

UNIVERSITY POLICIES & PROCEDURES

For all other **University Policies & Procedures**, please visit: <http://www.montana.edu/policy/> Here you will find MSU policies relating to everything from Academic Affairs to Technology Transfer. You are advised to pay particular attention to all policies listed under Student Affairs, and otherwise familiarize yourself with all other policies that are available to you here.

GRADUATE PROGRAMS IN PHYSICS

The Department of Physics grants the degrees Master of Science and Doctor of Philosophy. The general requirements for these degrees as outlined at <http://www.montana.edu/gradschool/>, the Graduate School's webpage, apply. Every student should examine this site and be familiar with its requirements.

The following supplements the Graduate School's requirements and policies which apply specifically to degrees granted by the Department of Physics. In exceptional cases, departmental requirements, prerequisites, and time limits may be adjusted. Such exceptions require consent of the student's Graduate Committee and the Department Head in advance.

First year graduate students are required to register for a Fall Semester 1-credit teaching seminar (PHSX 594-01), and a 1-credit research seminar (PHSX 594-15) in Spring term designed to acquaint the students with the various research areas in the department. These seminars will be presented by persons active in those areas and are designed to aid a student in identifying the particular area or areas he/she would like to pursue. Students are urged to enroll in other seminars of their choice to obtain more in-depth knowledge of particular areas.

Graduate students who are not Montana residents should take steps to become legal residents of the State of Montana, to avoid paying nonresident fees in subsequent years. These students should register for a maximum of 6 credits per semester in the year (probably, their 3rd or 4th year) that they plan to establish residency.

MASTER'S DEGREES

The Department of Physics grants the Master of Science Degree under two options: Plan A (thesis required), and Plan B (without thesis).

PLAN A REQUIREMENTS

1. Course Requirements

A minimum of 20 credits of acceptable course work is required, which shall include the following:

Physics 594	Teaching Seminar (see above)	1 credit
Physics 594	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506	Quantum Mechanics I	3 credits
Physics 519	Electromagnetic Theory I	3 credits
Physics 566	Mathematical Physics	3 credits
Electives	see comment below	<u>6 credits</u>
		20 credits

2. Thesis Requirements

An acceptable thesis and at least 10 credits of Physics 590 are required.

3. Examinations

A written Comprehensive Examination is required. A Final Oral Examination is also required, covering the thesis and related areas.

PLAN B REQUIREMENTS

1. Course Requirements

A minimum of 30 credits of acceptable course work is required, which shall be distributed as follows:

Physics 594	Teaching Seminar (see above)	1 credit
Physics 594	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506 & 507	Quantum Mechanics I & II	6 credits
Physics 519 & 520	Electromagnetic Theory I & II	6 credits
Physics 566	Mathematical Physics	3 credits
Electives	see comment below	<u>10 credits</u>
		30 credits

2. Thesis Requirements – None

3. Examinations

A written Comprehensive Examination is required.

DOCTORAL DEGREE

Course Requirements

A minimum of 40 credits of acceptable course work is required, which shall include the following:

Physics 594	Teaching Seminar (see above)	1 credit
Physics 594	Research Introduction Seminar (see above)	1 credit
Physics 501	Advanced Classical Mechanics	3 credits
Physics 506 & 507	Quantum Mechanics I & II	6 credits
Physics 519 & 520	Electromagnetic Theory I & II	6 credits
Physics 535	Statistical Mechanics	3 credits
Physics 566 & 567	Mathematical Physics I & II	6 credits
Electives	see comment below	<u>14 credits</u>
		40 credits

1. Thesis Requirement

An acceptable thesis is required. A minimum of 20 credits of Physics 690 is required in addition to the courses listed above.

2. Examinations

Written and oral Comprehensive Examinations are required as is a Final Oral Examination covering the thesis and related areas.

ELECTIVES

All elective courses must be approved by the student's Graduate Committee and the Physics Department Head. This approval will ensure that the electives represent a coherent block of study of substantial relevance to Physics.

The following limitations normally apply to Elective Courses which may be listed on the Graduate Program for the M.S. or Ph.D. degree in Physics:

- A. No more than half of the Elective credits in the above Course Requirements may be at the 400 level in a student's Graduate Program for any graduate degree in Physics. The remaining Elective credits must be at the 500 level.
- B. The Electives will include courses in Physics and minor or supporting fields. At least half of the elective credits must be in Physics.
- C. Physics 461, 490, 492, 494, 589, 590, 689, 690 cannot be used as Electives in any Physics Graduate Program.
- D. Physics 592 (Individual Problems) is allowed as an Elective to a maximum of 3 credits for an M.S. Program and 6 credits for a Ph.D. Program. These credits must be letter graded.
- E. No more than 1 credit of non-required, pass/fail seminar courses are applicable as Electives in any Physics Graduate Program.
- F. No more than 3 pass/fail credits can be included in any Physics Graduate Program.
- G. Only 10 course-work credits must be taken beyond a M.S. enroute or continuing M.S., toward the Ph.D.

GRADUATE EXAMINATIONS

One **written** examination is given every year in the last half of August. It serves both as the M.S. Comprehensive Examination and as part of the Ph.D. Comprehensive Examination. The Ph.D. Comprehensive Examination also includes an oral examination. A Final Examination on the thesis and related topics is required for the Plan A M.S. and Ph.D. degrees.

All students must take the written examination within one year of entering. The results of the written examination may be applied to both the M.S. and Ph.D. programs. The written examination may be repeated once, the next time it is offered. Students must select an M.S. or Ph.D. committee and file the appropriate program form during the Spring Semester before taking this examination.

Postponement of the written examination is granted only in exceptional cases. Requests for postponement must be submitted to the Graduate Committee no later than April 1st by both the student and the advisor.

For both the Ph.D. and Plan A M.S. degrees, a final **oral** examination is conducted by the student's Graduate Committee. This examination takes place after the thesis has been submitted and covers the thesis and related topics.

M.S. COMPREHENSIVE EXAMINATION

A student attempting to obtain the M.S. degree is allowed two attempts to pass this written examination at the M.S. Comprehensive level.

A student who has passed the Ph.D. written Comprehensive Examination will be deemed to have passed the M.S. Comprehensive Examination.

PH.D. COMPREHENSIVE EXAMINATION

The written and oral portions of the Ph.D. Comprehensive Examination are considered separate examinations, and each must be passed separately.

The written Comprehensive Examination is a test of physics principles and their comprehension and application in solving a carefully chosen set of problems. It is a test of principles, which any physics graduate student embarking on advanced coursework and thesis research must know and be able to apply. The written examination consists of ten problems, drawn from typical undergraduate course work and from the first-year graduate core courses including: quantum mechanics, electricity and magnetism, classical mechanics, mathematical methods, statistical mechanics and thermodynamics.

The oral portion of the Ph.D. Comprehensive Examination will be administered by the student's Ph.D. committee. Students pursuing a Ph.D. must take the 2-hour oral examination within the fall semester immediately following the written exam. The student's Ph.D. committee will identify the topic (new to the student) and the student will have two weeks to prepare a 30-minute presentation, to be given at the beginning of the oral portion of the Ph.D. Comprehensive Examination. The talk will be followed by questions on the talk and other topics. Committee members must participate in the oral examination. If failed, the oral examination may be repeated once, six to nine months later. (Revised 6/2017).

The Physics Department administers its comprehensive exam in two parts. A written examination on general Physics principles is followed by an oral examination administered by the student's committee. According to the Degree Requirements of the Graduate School, the results of any department's comprehensive examination "[are] valid for five (5)* years from the term of successful completion." When the successful results of a student's Physics comprehensive exam are deemed to have lapsed, the student's graduate committee will administer an ad hoc re-examination. This will take the form of an oral exam by the entire committee and will serve to re-validate the results of the entire Physics comprehensive examination. The content of the exam will be set by the committee, and may focus on topics relevant to the student's thesis research. The oral exam may be counted as the annual meeting of the student's committee required by the Physics Department. If it occurs, it must occur before the student schedules a thesis defense and a passing result in the re-examination is required prior to scheduling the thesis defense.

*The Physics Department has an exception to this policy that allows validation for six (6) years from the term of successful completion- (per Dr. Karlene Hoo, Graduate School, 2/13/15).

PHYSICS DEPARTMENT FINANCIAL AID GUIDELINES

Most students admitted to advanced degree programs in the Physics Department are awarded financial aid, in the form of research and teaching assistantships, fellowships, and fee waivers. To receive financial aid, a student must satisfy the requirements of the Graduate School as listed on their webpage, as well as requirements of the Physics Department given below. Satisfaction of these requirements does not guarantee financial aid, although it is the policy of the Physics Department to support as many qualified graduate students as permitted by the available resources. Limited financial assistance is offered in the summer. For foreign students, continuation of financial aid beyond the first year is contingent upon satisfactory performance in spoken English as well.

CREDIT REQUIREMENTS

Students receiving financial aid must be registered for a minimum of 9 credits during the academic year, unless instructed otherwise by the Department Head. Exception: during the year in which a student plans to establish residency, domestic students may register for 6 credits in order to earn state residency. This will typically occur during a student's 3rd or 4th academic year.

GRADE REQUIREMENTS

Financial aid may be revoked if a student's cumulative grade point average (GPA) falls below 3.0; graduate standing may also be removed in this case (see webpage that follows). http://www.montana.edu/gradschool/policy/grades_academicstanding.html

The Department of Physics defines a passing grade for required graduate level classes to be a B- or better. A student receiving a C+ or lower is considered to have failed the required class and must retake the class when it is next offered. Questions regarding this policy should be brought to the Department Head. (Revised 11/15)

M.S. CANDIDATES

Candidates for the degree of M.S. in Physics will generally be granted a maximum of two years of financial aid including summers. Note that all specific course requirements for this degree can be satisfied in one year. Exception: students selecting the Plan A (thesis) option may apply for research assistantships for up to one academic year beyond the second year of study; generally, teaching assistantships will not be awarded after the second year.

P.h.D. CANDIDATES

Financial aid will be continued beyond two years only if the written Ph.D. Comprehensive Exam is passed at the Ph.D. level by the second attempt.

MANDATORY ANNUAL MEETINGS WITH THE GRADUATE COMMITTEE The Department of Physics requires senior graduate students to hold annual meetings with their graduate committee to discuss progress and plans for completing their Ph.D. thesis. These meetings are not intended to test the student's knowledge, but are simply intended to be a one-hour meeting to have the student and committee discuss progress on and plans for the thesis project. The meetings will also serve as a regular source of input from other members of the committee. The annual meetings are encouraged once a student joins a research group and has formed a Ph.D. committee, but become mandatory beginning with the Spring term of the student's fourth year in the program, that is prior to the student starting his/her 5th year. The student is responsible for scheduling the committee meeting. Attendance at the meeting for the two nonreaders on the committee is desired but not required. The three readers are required to attend the meeting, or an appropriate substitute found in rare conflicted cases. The grad student will discuss the planned timeline and progress on the thesis at the meeting. After the meeting, the thesis advisor will submit a summary letter to the department head, with copies to the student and other members of the committee, prior to the end of that spring semester. Failure to do this will delay initiation of the GTA or GRA appointment for the following Fall term. Questions regarding this policy should be brought to the Department Head.

TIME RESTRICTION FOR GTA SUPPORT This time restriction would apply to the ninth year after the student enters the program. For example, if a student enters the program in fall 2012, a time restriction would apply to GTA support for the fall semester of 2020. The department will normally not give GTA support to students beyond their eighth year in the graduate program. To request GTA support for semesters after the eighth year would require a letter from the graduate advisor to the Department Head describing the circumstances that justify the continued GTA support for the student. Moreover, the student could continue on GRA support or personal funds. Our hope is that the mandated annual meetings of the student and his/her committee will mean that the restriction on GTA support rarely comes into play. Questions regarding this policy should be brought to the Department Head.

Disclaimer: To the best of our knowledge, the information included herein is correct and up to date (6/28/17). Should you reference it in the future, please be sure to check our webpage at: www.physics.montana.edu for updates, changes, and additions. This document can be found in its entirety on the webpage and will note the date that any changes are made in the future.