Table of Contents

INTRODUCTION

The Mission of the graduate program in the Department of Physics at the University at Buffalo is to offer students an outstanding education through comprehensive, rigorous course work and intensive independent research experience. Our goal is to equip students with the skills necessary to pursue careers in education and/or original research.

Our main degree program is the Doctor of Philosophy (PhD) program. This program is designed for students who aim to pursue a career in higher education, scientific research, industrial research, or governmental services. A Ph.D. recipient is expected to have (a) comprehensive understanding of basic principles of physics; (b) advanced knowledge in a specialty area; (c) broad knowledge of physics topics outside the specialty area; (d) in-depth scientific research skills; and (e) teaching and communication skills.

We also have a Master of Science program, which consists of three tracks: the thesis option, the project option, and the Comprehensive Exam option. In addition, we offer an Advanced Graduate Certificate in Computational Science, and is part of the program leading to an Advanced Graduate Certificate in Professional Science Management. These certificates provide students with important skills and knowledge for professional development in the academic and industrial environment.

This Graduate Handbook is intended primarily as a source of information for all graduate students in the Department of Physics. It explains the general regulations of the Department pertaining to degree requirements and gives a brief introduction to the policies of the Department.

The regulations and procedures are those in effect at the time the handbook is written. The Department reserves the right to amend its regulations and procedures when necessary and grants students the right to petition in individual cases. The Department, however, does not have the right to waive requirements set by the University at Buffalo or the Graduate School.

In addition to the Departmental requirements found herein, the Graduate School has its own requirements and policies which can be found at their Policy Library here https://www.buffalo.edu/grad/succeed/current-students/policy-library.html The Graduate School Office is open from 8:30 a.m. to 5:00 p.m. Monday through Friday. Students are invited to call the Graduate School at 716-645-2939 for information or appointments.

The latest updated version of the Department of Physics Information Handbook is available online at https://arts-sciences.buffalo.edu/content/dam/arts-sciences/physics/GraduateHandbook_Fall2024_v1.pdf
If additional information is needed, please direct your inquiries to the Director of Graduate Studies. If you think additional information should be included in the next publication of this handbook, please send your suggestions to the Director of Graduate Studies.

GRADUATE PROGRAMS

In addition to the general requirements of the Graduate School, the Department requires:

MASTER OF SCIENCE, THESIS OPTION

1. A minimum of 30 credit hours of formal graduate course work and thesis research. The overall GPA must be a minimum of 3.0 (equivalent to a grade of "B") for all courses leading to the degree.

2. At least 18 credit hours devoted to formal graduate course work. Physics 551 or 552 (Graduate Lab) is required and is included in the 18 hours. Physics 598, 599, and all 600 level courses will not be counted toward the 18 hours.

3. Up to 12 credit hours of informal credits such as independent study, supervised teaching, or directed research (PHY 598,

PHY 599, and PHY 600) to aid in the production of a final publication-ready thesis.

4. No more than six credit hours of coursework may be transferred into the program. Only courses with a grade of "B" or better are eligible as transferable credit.

5. The student must pass a public oral defense of the thesis. The committee consists of the Major Professor who is a member of the Graduate School Faculty and holds the rank of Assistant Professor or above, and one other faculty member. The completed thesis must be submitted to the Department at least one week in advance of the date of defense.

6. An electronic copy of the thesis in the pdf format must be delivered to the Main Office for repose in the Physics Department Library before the degree is conferred. Refer to the Degree Conferral Timetable for the dates when paperwork must be received by the Graduate School in order to graduate on time.

Please refer to the Graduate School policies for a complete disclosure of all Master's degree requirements. They can be found here: https://www.buffalo.edu/grad/succeed/current-students/policy-library.html

MASTER OF SCIENCE, PROJECT OPTION

1. A minimum of 30 credit hours of formal graduate course work and project research. The student's overall GPA must be a minimum of 3.0 (equivalent to a grade of "B") for all courses leading to the degree.

2. 24 credits of formal course work consisting of:

    - 12 credit hours - 507, 509, 513, 519, and 3 credit hours of 551 or 552 (Graduate Laboratory). The grades in three out of these five courses must be “B” or better.

- 9 credit hours - courses exclusive of Physics 598, 599, and all 600 level courses.

3. 6 credit hours of PHY 600, which would terminate in a report approved by the student's research supervisor and one other graduate faculty member.

4. No more than six credit hours of course work may be transferred into the program. Only courses with a grade of "B" or better are eligible as transferable credit.

5. The student will write a project report, which will be reviewed by the Major Professor who is a member of the Graduate School Faculty and holds the rank of Assistant Professor or above, and possibly one other faculty member.

Please refer to the Graduate School website: https://www.buffalo.edu/grad/succeed/current-students/policy-library.html for a complete disclosure of all Master's degree requirements.

MASTER OF SCIENCE, COMPREHENSIVE EXAM OPTION

1. A minimum of 30 credit hours of formal graduate course work consisting of:

   ➢ Required Coursework:
   18 credit hours: PHY 507, PHY 508 (*Quantum Mechanics 1 and 2 – 6 cr.*), PHY 509 (*Dynamics – 3 cr.*), PHY 513 (*Electrodynamics– 3 cr.*), PHY 519 *(Thermal-statistical Physics 1 – 3 cr.)*, PHY 551 or 552 (*Graduate Laboratory – 3 cr.*). The grades in four out of these six courses must be "B" or better.

   ➢ Elective Coursework:
   12 credit hours – any graduate physics courses exclusive of: PHY 598, 599, and all 600 level courses.

2. The student's overall GPA must be a minimum of 3.0 (equivalent to a grade of "B") for all courses leading to the degree.

3. The student must pass the Comprehensive Exam at the M.S. level, usually during the last semester in the program. Specifically, a student with a total score of 50% or more on the whole exam passes the Comprehensive Exam at the Master of Science level. A more detailed description of the Physics Comprehensive Exam is given later in the Handbook.

4. No more than six credit hours of coursework may be transferred into the program. Only courses with a grade of "B" or better are eligible as transferable credit.

ADVANCED GRADUATE CERTIFICATE IN PROFESSIONAL SCIENCE MANAGEMENT (PSM)

This certificate aims to meet the needs of employers by providing science-trained professionals with a strong foundation in science/mathematics and business fundamentals. With a PSM certificate, you can acquire these desired work skills and gain an advantage in today's increasingly competitive job market.

The name "Professional Science" refers to the post-graduate opportunities for students who wish to pursue non-academic careers in science within business, government, or non- governmental organizations. The PSM Certificate program is centered in the activities of the College of Arts and Sciences. Considerable breadth is assured since this program will be a cooperative venture between a number of academic departments including Biological Sciences, Chemistry, Geography, Geology, Mathematics, and Physics. The Certificate program will be open to candidates for the Master's degree in Physics, Chemistry, Geography, Geology, Mathematics, and Natural Science Interdisciplinary, or to those already holding a baccalaureate

degree in a participating science department.

The Department of Physics offers a Biophysics track in PSM. Graduate students are eligible to participate in this program. Students will receive two credentials upon graduation, a graduate degree in Physics and a PSM certificate. For more information about the PSM program, please visit: www.professionalmasters.cas.buffalo.edu/.

ADVANCED GRADUATE CERTIFICATE IN COMPUTATIONAL SCIENCE

An advanced certificate program in computational science designed to train science and engineering graduate students is approved by the New York State Education Department and the Chancellor of the University at Buffa This certificate provides students with a credential certifying that they have obtained educational training targeted at the specific area of computational science.

Curriculum

Requirements for the Advanced Certificate consist of:

1. Acceptance into the graduate or combined BA-MA degree program of a participating Department.

2. Completion of 15 hours of coursework, including:
   - 6 credit hours consisting of the required courses PHY 515, "High Performance Computing I" and PHY 516, "High Performance Computing II";
   - 9 credit hours of elective coursework consisting of Department approved courses as detailed below.

Students must maintain a "B" average in all Certificate courses and must be in good academic standing in their home department.

The courses High Performance Computing I and II (HPC I and II)

serve to educate students in the methods of scientific computing on modern hardware architectures.

In addition to High Performance Computing I and II, students must take three courses from among PHY 501, Mathematical Physics, PHY 505 and 506, Computational Physics I and II, PHY 507 and 508, Quantum Mechanics I and II, PHY 509, Classical Dynamics, PHY 513 and 514, Electrodynamics and Advanced Electrodynamics, and PHY 519 and 520, Statistical Mechanics I and II. Students may request a waiver to allow a substitution for these requirements, but any substitution requires prior approval of the Director of Graduate Studies in consultation with the Director of the Center for Computational Research (CCR).

Participating departments, in consultation with the Director of CCR, will approve the awarding of the Advanced Certificate for students registered in the participating department.

DOCTOR OF PHILOSOPHY

A minimum of 72 credit hours of graduate study and thesis research is required for a Ph.D. degree.

Preparation level upon entering the Ph.D. program

When a student first enters the Ph.D. program, he/she should have taken undergraduate courses on all the basic subjects of physics as listed below, at the level illustrated by the listed textbooks. If a student has a deficiency in one (or more) of these subjects, a remedial course (or courses) should be taken. This decision should be made by the student and his/her academic adviser.

1. *Undergraduate Classical Mechanics*
   a. Mechanics, by K. Symon;
   b. Analytical Mechanics, by G. R. Fowles.

2. *Undergraduate Electricity and Magnetism*

a. Foundations of Electromagnetic Theory, by Reitz Milford and Christy;
b. Electromagnetic Fields and Waves, by Lorrain, Corson, and Lorrain;
c. Electromagnetic Fields, by R. K. Wangsness.

3. Undergraduate Thermodynamics and Statistical Mechanics

a. Statistical and Thermal Physics, by F. Reif;
b. Thermal Physics, by C. Kittel and H. Kroemer.

4. Undergraduate Atomic and Quantum Physics

a. Quantum Mechanics, by Griffiths
b. Quantum Mechanics, by Bransden and Joachain;
c. Introductory Quantum Mechanics, by Liboff;
d. Quantum Physics, by S. Gasiorowicz.

Graduate Course Requirement

1. A minimum of 30 credit hours must be earned in formal graduate courses approved by the Physics Department. Courses such as Physics 598, 599, and all 600 level courses do not count toward this 30-hour requirement. The overall GPA must be a minimum of 3.0 (equivalent to a grade of "B") for all courses leading to the degree.

   All Ph.D. candidates must take and pass, with an average grade equivalent to "B" or better, the following graduate courses:

   Graduate Core Courses

   - Classical Dynamics (PHY 509)
   - Electrodynamics (PHY 513)
   - Quantum Mechanics I and II (PHY 507, 508)
   - Statistical Mechanics (PHY 519)
   - Graduate Lab (PHY 551 or 552)

   Of the remaining 12 required credits, only graduate level courses can be taken.

PHY 503 and 504, as well as any undergraduate courses taken for graduate credits are excluded. It should be emphasized that students who must take remedial or undergraduate courses during the first two semesters will take more than two years to complete their course work.

2. Graduate courses offered by other Departments can be taken only if the student's advisor approves. Responsible Conduct of Research (RCR) training is required by the Graduate School before a student's Ph.D. Candidacy can be approved. Relevant information is provided on the Graduate School website.

3. The remaining 42 credits can be fulfilled with graduate level lecture courses and informal courses such as 598 (Independent Study), 599 (Supervised Teaching), and 600 (Graduate Research). The following informal courses are required: Colloquium 601 in the 1st academic year (both in fall and in spring of the first academic year), and 602 in the 2nd academic year (both in fall and in spring of the second academic year).

4. Graduate students who have taken equivalent courses elsewhere can petition the Graduate Studies Committee to approve transfer of credit for these courses. No more than 18 credits of course work may be transferred into the program. Only courses with a grade of "B" or better are transferable.

5. All Ph.D. students whose native language is not English and who do not have a previous degree from an English speaking institution, must pass the SPEAK Test in order to receive their Ph.D. English courses such as ESL512 do not count toward the 72 credits required for the Ph.D. degree.

Comprehensive Exam

Within 24 months (four semesters) of enrollment as a full-time graduate student, a student should pass the Comprehensive Examination. A maximum of two attempts at this exam is permitted (see "Regulations Concerning Comprehensive Examination for Degrees in Physics," later in this handbook).

Thesis Committee Composition

A Research Advisor (Major Professor) must be chosen, and a Ph.D. committee must be formed, no later than 24 months after enrollment in the graduate program. The Major Professor (or one of the co-Major Professors) must be a regular faculty member in the Physics Department. The Major Professor must also be a member of the Graduate School Faculty who holds the rank of Assistant Professor or above. Failure to choose a research advisor may result in losing Departmental financial support. The Committee consists of two or more faculty members (in addition to the Major Professor), chosen by the student with the approval of the Graduate Studies Committee. All committee members should be active in research during the last five years. At least one of them should work in the same general area if possible. Faculty from other departments of UB can serve on the committee (see Appendix B). The same criteria apply for the selection of committee members outside the Physics Department, i.e., they must be active in research during the last five years.

APPLICATION TO CANDIDACY

The Application to Candidacy is a document that includes a summary of courses to be applied toward a degree. The filing of this application with the Graduate School indicates that the student is entering the final stages of degree completion. Normally students should expect to file an Application to Candidacy after two semesters of full-time enrollment toward the Master's degree, or after four semesters of full-time enrollment for the Doctoral degree. A Doctoral student should have already passed the Comprehensive Exam, have taken the Research Ethics course, and is in good academic standing before filing for Candidacy. Primary responsibility for evaluation of a student's program shall rest with the student's Masters or Ph.D. committee. Students should refer to the Degree Conferral Timetable below for requirements particular to each of the three degree dates. Once admitted to candidacy, a student should submit a Full Time Status Form so 12 credits for unsupported students (9 credits for supported students) are not necessary for full time status. Application to Candidacy forms and Full Time Status Forms are available in the Main Office and the

Graduate School website, https://grad.buffalo.edu/succeed/current-students/forms.html.

Dissertation and Degree Conferral

The completed dissertation must be submitted for review by the committee members at least two weeks in advance of the date of defense and will be accepted only if it is judged to be publishable in a refereed scientific journal. In addition to the requirements of the Graduate School, the Department requires an electronic copy which must be received in the Main Office in care of the Department Library before the degree is conferred. Please refer to the Graduate School policies at: http://grad.buffalo.edu/succeed/current-students/policy-library.html for a complete disclosure of the doctoral degree requirements. Refer to https://grad.buffalo.edu/succeed/graduate/electronic-submission.html for the dates when paperwork must be received by the Graduate School in order to graduate on time.

COURSE SELECTION FORM

Each student, in consultation with his/her advisor, must complete a Course Selection Form available in the Main Office, and return it to the Director of Graduate Studies prior to registering for classes for the first four semesters. After that a student must always consult with their academic or research adviser before deciding on courses to register.

- A graduate student advisor (academic advisor) will be assigned to each graduate student. The advisor will be a member of the Graduate Studies Committee who will continue as such until the student selects a research advisor.
- Students who do not follow a course of study approved by their advisor will not be in good academic standing within the Department and are responsible for payment of tuition for the non-approved course(s).

- If there are course changes after the form has been submitted, the form must be suitably amended and signed.
- If a student is unable to come to an agreement on an approved course of study with the advisor the student may contact the Director of Graduate Studies.

TIME LIMIT FOR DEGREE CONFERRAL

Graduate School regulations impose limits on the time to be spent pursuing an advanced degree. Within the College of Arts and Sciences, a maximum of seven years is allowed to complete a Ph.D. degree and four years is the maximum for a Master's.

In special cases, students may petition the Graduate School through the Graduate Studies Committee to have these limits extended.

DEGREE CONFERRAL TIMETABLE

FOR DEGREE CONFERRAL ON	FEB 1	JUN 1	Aug 31
Graduate School receives Application to Candidacy with Dean and Divisional Committee approval by ...	October 1	March 1	July 1
ALL required materials (including the m-form) are received in the Graduate School by ...	Friday before Spring classes begin	Day after last day of Spring exams	Friday before Fall classes begin

The above dates are subject to change. You are advised to check with the DGS one semester prior to the deadline date listed for up-to-date information.

It is a student's responsibility to check with the Graduate School 716-645-2939 and Student Accounts at 1Capen at 716-645-1800 prior to the deadline dates to be sure that all the requirements and paperwork for your degree have been completed. The Application

to Candidacy and all relevant forms and additional instructions can be obtained from the DGS.

INFORMAL COURSES

Informal courses include projects, theses, dissertations, directed readings, directed research, and independent study. In the Physics Department, our informal courses are: PHY 598, "Independent Study"; PHY 599, "Supervised Teaching"; and PHY 600, "Graduate Research."

The following rules are in effect: for informal courses, other than thesis, dissertation or project, for which there is no description in the official university publications, a statement of the proposed activity and its relevance to the student's educational goal and degree program should be filed with the student's record and reflected in his/her Application to Candidacy. These statements become a part of the student's academic record and will be used by the Divisional or Area Committees and the Graduate School in questionable cases to form their recommendations concerning the student's program. It is the responsibility of the student, the instructor, and the advisor, in that order, to see that the statement is filed at the appropriate time. Failure to do so will delay and may interrupt appropriate responses of committees and individuals responsible for processing degree credentials. The "Informal Course Description" form is available in the Main Office.

SEMINARS AND COLLOQUIA

First-year graduate students in the Ph.D. program are required to register in PHY 601 for the full year (both in fall and in spring). Each week a faculty member will describe his/her research program. This course is designed to help new students choose a thesis advisor.

Second-year Ph.D. graduate students are required to register in PHY 602 (Physics Colloquium) for the full year (both in fall and in spring). Colloquia expose students to distinguished external speakers, and new developments

in physics. Graduate students are also encouraged to attend physics seminars, which consist of more specialized talks.

MONITORING STUDENT PROGRESS

The following policies will apply:

1. Each semester the modified GPA is calculated. The modified GPA is calculated by averaging all courses excluding PHY 598, 599, 600, 601, and 602, and English Language Institute courses. Students failing to make at least a "B" average will receive a notice that they have been placed on Academic Probation.

2. Any student failing to achieve a modified GPA of "B" for two consecutive semesters may have his/her graduate registration in the Physics Department terminated.

3. The Graduate Studies Committee is empowered to consider any petition for special consideration concerning the application of Rule 2.

4. Early career students (those who have not joined a research group) are expected to have regular meetings with their assigned academic advisers to discuss their progress and their short-term goals. Students who have research advisers are expected to meet with their advisers regularly to discuss their progress toward their degree requirements, and are required to file an annual progress report (typically after the end of the spring semester).

5. Any student violating standards of academic integrity may have his/her graduate registration in the Physics Department terminated.

REGULATIONS CONCERNING COMPREHENSIVE EXAMINATION FOR DEGREES IN PHYSICS

A student must pass the Comprehensive Examination (CE) before applying for Ph.D. Candidacy and continue toward the Ph.D. degree. Part of CE also acts as a capstone for obtaining an M.S. degree.

There are three objectives for the exam. It should verify that a student has command of basic physical principles covered in the core courses (Classical Mechanics, Electrodynamics, Statistical Mechanics, and Quantum Mechanics), that the student has a clear vision for the particular research field of interest, and that the student can communicate, both orally and in writing, the relevant physics principles and ideas. The outcomes are assessed via a written research proposal, a research presentation at an oral session of the exam, and questions at the oral exam.

The written proposal should follow a regular research proposal format, and should be at a similar level of rigor as the abstract or introduction to a research paper. Specifically, it should include an overview of the research field of interest, introduce important problems of the field, identify open questions, and provide proper references. The written proposal should be submitted to the student's Comprehensive Exam Committee (CEC) at least one week before the oral exam.

The oral exam consists of a presentation by the student based on the written research proposal, and committee questions on basic physics principles and on the content of the presentation. It should be around 2 hours and give ample time to adequately assess the above learning outcomes. The basic principles questions can be asked before, after, or interspersed within the research presentation, at the discretion of the CEC.

The level of the basic principle questions is up to the core course level. These questions would emphasize the concepts and principles instead of the exact calculations. A student should

clearly demonstrate the ability to formulate appropriate questions on a given problem and provide qualitative answers, in addition to the ability to formulate a path toward quantitative solutions. There should be up to 5 questions, covering a broad range (at least 3 out of 5) of core subjects (classical mechanics, electromagnetism, statistical mechanics, quantum mechanics, and experimental methods).

A Comprehensive Exam for an M.S. student contains only oral questions from the committee members and does not have the research components of the written proposal or the research presentation.

The Comprehensive Exam Committee (CEC) for each student should have at least 3 members, with at least one coming from outside the research field covered by the exam. The committee should be chaired by the research adviser or the academic adviser of the student.

The Comprehensive Exam Administration Committee will make available a topic bank and example problems, with expected level of answers, on the departmental website to help students adapt to the exam structure/content/emphasis.

A student has two chances to take the exam. The CEC does not have to be the same. In an exceptional case, judged by the GSC, a student can appeal for one additional try.

A student should normally pass the Comprehensive Exam within 24 months of entering the Ph.D. program. A student who does not pass the CE within 30 months would be considered as not making satisfactory academic progress and would lose associated benefits such as TA support. Part-time students who need additional time may also petition the GSC for extension of the 30-month limit.

Criteria for Passing the Comprehensive Exam:

The CE is scored as Pass/Fail. The CEC members would each have a score sheet of several criteria to evaluate a student's command of physics, readiness for research, and the ability to organize and communicate. An average score of 60% from all the committee members is required for a Passing grade at the Ph.D. level. An average score of 50% is required for a Passing grade at the MS level.

ASSISTANTSHIPS

In the Physics Department, the job duties of a Teaching Assistant (TA) are assignment to either recitation sessions for a lecture course, or laboratory sessions, together with exam proctoring and grading. Specifically, TAs have regular recitation/laboratory sessions, regular office hours during academic years (during reading days and exam periods, TAs should arrange office hours with their students based on need), regular TA meetings with lecture/lab supervisors, and other preparations.

It is the policy of the Department to use assistantships for support of meritorious students who wish to pursue graduate studies in Physics toward a higher degree. Assistant and Fellowship appointments are awarded on the basis of academic progress and potential. Appointments are intended to assist students in acquiring the skills and understanding they will need in order to complete the requirements of their graduate degree programs. There are more graduate students registered in the Department than there are teaching assistantships. For this reason, the selection of students for the positions has to be made on a competitive basis, by the Graduate Studies Committee, according to criteria set forth below:

Teaching Assistantship appointments are normally made for one academic year at a time. Foreign-language-speaking teaching assistants must pass the SPEAK Test upon arrival in the Department. Failure to be certified to teach by the English Language Institute will result in appointment as a Graduate

Assistant at a reduced stipend. Students in this category must pass the SPEAK Test within two semesters to be considered for renewal of their Teaching Assistantship position (see Appendix D). In order to qualify for renewal, a student must show satisfactory progress toward a degree.

A student who does not satisfy the criteria listed below may not have his/her assistantship renewed:

1. An assistant is expected to perform his/her teaching duties diligently and effectively as reflected by the supervisor's grade (PHY 599). Less than a "B" grade in PHY 599 results in an automatic reassignment to a different instructor. A second semester with less than a "B" grade results in an automatic standby status for Teaching Assistantship. Teaching Assistants are registered for up to a maximum of four times in PHY 599 Supervised Teaching. After four semesters, TAs are no longer enrolled in PHY 599.

2. A Ph.D. student is expected to pass the Comprehensive Exam within the time schedule described earlier.

3. A student is expected to maintain a modified GPA of "B" or better, and in no two consecutive semesters should his/her modified GPA be below "B".

4. A student violating standards of integrity may have his/her teaching assistantship immediately revoked.

It is to be emphasized that these criteria are only the minimum requirements. Because of the limitation of the total number of available positions, meeting these conditions will not automatically guarantee a teaching assistantship.

In the case of a first-year graduate student who holds a teaching assistantship, the modified GPA requirement of "B" in the first semester may be relaxed. However, if the student does not meet the requirement, he/she may not be re-appointed for the second year. It should be noted that unfilled assistantships may occasionally be available as late as September. Those who are turned down and who do better in the second semester may wish to re-apply.

During the first 4 semesters that a student works as a Teaching Assistant, he/she will be automatically registered in PHY599, Supervised Teaching (1 credit per semester) by the Department Administrator. These credits count toward the 72 credits required for a Ph.D. degree.

If a student has a co-Major Advisor outside the department, the external Advisor is expected to provide financial support to the student.

TA incident reports are filed against significant TA mistakes such as missing classes, meetings, office hours, or other TA duties. The first incident report would lead to a warning from the DGS, while a second would lead to loss of TA eligibility.

Time Limits

A limit is set by the Department and the College of Arts and Sciences on the number of years a student can hold a teaching assistantship, which is five years (10 semesters) for a Ph.D. candidate. Other support may be available for students who have exceeded these limits.

In some instances, special conditions may exist which justify an exception. A student whose academic record indicates steady progress may request an extension of support if any one of the following applies:

1. the student changes his/her Major Professor;

2. the student contracts a serious illness or physical handicap;

3. the Major Professor is inaccessible to the student and there are documented efforts to secure a replacement;

4. the student's academic progress is delayed due to a variation in the direction of his/her original research or program of study;

5. Other compelling reasons which are documented.

The Graduate Studies Committee has the right to make exceptions to all or any of the above guidelines.

UNSUPPORTED STUDENTS

The unsupported students are encouraged to meet the minimum requirements for an assistantship including passing the SPEAK Test. (see Appendix D). The Department has no financial obligation to graduate students who choose to enter the graduate program initially unsupported.

TUITION SCHOLARSHIPS

Graduate Students Appointed as Teaching, Graduate, or Research Assistants

Students appointed to an assistantship of at least 0.25 fulltime are eligible for tuition scholarships during the fall and spring semesters of the academic year of their appointment.

Tuition scholarship funds may be applied only to academic year tuition costs; any graduate fees or summer tuition costs are not covered by this scholarship. The tuition scholarship may be renewed to cover no more than the minimum credit hours required for a student's primary degree. Transfer credits are counted in the minimum credit hours toward the degree; tuition scholarships awarded at the Master's level are included in the Ph.D. scholarship totals. The complete Tuition Scholarship policies can be found at: www.grad.buffalo.edu/policies/tuition_scholarship_policy.

Definitions

The term "semester limit" applies to the number of semesters that have elapsed since admission into the University as a graduate student, *regardless of whether tuition scholarship support was*

received, but not counting any semester in which the student was on an approved leave of absence.

The term "credit-hour limit" applies to the cumulative number of credit hours a student has registered for since admission into the University as a graduate student, *regardless of whether tuition scholarship support was received*, and including courses from which a student has resigned after the drop deadline.

Responsibility

Out-of-State domestic students should apply for New York State residency as soon as they can so as to lower the tuition rate. Not having NY Residency could lead to a student paying for the difference between the In-State and Out-of-State tuition.

Eligibility

Students eligible to apply for tuition scholarship include those in the following categories, *in order of priority*, who have not reached the time limit applicable for their degrees:

- Full-time matriculated graduate students in the College of Arts and Sciences, in good academic standing, and supported by a semester-based fellowship or assistantship funded by the College of Arts and Sciences or by an external sponsor;
- Full-time matriculated graduate students in the College of Arts and Sciences, in good academic standing, and with demonstrated financial need (subject to availability of funds);
- Full-time matriculated graduate students outside of the College of Arts and Sciences, in good academic standing, and supported by a semester-based assistantship funded by the College of Arts and Sciences (subject to availability of funds).

A student violating standards of academic integrity may have his or her eligibility for a tuition scholarship revoked.

Registration Restriction

The tuition scholarship can be applied only to courses within a student's program of study approved by the Department before degree candidacy and by the Graduate School after degree candidacy. Courses outside of one's approved program of study and all undergraduate courses will not be supported unless specifically recommended by the Department and approved by the Dean's Office.

Time Limit for Tuition Scholarship

For a doctoral student, the CAS semester limit for tuition scholarship is *eight*, and the credit-hour limit is *72.* The time limit is reached when either the semester limit or the credit-hour limit is reached, *whichever comes first.* Doctoral candidates seeking a ninth semester or beyond of tuition scholarship support must complete a "Tuition Scholarship Application for Waiver of Time Limit" which is available in the Main Office. Students must justify why additional tuition scholarship support is needed. If approved by the Dean's Office and Graduate School, students will ordinarily be limited to only one credit hour of tuition scholarship per semester.

The above time-limit guidelines apply only to a student pursuing a single graduate degree at the University. A student pursuing more than one graduate degree at the University should refer to the section on Multiple Degrees.

Tuition Rate

For a student in the first two semesters of study at the University, the tuition per credit hour provided will be in accordance with the in- state or out-of-state classification of the student. U.S. students and Permanent Residents who are not New York State residents must file for New York State residency during their first year at UB. If filing for residency would impose a serious hardship, students may petition the Dean of the College of Arts and Sciences for an exemption from this requirement.

Beginning with their third semester of study, eligible out-of-state residents who have not applied for New York State residency will be awarded tuition scholarships at the lower in-state tuition rate. These students are personally responsible for the difference between the in-state and out-of-state tuition charges. Those eligible to apply for financial aid under the New York State Tuition Assistance Program (TAP) must do so in a timely manner. Failure to apply for TAP, if eligible, will result in a reduction of tuition scholarship equivalent to the estimated amount of TAP award. International students are not eligible for New York State residency and therefore exempt from this requirement.

For a student enrolled in a program outside of the College of Arts and Sciences, the tuition per credit hour provided will be equal to that appropriate for either the student's program or the College of Arts and Sciences, whichever is lower.

Multiple Degrees

A student pursuing more than one graduate degree at the University is subject to a *cumulative* time limit equivalent to that of the *highest* degree pursued. This time limit is calculated from the time of the *initial admission* into the graduate program at the University. Any additional support beyond this time limit is discretionary and will be considered for approval by the Dean's Office only under extraordinary circumstances, on a case-by-case basis, upon recommendation by the Department, and subject to the availability of funds.

Budget Constraints

The Dean's Office reserves the right to modify these guidelines in reaction to budget constraints.

FULL-TIME STATUS

A full-time graduate student in the Department of Physics is one who carries 12 or more credit hours per semester. Students who

hold Teaching, Graduate, or Research assistantships are considered full-time if they carry nine or more credit hours per semester.

Students in the terminal stages of their degree will be considered full-time while carrying less than the requisite credits if they have an approved *Application to Candidacy* on file in the Graduate School, complete a form entitled *Certification of Full-Time Status,* AND are working full-time on their thesis, dissertation, or projects.

Many Ph.D. students apply for degree candidacy several years before the actual graduation in order to be certified for full-time status as soon as possible. As a result, the proposed program of study and list of courses are highly preliminary and often require future amendments. The Graduate School has clarified that the copy of Application for Candidacy attached to a Full-Time Status Certification Form can be a *tentative* one that is approved only up to the department level.

Full-time Status for International Students

An F-1 student's principal purpose for being in the United States is full-time study. At the University at Buffalo full-time study is defined as at least:

- 12 credits per semesters for graduate students who do not have an assistantship
- 9 credits per semester for graduate students with an assistantship

Failure to comply with the regulations regarding maintenance of status results in violation of F-1 status. As this could result in serious consequences, students are advised to discuss any questions about full-time status with an advisor at International Student & Scholar Services, 210 Talbert Hall. Students in their first semester in the United States may be excused from the requirement to take 12 credits if they are experiencing difficulties with:

- The English language,
- American teaching methods,
- Inappropriate course level placement.

This lowering of the required number of credits due to academic difficulty is valid only for a student's **first semester in the United States** and only if alternative methods of addressing the academic problem (such as choosing an alternative grading scale, taking an incomplete, outside tutoring, etc,…) cannot be found. This option is not available to new students at the University who have transferred from within the United States, even if they have changed degree level or major.

The difficulties must be first discussed with an international student advisor, and then documented in writing by the professor of the course or by the student's academic advisor. This must be done prior to the University's established deadline for course resignation available at: http://www.buffalo.edu/studentaccounts/billing/financial-liability-deadlines.html Details of the student's financial liability for tuition are also outlined at this website.

Once the difficulties and possible solutions have been discussed with your course professor and with an international student advisor, you may be advised to reduce your course load below full-time. Your professor/advisor, then must write a letter to that effect. The letter should:

- Be written on Departmental letterhead
- Be addressed to the Director of International Student and Scholar Services
- Verify that the professor/advisor has discussed the problem with you
- State specifically that he/she recommends you drop the class
- State the reason why he/she recommends that you drop below full-time status. This must be for reasons described above and appropriate details must be provided.

From your second semester thereafter, you must register as a full-time student unless you meet the criteria for another exemption (as described above). If you continue to experience academic difficulty, you should consult with an international student advisor regarding your situation.

CONTINUOUS REGISTRATION REQUIREMENT

Graduate students must register (and pay all tuition and fees not covered by a tuition scholarship) for a minimum of one credit hour each Fall and Spring term until ALL requirements for the degree are completed. If continuous registration is impossible or inappropriate at any time, the student must secure a leave of absence from the Graduate School. Students may not be on leave of absence during the semester in which a degree is conferred. Under some circumstances, this requirement may be waived in the semester prior to degree conferral if the student has an approved Application to Candidacy on file in the Graduate School and will not be using any University services or faculty time. Students may request a waiver of continuous registration by filing a Graduate Student Petition Form with the Graduate School. Forms are available in the Main Office.

LEAVES OF ABSENCE

Requests for leaves of absence must be requested through the Director of Graduate Studies and forwarded to the Graduate School on a Graduate Student Petition for a Leave of Absence Form https://registrar.buffalo.edu/pdfs/gradleaveofAbsence.pdf prior to the start of the semester in which the leave is to begin. Normally, leaves are granted for a maximum of one year, but it may be possible to extend the leave if circumstances warrant. All requests must be supported by adequate documentation. "Personal reasons" cannot be listed because it is not a sufficient explanation for requesting a leave.

International students are advised to consult with the Office for International Student and Scholar Services, 210 Talbert Hall, North Campus, prior to applying for a leave of absence.

CREDIT TRANSFER

In order to transfer credit for a graduate course, a student must petition the Graduate Studies Committee and provide a detailed syllabus for the course as well as the grade received. Only courses with a grade of "B" or better will be considered for credit transfer. The Committee can approve or *disapprove the transfer* depending on the quality of the course, the institution where the course was taken, and the applicant's performance in graduate courses taken here. The Committee has the option of requiring the student to take some form of examination to prove that he/she has mastered the material of the course at a level comparable to our equivalent graduate courses. This task is carried out by the faculty member who is teaching the course that semester and can be in written or oral form. The faculty member then reports the recommendation to the Chair of the Graduate Studies Committee.

A graduate student is allowed to request credit transfer only after he/she has completed one semester in our graduate program. By that time, the student will have a good idea of the level of our graduate courses and the style of the exams. In addition, the Graduate Studies Committee can use the grades of the first semester courses to decide whether or not to allow a graduate student to pursue the requested transfer of credit.

Students from university-approved exchange programs pursuing an M.S. degree are excluded from this procedure.

GENERAL DEPARTMENTAL INFORMATION

Keys

Each new student will be issued a set of keys for his/her workspace.

Mailboxes

Each graduate student will be assigned a mailbox. Please check the box daily for important notices, in particular, Teaching Assistants should check daily for homework and lab reports. Students will be notified when packages or other large items arrive, these should be picked up as soon as possible in the mailroom. Students cannot use Campus Mail Services for personal packages.

Home Address and Telephone Number

We ask that you inform the Department office of any change of address or phone number. Do not use the Physics General Office as your permanent address. The Office of Records and Registration must also know of your address change. If you are supported as a TA, RA, GA, or SA, you will need to update any change to Human Resources. Updating your information is done on the Administrative Services Gateway website http://www.buffalo.edu/administrative-services/for-faculty-staff/my-employment-information.html

Paychecks Direct Deposit

For state employees (Teaching Assistants):

https://www.buffalo.edu/administrative-services/forms-catalog/hr/state-direct-deposit-enrollment-request.html

For Research Foundation employees (Research Assistants):

https://www.buffalo.edu/administrative-services/forms-catalog/hr/state-direct-deposit-enrollment-request.html

Graduate Student Data

A Departmental Graduate Student Data Form obtained in the Main Office and is to be completed by each student upon entrance to the Department and updated as necessary. Information on the data form keeps our records up-to-date.

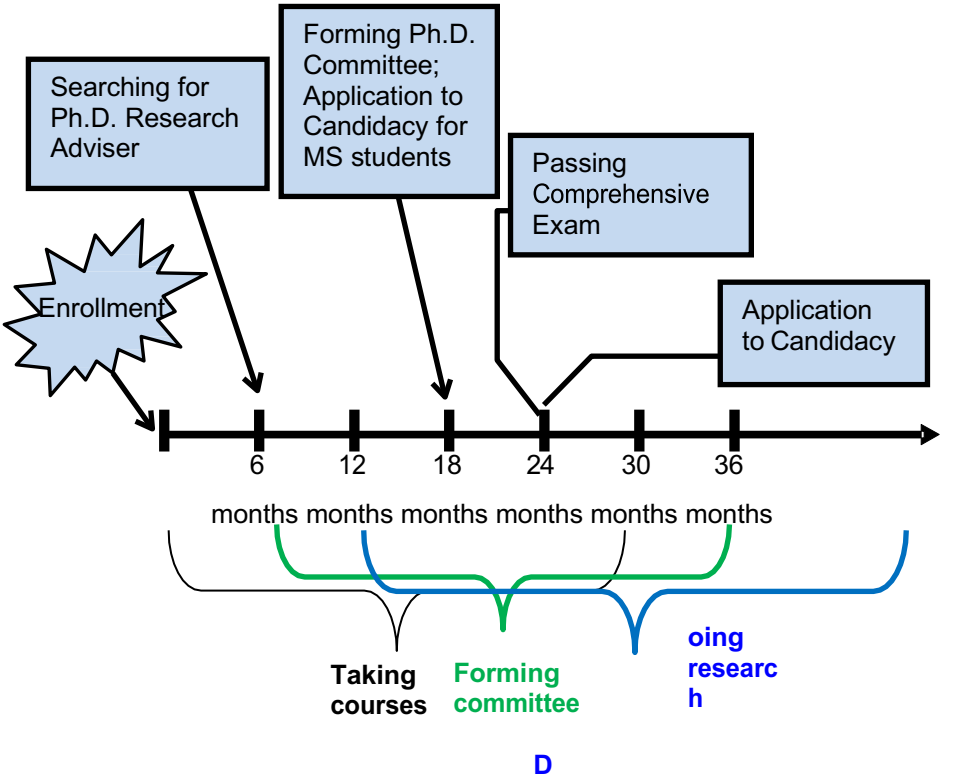
ocial Security Number

ll newly admitted foreign students must apply for a social security umber. Forms and information regarding application for a social ecurity number may be obtained during International Student rientation or from the International Student and Scholar Services ffice, 210 Talbert Hall. Please inform the Main Office of your social ecurity number as soon as you receive it.

Forwarding Address

Please inform the Main Office of your forwarding address if you plan to be away for a long period of time or are permanently leaving the Department.

APPENDIX A: Graduate Study Timeline



APPENDIX B: Responsible Conduct in Intellectual and Creative Activity

Physics Department Statement on Academic Integrity:

Academic integrity is a core value underlying all scholarly activities in the Department of Physics. The worth of every degree conferred and every project performed is directly dependent on the ethical conduct of every individual in the Department. Accordingly, all members of the Department are expected to adhere to the highest standard of scholarly integrity. It is the responsibility of each individual to understand what does and does not constitute ethical scholarly behavior, and to practice academic integrity in all scholarly activities. This statement is based on UB's Policy on Academic Integrity, which is available online at: https://grad.buffalo.edu/succeed/current-students/policy-library.html#academic-integrity Policies related to responsible conduct in research are available at: http://www.buffalo.edu/administrative-services/policy1/ub-policy-lib/responsible-conduct-research.html

You should familiarize yourself with your rights and responsibilities under the Graduate School's Academic Integrity Policy. Some specific actions which constitute academic dishonesty include:

Examples of Academic Dishonesty

Academic dishonesty includes, but is not limited to, the following:

- **Previously submitted work.** Submitting academically required material that has been previously submitted - in whole or in substantial part - in another course, without prior and expressed consent of the instructor.
- **Plagiarism.** Copying or receiving material from any source and submitting that material as one's own, without acknowledging and citing the particular debts to the source

(quotations, paraphrases, basic ideas) or in any other manner representing the work of another as one's own.

- **Cheating.** Soliciting and/or receiving information from, or providing information to, another student or any other unauthorized source (including electronic sources such as cellular phones and PDAs), with the intent to deceive while completing an examination or individual assignment.
- **Falsification of academic materials.** Fabricating laboratory materials, notes, reports or any forms of computer data; forging an instructor's name or initials; resubmitting an examination or assignment for reevaluation which has been altered without the instructor's authorization; or submitting a report, paper, materials, computer data or examination (or any considerable part thereof) prepared by any person other than the student responsible for the assignment.
- **Misrepresentation of documents.** Forgery, alteration or misuse of any university or official document, record or instrument of identification.
- **Confidential academic materials.** Procurement, distribution or acceptance of examinations or laboratory results without prior and expressed consent of the instructor.
- **Selling academic assignments.** No person shall sell or offer for sale to any person enrolled at the University at Buffalo any academic assignment, or any inappropriate assistance in the preparation, research or writing of any assignment, which the seller knows, or has reason to believe, is intended for submission in fulfillment of any course or academic program requirement.
- **Purchasing academic assignments.** No person shall purchase an academic assignment intended for submission in fulfillment of any course or academic program requirement.

Additional policies relating to specific courses and assignments, such as rules regarding collaboration on coursework, may be specified by the course instructor.

A breach of academic integrity reflects upon the scholarly reputation of the entire Department. Therefore, incidents of academic dishonesty will be investigated immediately and vigorously. A student suspected of violating course, Departmental,

or University policies on academic integrity will be notified by the course instructor. Where possible, questions of academic dishonesty will be resolved through informal consultation between the student and the instructor. If informal consultation does not resolve the issue with mutual agreement, the student has the right to ask for an appeal of the instructor's decision. If the instructor feels that the circumstances of the alleged academic dishonesty warrant additional review, formal procedures may be used. Complete Graduate School procedures regarding academic infractions, including the right to appeal, are available at: https://grad.buffalo.edu/succeed/current-students/policy-library.html#academic-integrity

Depending on the severity of the violation, a first incident of academic dishonesty may result in one or more of the following actions:

- Failure of the assignment or examination on which misconduct occurred.
- Mandatory resignation from the course in which misconduct occurred.
- Failure for reason of academic dishonesty in the course in which misconduct occurred.
- Permanent loss of Departmental financial support, including Teaching Assistantships, Research Assistantships, and scholarships.

Any such action will be noted in the student's confidential Departmental record. A second violation will result in the Department seeking permanent dismissal from the major and a bar from enrollment in any Departmental courses. Particularly serious infractions will result in a recommendation of suspension or expulsion from the University.

APPENDIX C: SPEAK Test Policy

According to the English Language Institute (ELI), a graduate student achieving a score of 55 or 60 on the SPEAK test is approved to teach. If an individual receives a 45 or 50, their department may request an oral evaluation at ELI in the form of a teaching demonstration. Before a department can request this evaluation, that Department is required to assess each individual to determine their communication abilities. Successful completion of the ELI evaluation certifies the graduate student to teach, hold office hours or perform other duties requiring speaking to students. More details can be found at the Graduate School website https://grad.buffalo.edu/succeed/current-students/policy-library.html?q=speak%20test and the ELI website: http://www.buffalo.edu/english-language-institute/programs-and-services/SPEAK-test.html

The Physics Department has formed a committee to evaluate graduate students with SPEAK test scores of 45 or 50; members include the Supervisor, Introductory Labs and two faculty members. Interviews will be coordinated by the Supervisor and all inquiries should be addressed to him/her.

Periodically, open interviews will be held to assess individuals with SPEAK test scores of 45 or 50 to determine if their level of English proficiency is such that they warrant an oral evaluation by ELI. These interviews simply support the student's ability to take an oral evaluation at ELI, and do not imply a promise or intent to provide support. Successful completion of this interview and the subsequent ELI oral evaluation will certify the graduate student to teach (lab only or lab and recitation), but there may not be any positions available. Assuming the student meets the other criteria for a Teaching Assistantship, he or she would be placed on a stand- by list to be considered with other qualified applicants for available positions. Supported students who fail to pass the SPEAK test or

an ELI oral evaluation within 1 year of arrival may have their support terminated.

The format of these pre-screening interviews will be as follows: you will be given a laboratory introduction to present. You will have 15 minutes for the presentation using only your notes and a chalkboard. The Committee will have up to 5 minutes at the end to ask you questions. It will then be decided whether or not to recommend you receive an ELI oral evaluation. You will be evaluated primarily on your ability to communicate, but consideration may be given to your level of mastery of the physics and laboratory practices described in the presentation.

There will be a general announcement made, either by email, office mail box, or bulletin board posting announcing when interviews will be held.

If a student is not recommended for an oral evaluation at ELI, or if they do not successfully complete the formal ELI oral evaluation after passing a Departmental level screening, they will not receive another Departmental level screening unless they do one of the following:

1. Retake the SPEAK test and show an improvement over their best score.

2. Register for and successfully complete one of the remedial courses offered by ELI, currently ELI 411, ELI 412, or ELI 512. Non-credit courses such as the "American English Pronunciation" course are also acceptable. For the purposes of being granted another Department screening, each course may only be taken once.