



# **Graduate Student Handbook**

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Ph.D. (Dissertation) Program



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## I. Introduction

The Graduate College provides the basic structure and minimum degree requirements for all graduate programs at Arizona State University. However, the graduate degree programs are established and administered by individual departments according to the needs and standards of the various fields and professions. The Department of Physics has established both Master's and Ph.D. programs, which, in many aspects, have requirements that exceed the basic degree requirements of the Graduate College. These degree programs also have considerable flexibility to meet the varied needs, goals, and abilities of the students.

The formal policies governing the Department of Physics degree requirements can be found in the ASU *Graduate Catalog*. This *Handbook* provides overviews of the Department's programs and their requirements, along with many of the internal policies and practices. It does not establish a contractual relationship between students and the Department or University, but is intended to be used in conjunction with the *Graduate Catalog* to guide students in the steps necessary to complete a graduate degree in the Department. The Department reserves the right to change its internal operations and policies from time to time. Such changes will be communicated to the students promptly. The most current information may be obtained from the Director of Graduate Studies.

The faculty and staff of the Department are committed to providing a productive and pleasant environment for students pursuing graduate degrees, in both the academic and personal realms. Information, guidance, and advice are readily available on University and Departmental policies so that students may continue to meet degree requirements and timetables. Students may consult freely with their advisors, other members of the faculty, the Director of Graduate Studies, and the Department Chair in academic or personal matters that may impact their participation in the graduate program so that suitable and timely adjustments can be made whenever possible.

An overview of the Department's graduate degree programs is given in **Section II**. General policies applicable to all programs are given in **Sections III and IV**. Policies specific to the Ph.D. program are given in **Section V**. The remaining sections discuss issues and policies related to research, financial support, and Department resources. The basic steps for getting through the degree programs are listed in the Appendix. Students should familiarize themselves with all relevant sections of the Handbook. Cross-references between sections are also provided.

**Most information at ASU can now be found somewhere online.** For example:

Physics Graduate Program Website: <http://physics.asu.edu/graduate>

Physics Graduate Student Handbook: <http://physics.asu.edu/resources/student>

ASU Graduate Catalog: <http://catalog.asu.edu/>

ASU Graduate College Policies: [http://graduate.asu.edu/academic\\_policies.html](http://graduate.asu.edu/academic_policies.html)

ASU TA/RA Handbook: [http://asu.edu/graduate/files/TA\\_RA\\_Handbook\\_2008-2009.pdf](http://asu.edu/graduate/files/TA_RA_Handbook_2008-2009.pdf)

Physics Research Rotation Catalog: <http://physics.asu.edu/rotation/catalog>

## II. Overview Of PhD Degree Program

Primary information about the graduate degree programs in the Department may be found in the *ASU Graduate Catalog*, which has priority over Department policies in cases of direct conflict. This section provides an expanded discussion of the PhD program.

Ph.D. programs are designed for students of high ability who show promise for independent research. The aim of the programs is to prepare students for professional research careers in government, industrial or academic institutions, and for teaching at the university or college levels.

The intent of the Physics PhD is to provide a thorough course of instruction and research training/experience within the areas of professional interest of the faculty of the Department. A Physics PhD may incorporate courses from cognate fields (mathematics, chemistry, life sciences, engineering, etc.), as well as research done in collaboration with faculty from other relevant departments. However, it is understood that the major part of the program will be conducted within the Department of Physics. PhD advisors may be chosen from among the entire Physics Graduate Faculty ( <http://graduate.asu.edu/exploregraduatefaculty.html> ). This allows Physics students considerable latitude in designing an area of emphasis for their PhD studies, ranging through Biological Physics, Condensed Matter and Materials Physics, Physics Education, Subatomic Physics, and Astrophysics and beyond.

The program includes an appropriate set of courses, consisting of the prescribed “core courses” (see **Section V.1**) plus additional courses selected with approval of a Supervisory Committee (see **Sections III.3 and V.4**) chosen largely or solely from the faculty of the Department. A Comprehensive Examination (see **Sections V.6**), consisting of integrated written and oral exams, must be passed. A program of research is conducted under the auspices of the Department, supervised by a Departmental faculty member and a Supervisory Committee, and a dissertation (see **Section IV.10**) is prepared. This dissertation must make an original contribution to the field as a result of independent work, suitable for publication in a reputable physics journal. A final oral examination covering, but not limited to, the subject of the dissertation is also required.

A Master's degree is not required for entry into or completion of a Ph.D. program. Since it has its own research and thesis requirements, a M.S. degree program may delay completion of a Ph.D. degree.

### III. Management Of Graduate Program

The graduate programs in Physics are formally administered by the Director of Graduate Studies. Policies specific to the programs are established by the Graduate Program Committee, or are recommended by the Committee to the Faculty of the Department. The immediate supervision of students is carried out by initial faculty advisors, or by the research advisors and degree Supervisory Committees.

Students should first seek guidance about policies and other issues related to the graduate program from their initial or research advisors. The Director will also provide additional clarifications, assist students in bringing matters to the Graduate Program Committee, and resolve problems or disputes. The Director reports to the Chair of the Department, and the Chair is also available for consultation or advice whenever needed.

#### **1. Graduate Program Committee**

Members of the Graduate Program Committee are appointed by the Department Chair upon the recommendation of the Department Committee on Committees. In addition to the faculty members, the Committee contains two graduate student members to be appointed by the Chair from among candidates recommended by the Graduate Program Committee (**see Section III.4**). The student members may participate in and vote on all policy matters of the Committee apart from those issues that involve privileged student or university materials or subjects.

The Committee serves as a body for reviewing, recommending, and establishing policies with respect to the graduate programs in Physics. It considers and decides upon all petitions for waivers of policy matters, time extensions, etc. It conducts a review of the progress of all students each year, and defines the meaning of “satisfactory and timely progress” (**see Section IV.2**). It recommends students for Teaching Assistant/Associate (TA) appointments, subject to Department consent, Summer Research Assistant/Associate (RA) awards, and various scholarship awards as may be appropriate (**see Sections IV.6 and VII**). The Committee also assists with the recruitment of new graduate students. The Director of Graduate Studies is normally the Chair of the Committee, and serves as the liaison between the students and the Committee.

#### **2. Initial Graduate Advisors**

The first-semester PHY-500 mentor of each student becomes their Initial Graduate Advisor (IGA). These faculty members are acquainted with most aspects of the graduate programs and can provide advice with respect to the selection of courses during the first year or two of a student's career. Registration does not require the formal approval of the IGA, but students are strongly urged to meet with their IGA before the beginning of each semester in order to review their progress and status and to establish their curriculum for that semester. The IGA's can also often provide valuable support and assistance with noncurricular problems that may arise.

### **3. Supervisory Committee**

Once a student has chosen a research area of interest, an agreement must be reached with a faculty member to serve as the student's principal research advisor and Chair (or co-Chairs) of his/her Graduate Supervisory Committee. Since the Chair's name is required for the interactive Plan of Study (iPOS) entry process, this person must be identified and must agree to serve before the student files the iPOS. However, the remainder of the committee needed not have been selected at that time. In the latter case the student is required to complete a committee change, again via the iPOS, at a later date but well before the thesis defense. A Ph.D. Committee has generally has five members (**selected as described in Section V.4**). The Chair, and normally most of the Committee, must be from the Physics Graduate Faculty. In the case of interdisciplinary programs, a member from another Department may serve as co-Chair of the Supervisory Committee but must be approved to do so through the usual procedures of the Department of Physics and the Graduate College.

The Supervisory Committee assists the student in developing a suitable Plan of Study (POS). For Ph.D. students, the Committee also administers the thesis prospectus. All committees provide general and specific supervision of the student's research program and development, leading to a thesis or dissertation. Finally, the Committee reads and critiques the written thesis and administers the oral thesis defense.

### **4. Graduate Student Representatives on Graduate Program Committee**

The Graduate Program Committee includes two current graduate students of the Department of Physics, serving one-year terms. Early in the academic year, the Graduate Program Committee will request applicants to fill these two slots from among the current graduate students. The Graduate Program Committee will consider the applicants and pass its recommendations to the Department Chair, who will appoint two student representatives. The student members will participate in all committee matters with the exception of those that involve privileged student or university information.

## IV. General Program Requirements

The Graduate Program Committee and the Faculty of the Department of Physics have established specific policies that serve to implement the graduate programs. This section describes these policies, as well as those of general nature derived from the Graduate College.

### 1. Academic Performance Requirements

To be eligible for a degree in the Graduate College, a Grade Point Average (GPA) of 3.00 or higher must be achieved separately in:

- all courses numbered 500 or higher that appear on the transcript; and
- all courses (including 400-level courses) that appear on the Plan of Study.

To obtain graduate credit, the student must receive a grade of “C” (2.0) or higher in every course that is required for their degree program. Any required courses with grades of “D” or “E” must be repeated, and both the original grade and the new grade will be included in GPA calculations.

In addition, the Department of Physics requires that a GPA of 3.00 or higher must be achieved for all courses (including up to 6 hours of 400-level courses) other than those designated as “research.”

If a cumulative GPA of 3.00 or higher is not maintained according to any of these requirements, the Graduate Program Committee will place the student on Academic Probation, and advise the student on means whereby such academic probation may be lifted.

### 2. Satisfactory and Timely Progress

Each student is expected to make satisfactory and timely progress in the chosen degree program as set out in **Sections V and VI below**. It is rare for a student to complete a Ph.D. in less than four years from the date of enrollment. Students who take more than six years will raise considerable concern.

For the PhD program, a student should:

- Complete the core courses within the first year;
- Attempt the comprehensive examination on schedule;
- Make timely progression into research activity; prepare thesis prospectus; and
- Prepare and defend a dissertation within the prescribed time limits.

For the MS program, a student should:

- Complete the bulk of recommended courses within the first year;
- Make timely progression into research activity and thesis work; and
- Prepare and defend a thesis within the prescribed time limits.

### 3. Academic Integrity - Dishonesty

The Department of Physics will not tolerate academic dishonesty of any kind. When engaged in coursework, research, and examinations (specifically the written comprehensive exam), a student is expected to cite ALL references properly and not to use sections of anyone else's material inappropriately. This includes web sites, journals, textbooks, proposals, class notes,

and any published materials used in research. If academic dishonesty is uncovered, especially cheating and plagiarism, appropriate actions will be taken, which may even include dismissal from the program. The faculty members always hope to avoid such sanctions, but it is the student's responsibility to understand the issues involved. If you are unclear about any of the terms described in this section, or how they might apply to your work, always discuss the topic further with your advisor and/or course professor.

The leaflet "Addressing Student Course Concerns and Grievances" outlines the department policies in this general area. This leaflet will be distributed to incoming graduate students, and is available at the Main Physics office or the Graduate Coordinator's office, Bateman Physical Sciences Building, F wing, 4th floor.

#### **4. Annual Evaluation**

An evaluation of the progress of all graduate students is made during the Spring Semester of each year by the Graduate Program Committee. Students whose progress is considered to be unsatisfactory are placed on probation. Failure by a student to amend the unsatisfactory aspect may lead to removal from the program.

#### **5. Registration Requirements**

All Physics graduate students receiving a Teaching or Research Assistantship (whether funded by a grant or by University funds) are required to register for a minimum of 9 semester hours of approved graduate credit each semester. All physics graduate students receiving a Graduate Associateship (Teaching or Research) must register for a minimum of 12 credit hours each semester. Normally, no more than 3 credit hours for Assistants or 6 credit hours for Associateships may be for courses outside the Department, except for students in interdisciplinary programs where the courses will be part of a Plan of Study.

All graduate students doing research, preparing theses or dissertations, taking comprehensive examinations, or who otherwise are making use of University facilities or faculty time, must be registered for a minimum of one hour for credit (not audit). The course load of any graduate student must not exceed 15 credit hours (including audited courses), or 12 hours for Graduate Assistants/Associates.

#### **6. Financial Support**

Students may be admitted to the graduate program with financial support as Graduate Assistants (**see Section VII**). Students who have met the requirements of candidacy for the Ph.D. degree are eligible to be Graduate Associates (**see Section VII**). Graduate Assistants, whether Teaching Assistants or Research Assistants, all receive the same financial support. Graduate Associates receive a stipend at least 10% higher than that of graduate Assistants.

Continued financial support is contingent on satisfactory performance in course work, timely completion of examinations, teaching abilities (for Teaching Assistants/Associates), and availability of funds. A student must petition the Graduate Program Committee in writing for approval to extend the period of financial support and the student's faculty advisor must support the petition. The Department will not normally assume a the financial obligation at such time from its own funds. The period for which a Ph.D. candidate may receive financial support through the Department (as a TA or RA) is not to exceed six years.

Teaching Assistantships are guaranteed only for first-year students. The number of Teaching Assistantships is limited, and priority is given to first and second-year students.

## **7. Transfer of Credits**

Transfer credits are those accepted from another institution for inclusion on an ASU POS. The Graduate College places restrictions on number and type of credits that can be transferred. At the time of admission of a new student, the Graduate Program Committee can make recommendations about courses that will be accepted for transfer credit.

Transfer credit hours may not exceed 20% of the total credit hours for a master's degree nor 12 hours for a doctoral degree, and the credits must have been earned in graduate level courses with grades equivalent to "A" or "B." Any credits that counted towards the minimum requirements of a previously-awarded degree may not be transferred towards the minimum requirements of an ASU degree. Within this restriction, up to 30 hours from a previous Master's degree may be transferred. At least 54 hours of doctoral degree credits, including exactly 12 hours of PHY-799 Dissertation, must be obtained at ASU after admission to the doctoral program. In the special case of a student accompanying a newly hired faculty member to ASU, the student may list in the POS an additional 18 hours that have not been used in another degree program. Upon listing these 18 hours on the iPOS, the student will be prompted to complete a petition, in which they should provide the name and start date of the associated faculty member.

Graduate courses taken at ASU or elsewhere prior to acceptance into a graduate program (determined by the date of the acceptance letter) are called pre-admission credits. A maximum of 9 pre-admission credits may be included on the POS for a master's degree, and 12 pre-admission credits on the POS for a doctoral degree.

Transfer and pre-admission credits must be approved by the Graduate College and by either the student's Supervisory Committee or the Graduate Program Committee. Additional restrictions apply to a Master's in Passing degree.

The results of PhD comprehensive exams taken at other institutions cannot be transferred to ASU. To receive an ASU PhD, the student must complete comprehensive exams at ASU.

## **8. Omnibus Courses**

The Graduate Catalog lists several generic or "omnibus" courses that can be included in the schedule of classes. The 500-level courses (*e.g.*, PHY-592 and PHY-599) are intended for students in a master's degree program, or for students who have not yet passed their Ph.D. comprehensive exams. The 700-level courses (*e.g.*, PHY-792 and PHY-799) are intended for Ph.D. students, particularly those who have passed the comprehensives. No more and no less than 12 credit hours of PHY-799 may be included on the iPOS.

Other omnibus courses that are usually included in the schedule of classes are PHY 500/700 (Research Methods), PHY-590/790 (Reading & Conference), PHY 591 (Seminar), and PHY-595/795 (Continuing Registration). PHY-598 Special Topics courses may also be offered periodically.

## 9. Switching Degree Programs

Students may enter the doctoral program only by direct application to that program. The Graduate College does not allow a student to switch from a master's program to a doctoral program even within a given department. Students may switch in the opposite direction - from doctoral program to master's program - provided they remain within the same department and provided they have not already undergone a change in their current admission.

To switch to a graduate program outside of the Department of Physics, students must file a new application with the Graduate College and follow the standard admission procedures. A student who moves out of the Physics department in this fashion will be removed from the Physics program, will lose his or her Physics assistantship, and must re-apply to the Physics graduate program if he/she subsequently desires to return to the Department of Physics.

During their first year of graduate study at ASU, students shall be permitted to switch freely from the doctoral to the master's program simply by contacting the Graduate Coordinator. After the first year, applications to change programs shall be reviewed by the Graduate Program Committee, which will set time limits for completion of a written thesis and for financial assistance on a case-by-case basis. In any event, a student must always remain within the specified time limits from the original semester and year of admission, namely 6 years for the master's degree and 10 years for the doctoral degree.

## 10. Dissertation and Defense

After the research for a degree has been completed, it must be written and published as a thesis or dissertation. Normally the research leads to one or more published articles in well-known physics or astronomy journals as well.

Allowed formats of the dissertation are defined by the ASU Graduate College in the Format Manual, which must be followed very closely. Several formats have been programmed for various word-processing languages, and are available through the research groups. It is also good practice for students to familiarize themselves with the American Institute of Physics (AIP) Style Manual, which gives information on figure preparation, including size of lettering, to meet the standards of most scientific journals. The AIP Style Manual serves as a useful guide for ASU thesis preparation to the extent that it is compatible with ASU Format Manual. A thesis must be written in good English.

Upon completing all requirements, the student should apply for a formal Final Examination. This Examination has two parts: (i) Supervisory Committee members will read and approve the thesis (or, in many cases, ask for modifications), and (ii) the Committee will conduct a final oral examination (thesis defense). The Examination must be announced in ASU Insight and within the Department.

The Graduate College imposes stringent deadlines on submission of the thesis for format approval and on scheduling of the Final Examination (see **Section IV.11**). It is contingent upon the student to observe these deadlines. The Final Examination normally consists of a public seminar in which the student presents the thesis material and during which the audience may ask questions for clarification. After this initial discussion, the committee may excuse the public audience and proceed to a thorough examination of the details of the thesis. The

Committee may also examine the student's general knowledge of science. The Committee will then excuse the candidate and deliberate on its findings.

### **11. Deadlines**

Oral thesis defenses must be scheduled with the Graduate College at least 10 working days in advance of the defense date. Note that certain days during the academic year, as specified on the Graduate College website, are excluded as dates for oral defenses. Students are required to submit a complete copy of their thesis or dissertation to the Graduate College for format review at least 10 working days before the proposed date of the defense. Substantive format errors that require the thesis to be revised and resubmitted may force the oral defense to be rescheduled, with graduation possibly delayed by an entire semester. Specific graduation deadlines for each semester are published by the Graduate College on its website. Students who are approaching their degree completion should carefully consult those schedules. A student who completes all degree requirements prior to the first day of classes of a given semester or summer session will not be required to enroll for that semester or session in order to receive a degree at the next graduation exercise.

## V. Ph.D. Program Specifics And Chronology

### 1. Core Courses

A total of 18 hours of core Physics courses are required of all Physics students. The core courses should be completed within the first year of graduate study. All of them are for three semester hours each. Currently, they are:

PHY-500 Research Rotation I (Fall semester)  
PHY-521 Classical and Continuum Mechanics (Fall semester)  
PHY-541 Statistical Physics (Fall semester)  
PHY-500 Research Rotation II (Spring semester)  
PHY-531 Electrodynamics (Spring semester)  
PHY-576 Quantum Theory (Spring semester)

The research rotations must be taken with specific faculty advisors as requested by the student but assigned by the Graduate Program Committee. The two rotations must be in two different sub-areas of physics. Students will choose preferences from a list of rotation topics supplied by the Department. The Graduate Program Committee will allocate students to rotation topics, and will aim to give students their highest preferences, while not over-burdening individual faculty mentors.

### 2. Waivers of Core Courses

The Ph.D. graduate core curriculum, as delineated in the ASU Graduate Catalog, is an essential requirement of the Physics Ph.D. program, to be deviated from only in exceptional circumstances. All waivers of core course requirements must be approved by the Graduate Program Committee. Petitions for such waivers must come from the student's Supervisory Committee with a recommendation for approval. The petition must document clear evidence of equivalent course-work taken elsewhere and mastered at a high level of competence. Generally this will include: (1) the title, course number, instructor's name, syllabus or catalog description, and institution name of the equivalent course, (2) the name of the text(s) used in that course, and (3) an official transcript showing the grade received in the course.

### 3. Additional Courses

Additional course work beyond the core courses may be required as determined by the student's Thesis Advisor and Supervisory Committee and specified in the student's Plan of Study. Students should design their studies to complete all core course-work within their first year of graduate study and to be heavily engaged in research by their second year. In the second and higher years, graduate students should be taking only specialized courses, largely in their chosen area of emphasis, or Special Topics courses. Students are strongly advised to plan their programs carefully, seeking advice from advanced graduate students and faculty, and in close consultation with their Supervisory Committee.

Certain sub-fields of physics are particularly well represented among the research and teaching interests of the Department faculty. Examples of courses that students typically take for three such areas are given below.

*(a) Biophysics*

PHY 598 Special Topics - Introduction to Biophysics (typically Fall semester of second year)  
Specialized courses can and should include several courses outside the department.

*(b) Nanoscale and Materials Physics*

PHY 511-512: Materials Physics I and II

PHY-581 Quantum Theory of Solids I

PHY-582 Quantum Theory of Solids II

PHY/NAN-546 Surfaces and Thin Films

PHY/NAN-544 Introduction to Nanoscience

Specialized courses in Physics, Nanoscience, Electrical Engineering and School of Materials

*(c) Particle and Astrophysics*

PHY-567 Relativistic Quantum Mechanics and Field Theory

PHY-568 Particle Physics Phenomenology

PHY-462: Nuclear and Particle Physics

PHY-561 Nuclear Physics

PHY-569 The Standard Model and Beyond.

#### **4. Forming a Graduate Supervisory Committee**

Each student who is admitted to Physics graduate studies is assigned an Initial Graduate Advisor (IGA). Unless otherwise specified by the Graduate Program Director, the student's first-semester PHY-500 mentor serves as IGA and remains responsible for the student until the student selects a Dissertation Advisor and forms a Graduate Supervisory Committee.

Dissertation Advisor should be selected shortly after the student completes the six first-year core courses. In consultation with this advisor, the student forms a Supervisory Committee as follows: The student selects four members and notifies the Director of Graduate Studies in writing of these choices through submission of a "Supervisory Committee Nomination Form" (<http://phy.asu.edu/graduate/forms.php>). The Director provides two additional Graduate Faculty names to the student, of which the student selects one as a fifth member of the Committee. At his/her discretion the Graduate Coordinator may add additional members to the committee by repeating this same selection procedure. After the committee members have been selected and in consultation with them, the student enters an interactive Plan of Study (**iPOS, Appendix IV**). Selection of the committee need not be fully completed at the time of submission of the iPOS. It suffices that Dissertation Advisor has been identified and has agreed to serve. The approved members of the Supervisory Committee are entered as part of the iPOS submission.

#### **5. Elements of a Ph.D. Plan of Study**

Doctoral students must file an interactive Plan of Study (iPOS) before they have enrolled in 50 percent of the credit hours required for their degree program. The iPOS must be approved by the Graduate College prior to the comprehensive exam. To facilitate degree completion, most Physics doctoral students will therefore file their POS shortly after passing their six first-year courses (which the Graduate College considers to constitute "essentially completing" their doctoral coursework). Such an iPOS will accordingly list those six courses along with 12 credit hours of PHY-799 Dissertation and an adequate number of PHY-792 Research and other anticipated courses to meet minimum Graduate College requirements. The doctoral POS must be approved by the student's supervisory committee, by head of the academic unit, and by the

Graduate College Dean. It can be amended at any later date under the same approvals. Hence an initial iPOS can be submitted and approved even before the committee selection is fully complete, then modified in accord with the committee's wishes once the committee has been constituted.

The requirements for a degree are given in the ASU Graduate Catalog (<http://catalog.asu.edu/>). Requirements that apply most often are repeated here (for a complete list, consult the Graduate Catalog). A total of 84 credit hours must have been completed after admission to the doctoral degree program at ASU, although students may include up to 30 credit hours from a previously awarded master's degree (**see Section IV.7**). All courses in a doctoral student's approved Plan of Study must have a course number of 400 or higher, subject to the additional restriction that at most six credit hours of 400-level coursework can be included. Students must take and pass the *core courses* listed above, unless explicitly waived by the Graduate Program Committee. Each student's program of courses must be approved by the student's Supervisory Committee.

## 6. Comprehensive Exam

The written and oral comprehensive examinations will be taken, in an integrated form, at the beginning of the second year. Prior to taking the comprehensive exam, the Graduate College requires the interactive Plan of Study (iPOS) to be approved and the coursework listed in the POS to be "essentially completed." Successful completion of the six first-year courses meets the latter requirement. Students will choose one of their written reports from their two research rotations and expand it (usually over the summer while conducting summer research) into a professional-level report of about 20 pages covering a particular research topic. The report is due by July 31<sup>st</sup> for the August exam or December 31<sup>st</sup> for the January exam. The report will be expected to give broad background to the research area, a synthesis of relevant literature, and a discussion of more specific topics addressed by the student during their individual work in the research rotation. A three person examination committee (which is not related to the student's eventual thesis committee) will subsequently conduct an oral examination of the student. During this oral exam, the committee will gauge the student's understanding of more specialized topics in the research area in question and probe the student's grasp of broad fundamental physics. Students will be asked questions on fundamental physics covering the core areas of classical mechanics, electrodynamics, quantum mechanics, and statistical mechanics.

Failure in the comprehensive examinations is considered final unless the Supervisory Committee and the head of the academic unit recommend, and the Graduate College Dean approves, a reexamination. Only one reexamination is permitted and the Department of Physics requires that it be administered at the next possible opportunity (e.g., in January following an August failure). The Graduate College may withdraw a student from his/her degree program if the student's petition for re-examination is not approved, or if the student fails to successfully pass the retake of the comprehensive exam. Additional information is provided in **Appendix III**.

## 7. Thesis Prospectus

At the end of the second year or beginning of the third year, the student will present a thesis prospectus to their Supervisory Committee. The Supervisory Committee must be fully constituted by this time. Passing the prospectus confirms that the committee supports the aims and proposed content of the proposed thesis work. If the committee has strong concerns about

the proposed work, the student must work with their advisor to produce a new prospectus with a period of a few months.

### **8. Applying for Admission to Candidacy**

After passing the comprehensive examination, and thesis prospectus, a student should apply to the Graduate College for *admission to candidacy*. The results of the comprehensive examination and an interactive Plan of Study (iPOS) must be on file by that time. The student then performs the research that is the basis of the dissertation, writes the dissertation, and defends it. No more or less than 12 hours of PHY-799 must be taken in the semesters following the semester in which the student is admitted to candidacy. Thus, the application should be made as early as possible.

### **9. Dissertation and Defense**

See **Section IV.10** for details about the preparation of the dissertation and its oral defense.

### **10. Deadlines**

See **Section IV.11** for details about deadlines for the Ph.D. program.

## VI. Research

The Ph.D. degree in physics signifies that one is able to conduct independent research at a level that will be recognized by peers around the world. Courses and exams are preliminary to this activity, providing the student with some of the necessary tools, but the main elements of research are learned by “doing” under the supervision of an expert in the field. Sometime fairly early in a student's career, he or she must choose an area of research, an advisor, and a specific dissertation topic. These are the most important choices a student will make while in school. Following are some guidelines and tips for students to assist them in making the transition from courses and exams to research.

### 1. Getting Started

Students should begin to explore and define their research interests as early in their graduate careers as possible. To do so, they should:

- Study the Department brochure describing the research activities of the faculty.
- Talk with graduate students who are already involved with specific research projects and/or visit the research labs to see what is going on.
- Make appointments with professors to discuss their research activities. Most professors are delighted to talk about their own work, especially with students who show a marked interest. They will likely direct one to appropriate literature in the field, which may be read to assess possible interest.

### 2. Getting (and Keeping) RA support

Most students begin with TA support, and most end with RA support. However, professors are generally reluctant to start students on an RA too early in their careers, since they will be occupied with coursework and studying for exams. Some professors refuse to do so, particularly if they have enough strong students already in their programs. In order to maintain quality research programs, advisors will try to determine as quickly as possible the quality of match and the likelihood of success over the next several years when considering new students. The initial stages of research often involve small projects so that students begin to become familiar with the field and the faculty learns the capabilities of the students. A satisfactory relationship will normally lead to full RA support, including summers.

Once started on a RA, it is normally expected that the advisor will carry the student through to completion of the degree. However, the grant from which RA support is derived is normally subject to annual renewal and possible termination. In the case of termination, support might be found from another grant, which could shift the nature of the thesis research, or by reverting to a Department TA. It is always possible for a student to change from one research supervisor to another. However, since such changes will probably delay completion of the degree substantially, and bring the student up against the six-year limit of support, they should be done only after considerable thought and consultation.

## VII. Financial Support

The Department strives to ensure that every full-time physics graduate student who is making satisfactory progress will have a suitable source of support. Although most forms of support are treated as compensation for services rendered, the Department considers all financial support it provides as earmarked for the students' professional training. This view does not necessarily extend to other University offices or to the tax authorities. (The tax considerations of assistantships can be a complex subject.)

Teaching Assistantships/Associateships (TA's) and Research Assistantships/Associateships (RA's) are the normal means of support. These are restricted to students who are registered full-time in one of the graduate degree programs in Physics, and each carries a full waiver of tuition fees. They are not normally available to unclassified graduate students or to students who are in graduate degree programs with other departments.

Students who have completed at least 30 credit hours or who hold a Master's degree, who have passed the written and oral comprehensive examinations, and who have an approved Plan of Study for the Ph.D. degree may be appointed as Graduate Associates at the beginning of the next semester or Summer period with a stipend at least 10% greater than for Graduate Assistants. All Graduate Assistants must register for at least nine (9) hours of credit each semester. All Graduate Associates must register for at least twelve (12) hours of credit each semester, at least six (6) of which shall be for courses in the Department.

Various fellowships are occasionally available from Department programs. Information and application forms pertaining to scholarships offered by the Graduate College, and for fellowships offered by various agencies and institutions outside ASU can be obtained from the Graduate Coordinator in the Department, offices in the Graduate College, or the ASU office of financial aid.

**Maximum Time Limit.** The candidate must take the final oral examination in defense of the dissertation within five years after passing the comprehensive examinations. Any exception must be approved by the supervisory committee and the dean of the Graduate College and ordinarily involves repetition of the comprehensive examinations.

Support in the Summer includes TA's for the Summer Sessions, some Department-supported RA's, and RA's with research groups. Department policies limit all support to a maximum of six years. Students who wish to be supported beyond their sixth year must petition the Graduate Program Committee each semester for a waiver. All academic-year TA's and RA's have the same stipend, at a rate set by the College of Liberal Arts and Sciences.

Finally, many physics graduate students supplement their income by tutoring undergraduates. The Department maintains a list, updated each semester, of graduate students who are willing to be contacted by anyone in need of tutoring. The tutor and the tutee are free to negotiate their own fees. TA's are not permitted to tutor students in a class for which they have responsibilities.

**Note: the maximum permissible times are very long. You should aim to defend your thesis well before these time limits approach.** Your thesis does not get better by itself merely

with the passage of time, and combining thesis writing with full time work, after you have left the University, is not an ideal situation.

## **1. Teaching Assistantships/ Associateships**

Most physics recitation and laboratory sections are taught by TA's under faculty supervision. Other TA's serve as graders. A TA appointment helps the student to develop communication skills and to gain valuable teaching experience. It also provides an opportunity for the student to review basic physics material and to gain insights needed to deal well with the graduate courses and comprehensive exams.

The Department is allocated a certain number of TA positions each year by the College of Liberal Arts and Sciences. They are the typical means of support for entering graduate students and for students who are making satisfactory progress but whom have not yet selected a research supervisor. Such students are normally in their first or second years. Except for unusual circumstances, students should be working with a thesis or research supervisor after their second year, where an RA is the normal means of support. TA's can also be granted to senior students whose research supervisors do not have sufficient RA funding, and who are not yet past the six-year upper limit. Note, however, that TA support is subject to availability of funds, and priority will be given to first and second year students.

A regular TA assignment is expected to consume no more than 20 hours/week. The faculty member in charge of the course is responsible for all administrative aspects of the course, for assigning duties to the TA, and for guiding him or her with these duties. TA's do not have the authority to sign forms for students or to submit grades to the University. All teaching assistants are responsible for being present at all of their meetings and classes, and for grading assignments and homework fairly and in a timely fashion. Any difficulties a TA may have in satisfying any of the duties of an assignment until the final grades are submitted must be resolved in advance with the faculty member in charge. Issues that are not easily settled should be brought to the attention of the Director of Graduate Studies.

International students who do not speak English as a primary language are required by the University to pass a test of spoken English known as the SPEAK test before they are allowed to teach in front of a class. Currently the minimum scores on the SPEAK test are **50** for supervising a laboratory section and **55** for being a recitation instructor. The Department can set higher standards at any time. Students who have not met this requirement may serve as graders, and they must also take special classes to assist them in becoming certified for classroom instruction. A Teaching Assistantship will not be renewed if full certification (SPEAK score of 55 or above) is not achieved within the first year.

## **2. Research Assistantships/ Associateships**

Most RA's are funded from the research grants of various professors in the department. A few may be funded by other University resources. Not all professors have research grants, and some have more than one. An RA enables the student to work full-time as part of a research group, doing current research in his or her chosen field.

A student receives an RA appointment through an individual agreement with a faculty member who then serves as the student's research supervisor. The normal time for making the arrangements is during the Spring or Summer of the student's second year. The student should

carefully review and consider the research activities of several faculty members in order to select the field that seems to be most interesting and promising for a career. Faculty members may also review the students. An RA appointment may be made for a brief period (e.g., a Summer) on a trial basis, or on a continuing basis. Most RA appointments extend throughout the academic year and Summer.

Although an RA appointment is primarily a means of support for a research apprenticeship in which the student learns the techniques and language of the field, specific activities are determined by the goals of the underlying research grant. The professor can assign duties or tasks as needed for satisfactory progress on the grant. Such assignments can vary with the research field or the professor. Normally, the time involved with research will greatly exceed the nominal 20 hours/week associated with an RA appointment, the extra hours typically being credited under a research or thesis course registration.

### **3. Summer Support**

The Department generally offers summer support in the form of summer TA's, departmental RA's, and University Graduate Fellowships (UGF). All of these are limited in quantity and duration, but the Department tries to provide at least one month equivalent of the academic year support to all students who need it. Summer TA's assist with accelerated versions of several of the courses that are taught during the regular school year. Departmental summer RA's are awarded by the Graduate Program Committee to a few students who have proposed promising research projects that can be carried out during the course of the summer under the supervision of a sponsoring faculty member. The number of these summer research assistantships can vary from year to year. The research groups may share in the support of these RA's; some groups can supply full RA support during the summer.

## VIII. University/Department Resources

### 1. Colloquia and Seminars

A Department Colloquium is given each week by a visiting scientist. These talks provide an opportunity to hear a discussion of an interesting field, normally presented at a level appropriate to an audience with a strong technical background, such as first-year graduate students. Refreshments normally served just prior to the colloquium, which offers students the opportunity to meet with the speaker and faculty in an informal setting.

In addition to the Department colloquium, most research groups hold weekly or impromptu seminars aimed at specialists in that field. Announcements for these talks are normally posted and/or distributed a few days before the talk. Some groups also hold “journal clubs” or other sorts of meetings. Participation in colloquia and seminars is an important part of graduate education. Regular attendance at the Colloquium is expected of all graduate students who intend to earn a graduate degree. Students are also encouraged to attend seminars in fields or on topics, which might be of interest. Following affiliation with a research group, students are expected to attend the seminars and other discussions held by the group.

### 2. University Library Facilities

Library facilities are distributed across the ASU campus. The Noble Science Library is located directly across Tyler Mall from the Goldwater Science and Engineering Building. Books, current and bound periodicals relevant to physics and astronomy are found in Noble and are available online through the libraries' electronic journals.

### 3. Department Computing Facilities

When a student joins the department in either the M.S. or Ph.D. degree program, he or she will have access to various computer facilities. To get an account or to find out more about these facilities, students may contact Gary Childress (9655-4702 or [gary.childress@asu.edu](mailto:gary.childress@asu.edu)).

### 4. Shop Facilities

On behalf of the College of Liberal Arts and Sciences, the Department manages a Mechanical Instrument Shop and an Electronics Shop, both located in the “Research Support Services” building RSS1, in Room 101 and Room 110, respectively. There is a student shop located in the basement of the PSF-wing. Classes in the use of the student shop equipment are offered by the Mechanical Instrument Shop for up to six people per class on a per demand basis. Machine tools (bits, etc.) are kept in the student shop, but the student should expect to provide his or her own measuring tools and materials.

The CLAS Mechanical Instrument Shop offers a full suite of services including CAD design, precision fabrication, and equipment repair. It is one of the premier university mechanical shops nationwide. The electronics shop offers analog and digital design support, including access to computer aided design (CAD) and manufacture (CAM) facilities of circuit boards. Electronics shop personnel build and repair equipment, and maintain a reasonable supply of components as well as a fairly complete library of catalogs and technical manuals. A limited supply of meters and other equipment is available for loan.

## **5. Office Assignments and Department Key Policy**

Each supported graduate student is given an office/desk to use while conducting his/her studies with us. Offices/desks are assigned and must not be switched or changed without permission from the Main Department Office. The Department also adheres to a strict Key Policy (see **Appendix II**). Keys must never be loaned or given to any unauthorized user. Misuse of University and/or Department property will result in suspension of said property.

## **6. Health Benefits**

The University provides health benefits for all enrolled 50% (full-time) graduate students. It is the responsibility of each graduate student to activate his or her benefits—it is **not** automatic. The Department sends out email notices and flyers in your mailbox reminding you to activate your benefits. Please be sure to pay close attention to these reminders and make sure you are aware of all deadlines.

## **7. Sample Documents**

Appendix IV provides links to a variety of online forms and common procedures, including those to nominate and change the members of a Graduate Supervisory Committee, to report the results of a doctoral comprehensive exam or thesis prospectus, to petition the Graduate College, to request a Master's in Passing, and to complete an online interactive Plan of Study (iPOS).



## Appendix I

### Standard Steps for Ph.D. Degree

1. *Early in the first year*, the student should meet with his/her initial advisor (namely the first semester PHY-500 mentor) to answer any questions about the prescribed core courses to be taken during the *first year*.
2. During the *first year* and definitely *before the start of the second year*, the student should begin considering his/her choice of emphasis within Physics. *Before the start of the second year*, the student should select a PhD thesis advisor and, in consultation with this advisor, file an initial interactive Plan of Study (iPOS) listing this Dissertation Advisor, the six core courses, 12 hours of PHY-799, and sufficient hours of PHY-792 and other anticipated courses to meet Graduate College requirements on total credit hours (see **Section V.5 and Appendix IV**).
3. At the *beginning of the second year*, the student should take the Comprehensive Examination, both the written and oral parts. If the exam is not passed, it may be retaken (by petition to the Department and Graduate College) at the beginning of the second semester in the second year. If this second attempt is unsuccessful, the student will not be able to continue in the PhD program, but may be eligible for a MS degree “in passing.”
4. During the *second year*, the student should join a research group, formally appoint the remainder of the Supervisory Committee and, with the help of this Committee, revise the iPOS course listing as appropriate.
5. At the **end of the second year, or beginning of the third year**, the student should prepare for and present the thesis prospectus. On passing this, the student advances to candidacy, and takes the title Research Associate.
6. During *third year*, take additional courses and PHY-792 Research as appropriate. Continue to *fourth or fifth years* as needed. Be sure to include PHY-799 Dissertation at proper time. Exactly 12 hours of PHY-799 must be taken in the semesters following the semester in which a student is admitted to candidacy.
7. Apply for graduation prior to the deadline during the final expected semester.
8. Submit “Graduate Supervisory Committee Appointment” if any change in membership of the committee is required.
9. Submit the form “Dissertation Defense Recommendation,” dissertation for format review, and related documents to Graduate College prior to deadline. See Appendix III in your Ph.D. Graduate Student Handbook for a sample of these forms.
10. Hold oral defense of dissertation and respond to Committee recommendations. See Graduate Coordinator to schedule a room.
11. Submit final copy of dissertation and ASU Bookstore Worksheet to ASU Bookstore. A “Doctoral Dissertation Agreement Form” is also required.

## Appendix II

### **KEY POLICY**

Effective Date: 10-1-05

**DEPOSIT:** Effective October 1, 2005 the Department of Physics will no longer require a deposit for keys. If a key is lost or stolen, you will still be required to file the appropriate paperwork with DPS and may be required to pay a deposit to DPS in order to obtain a new key. No replacement keys will be requested if they incur department expense.

**RECOMMENDED KEYS:** It is recommended that Graduate students or visitors obtain one (1) exterior building key (B, F, H, or Goldwater Wings), one (1) office key, and one (1) lab/recitation key. These keys should be the only keys necessary.

**REFUNDS:** For all persons who have paid deposits for keys requested prior to October 1<sup>st</sup>, your deposit will be refunded upon the return of the key(s) you have in your name.

**AFFECTED PERSONNEL:** This policy will affect all persons requesting keys through the Department of Physics.

**PROCEDURES:** All persons requesting keys **MUST** fill out a Key Request Form and obtain appropriate authorized signatures. These forms are turned in to the Department of Physics main office, which will process a Key Action Form. The person requesting the key(s) will be responsible for taking the Key Action Form to DPS, and picking up their key(s) from DPS. A copy of the Key Action Form must then be returned to the main office for department records. All keys will be returned directly to DPS and a copy of the return receipt will be given to the responsible person in the main office.

**DEPARTMENT RESPONSIBILITY:** The Department is not responsible for any lost or stolen keys.

**UNIVERSITY REGULATIONS:** Each key holder is reminded to read the University policy statement printed on the Key Action Form.

**EXTRA KEYS:** Responsibility for the use of keys remains with the holder until the keys are returned to DPS. Extra keys should be returned because they produce unnecessary hardship in the case of loss or theft.

**KEY CARE:** Reasonable caution is urged. For example, do not add identifying marks or place keys on a key ring that tells the thief or finder who you are or which doors the keys open.

## Appendix III

### Comprehensive Exam Procedures

A substantially different form of Physics PhD Comprehensive Examination was introduced in the Department beginning with the PhD class entering in Fall 2007. A brief description of the new system is given in **Section V.6.** of this handbook. This appendix fleshes out details of exam policies and procedures as they currently are formulated (August, 2008). Modifications will likely be forthcoming as the Department gains experience with the new system.

One intent of the revised comprehensive system is to rapidly move students through the exams or out of the program. Barring unusual circumstances, each student will receive a final decision on both the written and oral portions of the exam no later than three semesters after entering the PhD program.

The results of comprehensive exams taken outside of ASU may not be transferred to ASU. To receive an ASU PhD degree, the student must complete his/her comprehensive exams at ASU.

#### **Role of the Graduate Exam Committee (GEC)**

Scheduling and implementation of the comprehensive exams will be the responsibility of the departmental Graduate Exam Committee (GEC), which has been expanded from six members to eight to manage its new duties. The GEC will be aided as required by the Graduate Program Director and Coordinator. The GEC will formulate and modify procedures for choosing graders and examiners, for implementing the exams, and for insuring that the exams are consistent and equitable from one student to the next and from one exam period to the next.

#### **Graders and Examiners**

Collaborative assessment of students by faculty is an integral part of mentoring PhD students, and all faculty who are eligible to serve on Physics graduate committees should be willing to participate in the Physics comprehensive exam process. Accordingly, graders and examiners will be drawn from the entire Physics Graduate Faculty as specified on the list maintained by the ASU Graduate College (<http://graduate.asu.edu/exploregraduatefaculty.html>).

#### **Exam Schedule**

There will be at most two comprehensive exam periods in any given year, the primary period being at the beginning of the Fall semester (for PhD students entering in the previous Fall) and the secondary at the beginning of the Spring semester (for entry in the previous Spring). Oral exams will be scheduled during the week preceding the first day of classes. Students must take the comprehensive exam in the first exam period following their first two semesters in the graduate program. Any deviation from this schedule must be approved in advance by the Graduate Program Committee.

The GEC will prepare the schedule of oral exams and notify the examiners of their assigned committees and the dates and times at which they are scheduled to serve. An individual oral exam committee may re-schedule its assigned exam to a different time within the designated exam period or within the first week of classes, providing all members of the committee agree. Any such re-scheduling must be approved in advance by the GEC and must be arranged by the individual committee - not by the student, the GEC, or the Physics office staff.

Up to three sets of oral exams will run concurrently on the designated examination days. Exam slots of two hours in length will be scheduled, with 15 minutes between slots.

### **Written Comprehensive Exam**

Students will choose one written project report from their two PHY-500 research rotations and expand this into a professional-level report of ca. 20 pages. The report is due by July 31<sup>st</sup> (summer exam session) or December 31<sup>st</sup> (winter exam session). Submission of a written comprehensive exam requires that a digital (PDF or DOC) copy of the written report be placed on the PHY-500 Blackboard site by midnight of the deadline date.

The written report should give broad background to the chosen subject, a synthesis of relevant literature, and a discussion of more specific topics addressed by the student during his/her individual work during the research rotation. The written comprehensive exam reports need not be original research. Original work is not excluded, but the report can equally well be a description, synthesis, and critical analysis of experiments and/or calculations in the published literature that bear closely upon the research rotation topic. It is essential, however, that any material not originating with the student be properly cited. This includes all material taken from books, journals, websites, class notes, grant proposals, etc. All submitted written reports will be checked for plagiarism. Plagiarism in any form or degree will be immediate and sufficient cause for receiving a failing grade on the written exam.

The written reports are formal university assessments and must therefore be each student's own work. In particular, the reports are not to be prepared, reviewed, or corrected by anyone other than the student.

The GEC will select two members of the Physics Graduate Faculty to read and grade each written comprehensive report. PHY-500 mentors will be excluded as graders of students they have supervised. GEC members may serve as graders but are not required to do so. Each of the two graders will separately read and assess the report, then assign a grade based on a 10-point scale with 5 being barely passing. If the two grades differ by 1 point or less, the assigned grade will be the average of the two grades. If the two grades differ by over 1 point, it is the responsibility of the two graders to revisit their grading and reduce the discrepancy to one point or less. In extreme cases, where no agreement can be reached after a genuine attempt by the graders, the matter will be referred to the GEC for adjudication.

Graders will have until the Friday before the first day of classes to read the exam, formulate a grade, consult with their counterpart grader to resolve any discrepancies, and return a final numerical grade to the GEC.

### **Oral Comprehensive Exam**

The intent of the oral examination is partly to gauge the student's understanding of specific topics within the research area of the report and also to probe the student's grasp of broad fundamental physics.

A three-member Oral Exam Committee (OEC) will be convened for each student taking the comprehensive exam. Two of these three examiners will be current members of the GEC. The third examiner will be chosen by the GEC from among the remainder of the Physics Graduate Faculty, excluding only those on sabbatical leave or otherwise excused from service duties. This third examiner will be the Chair of the OEC Chair and will bear overall responsibility for implementing the student's exam. Third examiner duties will be spread as equitably as possible among the entire Physics Graduate Faculty.

The oral exam will last a minimum of one hour and a maximum of two hours. The student will be allotted up to 20 minutes (with minimal interruptions) to present a coherent summary of his or her written report. The members of the committee may ask particular questions on that topic, but they will also expand the questioning to a broader range of related issues, seek to work out how well the student understands the physics context and implications of the work, and examine the student on core physics issues (graduate or undergraduate) that pertain to the broader range of topics. Although members of a committee will not have been graders of the written report, they will need to scan the reports ahead of time to determine the nature of the relevant questions. It is the responsibility of the OEC Chair to see that the examination proceeds steadily, without undue time spent on pauses or unproductive paths.

Following the oral exam and with the student not present, the OEC will attempt to reach a consensus pass/fail decision based on the student's performance. If no consensus can be reached, the decision will be made on the basis of a simple majority vote.

### **Comprehensive Examination Outcomes**

Following the oral exam period and within two weeks after the first day of classes, the GEC will convene to review the results of the individual exams and to prepare pass/fail recommendations. These will be presented to the Physics Graduate Faculty, which will discuss, possibly alter, and vote upon the recommendations. This vote will mark the official date of completion of the written and oral comprehensive exams for that examination period.

The written and oral portions of the exam will be graded independently. Hence a student may fail one portion yet pass the other. Should a student fail one or both portions of the exam, he/she may petition for a single re-examination of the failed portion(s) during the immediately subsequent exam period (e.g., in January for an exam failed in August). The same three-member examining committee will administer the repeat attempt unless the student requests otherwise, which he/she may do without stating a reason and without prejudice. In that case the GEC will select a new slate of three examiners.

### **Petition for Reexamination**

To petition for reexamination, a student submits a written request to the Graduate Program Committee (GPC), briefly explaining why a reexamination is warranted. A written endorsement by the student's PhD committee chair must accompany this petition. The GPC acts in an advisory role to the Department Chair to: (1) assemble the relevant information (student's petition, supporting letter from supervisory committee chair, reports filed by comprehensive exam graders and/or examiners, information on the student's performance in courses and research activities, etc.); (2) review the materials to verify that established procedures were followed in the exam; and (3) prepare a recommendation to be sent to the Department Chair along with the assembled materials. The Department Chair reviews this

information and prepares a report and recommendation to the Graduate College Dean, who must approve the reexamination.

### **Graduate College Requirements**

Graduate College places the following restrictions on comprehensive examinations: Students are allowed at most two attempts at each of the written and oral portions of the comprehensive exams. A reexamination must be approved by the head of the academic unit and by the dean of the Graduate College and must be administered no sooner than three months and no later than one year after the first exam. The examining committee must be composed of three to five members.

### **Student Privacy**

Comprehensive exam grades are protected student information under FERPA. Examiners and graders should not discuss the grades other than necessary as part of the grading process and should never otherwise divulge the grades to others, including the student.

### **Tuition Implications**

According to the Graduate Catalog, “*Students are required to register for at least one semester hour of credit that appears on the Plan of Study or one hour of appropriate graduate-level credit (such as 795 Continuing Registration) during the semester or summer session in which they take their comprehensive examinations.*” Given the exam schedule as described above, the Department will interpret the date of the exam to be that date on which the Physics Graduate Faculty votes on the examination results, which will always be after the first day of the Fall/Spring semester, respectively, for the summer/winter exam period.

### **Unusual Circumstances**

If a student is prevented by compelling and unavoidable circumstances from following the above guidelines, he/she may petition the Graduate Exam Committee for an exception.

## Appendix IV

### FORMS AND PROCEDURES

#### **iPOS: Interactive Plan of Study for Graduate Students Instructions**

Graduate students file an interactive Program of Study (iPOS) online. This software guides students through a step-by-step process that includes many built-in checks to ensure that student choices are compliant with university requirements. Students will be able to login to review the status at any point along the way. Instructions on how to enter an iPOS are available at: [http://graduate.asu.edu/files/pdfs/POS\\_student\\_manual.pdf](http://graduate.asu.edu/files/pdfs/POS_student_manual.pdf). As with all PeopleSoft software, the iPOS program can be complicated, confusing, and frustrating to use. If you have questions, please contact the Graduate Coordinator.

Following initial submission of an iPOS, the student may make various changes and entries, subject to Department and Graduate College approval. These typically include:

- (1) Changes in the list of courses, e.g. when courses anticipated to be taken do not match those actually taken,
- (2) Changes in the constitution and/or roles of the Supervisory Committee, including appointment of previously unspecified members,
- (3) Petitions to accommodate special circumstances, e.g. to transfer the extra 18 credit hours possible for students who accompany a new faculty member to ASU.

**Department of Physics Forms** are available at: <http://graduate.asu.edu/forms/index.html>

To nominate members of a Graduate Supervisory Committee:  
[http://physics.asu.edu/files/Supervisory\\_Committee\\_Nomination\\_Form.doc](http://physics.asu.edu/files/Supervisory_Committee_Nomination_Form.doc)

**Graduate College Forms** are available at: <http://graduate.asu.edu/forms/index.html>

To appoint or change members of a Graduate Supervisory Committee:  
<http://graduate.asu.edu/files/forms/GradSupComChng.doc>

To petition the Graduate College (e.g., to take more than 12 credit hours in a semester):  
<http://graduate.asu.edu/files/forms/gradpetGC.doc>

To report the results of the Doctoral Comprehensive Exam:  
[http://graduate.asu.edu/files/docs/Report\\_Doctoral\\_Comp\\_Exam.doc](http://graduate.asu.edu/files/docs/Report_Doctoral_Comp_Exam.doc)

To report the results of a Doctoral Dissertation Proposal/Prospectus  
[http://graduate.asu.edu/files/docs/Results\\_Doctoral\\_Proposal.doc](http://graduate.asu.edu/files/docs/Results_Doctoral_Proposal.doc)

To request a Master's in Passing:  
<http://graduate.asu.edu/files/forms/MiP.doc>