M’ permits are still available, after the Medical students purchase the ‘M’ permits on August 12th, P & A students may purchase an ‘M’ permit. Generally, additional ‘M’ permits again become available in late September or October, and it may be possible to upgrade to an ‘M’ permit if that occurs. Lot ‘G’ permits are usually the alternative when ‘M’ permits are not available, and there is a shuttle to transport students from the ‘G’ lot to the Physics building.

Student Health Insurance

Health Insurance (major medical insurance) is provided for graduate students who are employed as TAs, GAs, and RAs. All other students can purchase coverage via the Student Health Center.

UNM Catalog Online

Each student is expected to use the University Catalog as an academic guide. All of the University policies and procedures are spelled out in the catalog and, as a graduate student in the Department of Physics & Astronomy, you are primarily responsible for the correct and timely completion of your own academic requirements. Alisa will provide you with updates and the time-lines for submitting necessary forms to the Office of Graduate Studies (OGS), however, you are responsible for knowing the regulations and monitoring your own progress because each student's program and pace are different.

The Office of Graduate Studies (OGS)

From this point forward you will hear the term "OGS" again and again. OGS is the campus department that implements policy for graduate students. You will find that there are some very helpful people in OGS, each with a responsibility to abide by the policies that have been established by the University Faculty Senate. So long as you familiarize yourself with the procedures outlined in the Student Catalog, as well as the Department policies, and stay in close contact with your faculty advisor, and your Graduate School experience will be smooth sailing.

RA/TA Contracts

OGS monitors the RA and TA contracts to ensure that a student is indeed eligible to hold a contract. A student can become ineligible if his/her grade point average (GPA) falls below 3.0. As you will be notified of this only when the end-of-semester GPA is calculated, your entire academic program can be placed in jeopardy if you rely on financial assistance to support yourself while at UNM. It is important to maintain awareness of your GPA and to keep in close communication with professors if you are at risk academically. There are circumstances that can impact your academic work, but your advisor and other faculty members are here to help forestall major problems.

There are multiple rules governing RA and TA contracts. The basic limitations are that you may not work more than .5 FTE hours (20 hours/week) during the academic year (fall and spring semesters) until you achieve the A.B.D. status ('All But Dissertation'). Once domestic students are A.B.D., they can work 1.0 FTE hours (40 hours/week); this does not apply to International students who are always limited to .5 FTE hrs. during the academic year due to various and sundry regulations related to visas. All students with more than 18 graduate credit hours at UNM can work 1.0 FTE hours during the summer. Students who enter the University for the first time during the summer semester are limited to .75 FTE hours (30 hours/week), because they must also take a 3 credit hour course during that first semester.

Please note that RA students are subject to a FICA tax if they are not enrolled in at least 3 credit hours of coursework during the summer. FICA (social security) is deducted at the

rate of 6.2% and FICA Medicare is a 1.45% deduction...a total deduction of 7.65% from your paycheck! So, if your Contract Supervisor is will to cover the tuition for 3 credit hours, it will be to your academic AND financial benefit to take a class. RA students are also subject to a tax on their tuition remission...during each semester and, unfortunately, one cannot take a class to avoid this tax. The IRS considers tuition remission to be part of an RA student's income and, therefore, taxable. This tax (which varies depending upon overall income) will only be deducted once during each semester.

Academic Probation

If your cumulative GPA falls below 3.0, you will be placed on Type 1 Academic Probation. If your GPA does not improve to 3.0 or higher after you have completed 12 semester hours in probationary status, you will be disenrolled from graduate status. While in Type 1 status, you will not be eligible for assistantships, nor will you be allowed to take a comprehensive exam. Although you have a right to petition OGS to continue your RA Contract even while on academic probation, our Department Chair will not support such a petition unless there were serious circumstances involving family or personal health that contributed to your academic probation status.

Leave of Absence

A pre-candidacy graduate student who wishes to take a leave of absence for one or more academic-year semesters must consult his/her academic advisor, who will bring the matter to the attention of the Graduate Committee. The following questions should be addressed before the leave of absence:

- (i) how the leave will impact the student's clock for the Preliminary Examination, the required core courses, and the Candidacy Exam; and
- (ii) how the leave will impact any departmental commitment to financial aid.

Decisions on these questions must be reduced to writing and placed in the student's file before the leave begins. During the leave, the student must contact his/her academic advisor at least once per semester to keep the department abreast of any change in plans. Please note that according to OGS rules, a student who has not enrolled for three consecutive semesters (including the summer session) must apply for re-admission to the graduate program.

VI. The Graduate Assistant Bill of Rights

The following refers to TAs and RAs as well as GAs:

- (1) Graduate Assistants are colleagues in teaching.
- (2) Graduate Assistants' duties and work loads for grading:
 - a) grading papers is the first work priority.
 - b) writing solutions to homework is the second priority.
 - c) Professors should provide GAs with detailed, written solutions, and the weights of

test questions.

d) Professors should grade their own exams in upper level and graduate level courses.

e) Graduate Assistants should not be asked to grade for more than two different courses.

(3) The faculty encourages the Graduate Student Association to be involved in the professional activities of Graduate Assistants and to assist with training of new assistants. The Department Chair's award (\$100) is given each year in recognition of a particularly good job. New GAs who teach labs are encouraged to seek advice from experienced GAs and the Regener Hall faculty/staff members.

(4) Professors should intercede for students wanting to drop Teaching Assistantships for Research Assistantships. The Graduate Committee should be given as much warning as possible when discussing a potential RAship with a student. Prospective RAs are to be fully informed about what will be expected of them (responsibilities and time commitment), level of compensation, tuition remission, and so on.

(5) Grievance procedures - It is essential that there be an orderly and timely procedure for resolving grievances that Assistants may have with their assignments. The procedures are as follows:

a) The GSA has a committee to hear and attempt to solve grievances.

b) A faculty member is assigned as an ombudsman to hear complaints that are not resolved by the GSA committee.

c) The problem should be referred to the Department Chair if other avenues of mediation have been unsuccessful.

A faculty member's grievance with a Graduate Assistant's performance should follow the same procedures.

Required Seminar for TAs (policy adopted by P&A Faculty 2001)

All graduate students who are teaching undergraduate labs are now required to register for a 1-credit-hour seminar (Physics 452) during each of their first two semesters. Call numbers corresponding with the TA Seminar for Bill Miller (Astro 101, Physics 102, and Physics 106 labs) and Mickey Odom (all other Regener labs) can be obtained by emailing to pandainfo@phys.unm.edu. Registration in these seminars will be optional for undergraduate TAs and for grad students who have already passed the Departmental Preliminary/Comp Exams.

The seminars will involve meetings during which the TAs discuss relevant physics / astronomy / astrophysics questions concerning upcoming lab sessions, and will also include a thorough prep and rehearsal of individual lab presentations.

As the purpose is to become better acquainted with the relevant subject matter and how to present it to students, in lieu of the discussion sessions some TAs may choose to enroll in

a section of Physics 400 that is dedicated to training in tutorial methods for undergraduate education, when that course is offered. Naturally, the individual prep and rehearsal for lab sessions will still be required.

The University and the School of Arts & Sciences have established policies regarding student-faculty relationships and [sexual harassment](#). Graduate Teaching and Research Assistants are considered members of the faculty and are expected to conduct themselves accordingly.

VII. Academic Requirements



As a graduate student in the Department of Physics & Astronomy, you are primarily responsible for the correct and timely completion of your own academic requirements. The Academic Advisor will provide you with updates and the time-lines for submitting necessary forms to the Office of Graduate Studies (OGS). However, you are responsible for monitoring your own progress because each student's program and pace are different.

There are essential matters that you must keep in mind. For example, once you are Advanced to Candidacy, you will have five years to complete your manuscript. This is a firm University rule, and OGS grants exceptions only if a timely petition that is supported by the Department is made by the student.

The UNM Student Catalog spells out very clearly all aspects of university policy regarding completion of degrees. Confusing points may arise when there are unusual circumstances surrounding transfer credits or previous degrees. Again, petitions can be submitted to address such issues.

The Department of Physics & Astronomy has developed a set of policies specific to our department. These are outlined on the following pages, so we urge you to keep this handout as a reference and academic guide for the future.

You are bound by the provisions and policies set out both in this handbook as well as the UNM Catalog throughout your degree program. Should changes occur in subsequent

editions of either publication, you may or may not be accorded the option to switch to the later guidelines.

VIII. The Physics Program

A) Your Personal Academic Advisor

When you arrive at UNM, you are assigned an academic advisor, who is selected from the members of the Graduate Committee. Your academic advisor will advise you on course work, the preliminary examinations, and the candidacy exam. You are encouraged to seek help from your advisor at any time, and you are required to have at least one meeting per semester with your academic advisor. Generally this meeting occurs during a week in November and again in April, at which time you and your advisor assess your current academic status and discuss plans for the following semester. A brief, informal progress report is placed in your file after each advisement session. Naturally you may seek assistance from any faculty member, but you will continue to meet with your academic advisor till you have passed the PhD candidacy exam, at which time the chair of your candidacy exam committee becomes your advisor and the supervisor of your PhD dissertation.

b) Initial Advisement

Advisement begins during 'Duty Week' (the week before classes start) of your first semester, when you will be scheduled to meet with your academic advisor. At this initial advisement session, your undergraduate (and graduate, if applicable) background and preparation will be carefully evaluated, and a tentative course curriculum for the first two years of graduate studies will be established and entered into your file. This is also an opportunity for you to discuss credits you might want to transfer from another institution, as well as any other questions you have about the program. You should leave the initial advisement session with a clear idea of what courses you will need to take in the first two years. You will continue to consult your academic advisor at least once per semester till you have passed the PhD candidacy exam.

c) Optics Committee on Studies

Optics students have an additional requirement (also see the Optics section of this handbook). You are required to form a Committee on Studies during your first semester in the Department. This Committee will consist of three faculty members, at least one of whom is from the Optics faculty. Once the Committee is established, you should notify Alisa. Plan to consult frequently with the Chairperson of your Committee. You are also required to meet at least once each semester with the full Committee to review your progress. One permanent member of the advising committee and one other optics faculty member will participate in your initial advisement session.

d) Leaves of Absence

A pre-candidacy graduate student who wishes to take a leave of absence for one or more academic-year semesters must consult his/her academic advisor, who will bring the

matter to the attention of the Graduate Committee. The following questions should be addressed before the leave of absence: (i) how the leave will impact the student's clock for the Preliminary Examination, the required core courses, and the Candidacy Exam; and (ii) how the leave will impact any departmental commitment to financial aid. Decisions on these questions must be reduced to writing and placed in the student's file before the leave begins. During the leave, the student must contact his/her academic advisor at least once per semester to keep the department abreast of any change in plans. Please note that according to OGS rules, a student who has not enrolled for three consecutive semesters (including the summer session) must apply for re-admission to the graduate program.

e) Dealing with Problems

Should a student encounter serious problems that impact his/her academic standing or progress, these should be brought to the attention first of the student's academic advisor, then of the Chair of the Graduate Committee and the Associate Chair for Graduate Affairs, and ultimately the Department Chair.

IX. Academic Requirements for Graduate Degrees in Physics

Preliminary Examination

Students entering the MS or PhD programs in Physics should have an undergraduate degree in Physics or its equivalent. Ideally, their undergraduate curriculum should have included courses in the four "core subjects" exemplified by the following UNM upper-division courses in Physics (the authors of some typical textbooks used here at UNM are shown):

- Thermodynamics/Statistical-Mechanics (Physics 301): Stowe; Kittel
- Classical Mechanics (Physics 303-304): Marion/Thornton; Symon
- Electricity and Magnetism (Physics 405-406): Griffiths
- Quantum Mechanics (Physics 491-492): Liboff; Townsend; Goswami

The format of the Preliminary Examination and the requirements for passing are given here. The requirements for passing at the Master's and PhD levels are repeated below as part of the MS and PhD degree requirements.

- The Preliminary Examination consists of **4 sections**, each of which is a written exam in one of the four core subjects listed above. The level of the exams is that of the upper-division undergraduate courses and texts given above.
- There are two sittings of the Preliminary Examination each year, one in January and one in August, both during Duty Week (the week immediately preceding the start of classes).
- At each sitting, a student can take any number of exam sections. A sitting at which a student takes a particular section is called a chance on that section.

- A student must complete the Preliminary Examination at the appropriate level, Master's or PhD, by the sixth consecutive sitting after entry into the program (i.e., by the beginning of the student's sixth semester). These six sittings include the initial sitting on entry into the program. Within these six sittings, there is no restriction on the number of chances on each section.
- A PhD student must pass two sections by the fourth sitting (i.e., by the beginning of the student's fourth semester), three sections by the fifth sitting, and must pass all of four sections by the sixth sitting. The PhD level of passing on each section is a grade of 60%.
- A non-thesis Master's student must pass two sections by the fourth sitting (i.e., by the beginning of the fourth semester), and must pass three of the four sections by the fifth sitting. The Master's level of passing on each section is a grade of 50%. Thesis-option Master's students are not required to take the Preliminary Examination.
- A PhD student who enters the program with a Master's degree and who has taken a comparable set of exams at another institution can petition the Graduate Committee to waive the entire Preliminary Examination, or sections thereof.
- A student can request re-grading of any section of the Preliminary Examination by submitting the exam and a written appeal to an Academic Advisor (who will forward the request to the Graduate Exam Committee) within one week of the return of the graded exams.

Timetable for the Preliminary Examination (any number of sections can be taken at each sitting)

	PhD-Physics	non-thesis MS-Physics	thesis-option MS-Physics
1st sitting (Duty Week, Semester 1)	No requirement	No requirement	<i>Not required</i>
2nd sitting (Duty Week, Semester 2)	No requirement	No requirement	<i>to take</i>
3rd sitting (Duty Week, Semester 3)	No requirement	No requirement	<i>the</i>
4th sitting (Duty Week, Semester 4)	Pass 2 sections at PhD (60%) level	Pass 2 sections at Master's (50%) level	<i>Preliminary</i>
5th sitting (Duty Week, Semester 5)	Pass 3 sections at PhD (60%) level	Pass 3 sections at Master's (50%) level	<i>Examination</i>
6th sitting (Duty Week, Semester 6)	Pass all 4 sections at PhD (60%) level		

Previous Exams: [Thermo/Statistical-Mechanics](#) [Classical Mechanics](#) [Electricity and Magnetism](#) [Quantum Mechanics](#)

MS in Physics Requirements

To remain in good academic standing, a graduate student must maintain a cumulative grade-point average of at least 3.0 in all courses taken for graduate credit after admission to a graduate degree program at the University of New Mexico.

1) Thesis and Non-Thesis Options

Plan I - Thesis Option:

- The Preliminary Examination is not required for the thesis option.
- At least 24 semester hours of graduate coursework in physics and mathematics are required, together with at least 6 hours of Master's Thesis (Physics 599).
- Defense of a written thesis serves as a final examination.

Plan II - Non-Thesis Option:

- A non-thesis Master's student must pass 2 sections of the Preliminary Examination by the fourth sitting after entry into the program and must pass 3 sections by the fifth sitting. The Master's level of passing on each section is a grade of 50%.
- 32 semester hours of graduate coursework in physics and mathematics must be taken. At least 4 of the 32 hours must be in graded problems or research courses (Physics 552 or 650).

2) Core Course Requirements

- 503 Classical Mechanics I
- 505 Statistical Mechanics and Thermodynamics
- 511 Electrodynamics I
- 521 Quantum Mechanics I
- ... and if the following courses (or their equivalents) have not been taken elsewhere,
 - 466/467 Methods of Theoretical Physics I/II
 - 493 Contemporary Physics Lab

A grade of **B-** or above is required in each core course. A Program of Studies can be submitted to OGS after the student has completed a minimum of 12 hours of graduate courses in graduate status. It must, however, be submitted to OGS by the following deadlines: March 1 for Summer graduation, July 1 for Fall graduation, October 1 for Spring graduation.

PhD in Physics Requirements

1) Preliminary Examination

After entry into the graduate program a PhD student in Physics must pass 2 sections of the Preliminary Examination by the fourth sitting, 3 sections of the Preliminary Examination by the fifth sitting, and must pass all 4 sections by the sixth sitting. The PhD level of passing on each section is a grade of 60%.

2) Course Requirements

To remain in good academic standing, a graduate student must maintain a cumulative grade-point average of at least 3.0 in all courses taken for graduate credit after admission to a graduate degree program at the University of New Mexico.

2a) Core Course Requirements.

- 466 Methods of Theoretical Physics I
- 503 Classical Mechanics I
- 505 Statistical Mechanics and Thermodynamics
- 511 Electrodynamics I
- 521 Quantum Mechanics I
- 522 Quantum Mechanics II or 537 Advanced Astrophysics II
- ... and if the following course (or its equivalent) has not been taken elsewhere,
 - 493 Contemporary Physics Lab

A grade of **B-** or above is required in each core course. A PhD student must maintain progress through the five mandatory core courses (466, 503, 505, 511, 521, and 522 or 537) at the following minimal rate:

End of Semester 1	No requirement
End of Semester 2	No requirement
End of Semester 3	2 core courses completed
End of Semester 4	3 core courses completed
End of Semester 5	4 core courses completed
End of Semester 6	all 6 core courses completed

2b) Elective Course Requirements. Four advanced graduate courses. All regular (three-hour) 400-level courses that are available for graduate credit for P&A students and all regular (three-hour) 500-level courses are eligible as electives, except 406, 491/492, and courses taken to satisfy the core-course requirements for the Physics PhD. Different

courses taken as Advanced Topics in Optics (569) or Advanced Topics in Physics and Astronomy (581) count as different electives.

2c) Seminar Course Requirements.

- Overview of Research in PandA (under Physics 501)
- One semester of Colloquium (under Physics 500)
- Two other, different advanced one-hour research seminars (under Physics 500 or 501), in each of which an oral presentation is required

3) The Candidacy Exam (which also serves as the "Comprehensive Exam" in OGS rules/terms)

After passing the Preliminary Examination and completing the core and elective course requirements, a PhD student's next task is to find a potential dissertation supervisor and to begin exploratory research with that faculty member. After about a year of initial exploratory research, the student is generally prepared to advance to doctoral candidacy by taking and passing the Candidacy Exam (formerly Dissertation Proposal Defense), which also serves as the Comprehensive Exam in OGS rules. The faculty member who has supervised the student's initial research is the Chair of the Candidacy Exam Committee and becomes the student's dissertation supervisor upon successful completion of the exam. Please note that the student's Academic Advisor continues to advise the student on all academic matters until the student has passed the Candidacy Exam.

The Candidacy Exam is an oral examination to ensure a student's readiness to enter into research and to demonstrate his/her proficiency in graduate-level physics in his/her subdiscipline.

- The Candidacy Exam Committee consists of four members:
 - A Chair, who has supervised the student's initial research and who becomes the student's dissertation supervisor upon successful completion of this exam;
 - Two members chosen in consultation with the Committee Chair;
 - A fourth "outside" member appointed by the Chair of the Graduate Committee. The role of the outside member is to ensure a department-wide standard of PhD qualification. Since this outside member is not meant to be an expert in the candidate's subdiscipline, it is essential that the student demonstrate a clear understanding of how his/her research fits into the broader context of physics/astronomy.
- The candidate gives a presentation of about one hour that consists of (i) a description of the initial research project and (ii) a brief description of the research project(s) planned for the PhD dissertation. The presentation is followed by a question-and-answer session wherein the student is expected to demonstrate advanced knowledge in the subdiscipline of the proposed dissertation, at a level determined by the Committee.

- A student must attempt the Candidacy Exam before the start of his/her seventh semester. In the case of failure, the student must make a second attempt and pass before the end of the eighth semester.
- A student can petition the Graduate Committee for an extension of the deadlines for the Candidacy Exam on the grounds of special, extenuating circumstances.
- The student is required to have the candidacy forms completed at the time of the candidacy exam and to provide them to the Coordinator for Program Advisement, Alisa Gibson, immediately following the successful completion of the exam.

Important reminders regarding UNM (OGS) requirements in order to advance to doctoral candidacy: To advance to candidacy, a student must submit an Application for Candidacy to OGS. The Application for Candidacy must list at least 18 post-Master's credit hours, exclusive of dissertation, earned in courses (>500) taken at UNM. The student is required to file the Dissertation Committee form with OGS immediately after admission to candidacy by the Department.

4) The PhD Dissertation Defense: See [OGS](#) for official rules.

Overall Schedule and Deadlines for Physics PhD Students

	Preliminary Examination	Core Courses	Candidacy Examination	Dissertation Defense
End of Semester 3		2 courses completed		
Beginning of Semester 4	2 sections passed			
End of Semester 4		3 courses completed		
Beginning of Semester 5	3 sections passed			
End of Semester 5		4 courses completed		
Beginning of Semester 6	4 sections passed			
End of Semester 6		5 courses completed		
Beginning of Semester 7			Candidacy Exam	

			attempted	
End of Semester 8			Candidacy Exam passed	
End of Semester 10-12				Suggested dissertation defense date
Candidacy + 5 years				OGS deadline for dissertation defense

X. The Optical Sciences Program

The Optical Sciences PhD program is a joint Physics & Astronomy-Electrical & Computer Engineering program approved by the Board of Regents in 1983. It has recently joined the distinguished Western Regional Graduate Program (WRGP) umbrella of programs that are available to qualified residents of participating western states at the resident tuition rate. The Optical Sciences and Engineering MS program has been approved to be offered since Fall 2002.

Faculty Advisement

Optics students will be advised once each semester by a member of the Optics Graduate Committee. The initial advisement session will be carried out by Wolfgang Rudolph for students enrolled through the Department of Physics & Astronomy, and by Marek Osinski for students who are enrolled through EECE.

The Qualifying Exam and Candidacy Exam (formerly Dissertation Proposal)

After passing the OSE Qualifying Exam, the student is expected to either obtain a dissertation research problem from a faculty member, or to formulate an independent dissertation proposal. The student should present this dissertation proposal to his or her Dissertation Committee as soon as possible, but no later than one year after the date of passing the Qualifying Exam. At least two members of the Dissertation Committee, including the Chair, should be Optics faculty. If the dissertation proposal is deemed adequate as a starting point for a PhD dissertation, then the student can formally advance to candidacy and begin dissertation work. (See [new Qualifying Exam format, schedule, and rules](#), eff. 2006.)

The Dissertation Defense

A satisfactory dissertation must be submitted to the individual members of the

