**Department of Physics-Graduate Curriculum and Examination Procedures**
**Supplementary to General College Requirements - July, 2013**

## Curriculum

All candidates for graduate degrees must successfully complete a program of courses approved by the department. This requirement is satisfied if the candidate completes either the usual program described below or one which has been explicitly approved by the Departmental Graduate Studies Committee.

### Typical Program for the Ph. D.

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| 1st Semester | Classical Mechanics (601) | Quantum Mechanics I (621) | Math Physics (603) | Colloquium (650) | Teaching Physics (651) |
| 2nd Semester | Classical Electricity & Magnetism I (610) | Quantum Mechanics II (622) | Statistical Physics & Thermodynamics (630) | Colloquium (650) | Teaching Physics (652) |
| 3rd Semester | Classical Electricity & Magnetism II (611) | Field Theory & Relativistic Quantum Mechanics (721) | Elective or Specialty Course | Colloquium (650) | Research (695) or Teaching Physics (651) |
| Beyond | Elective or Specialty Courses | | | | Dissertation (800) |

Upon satisfactory completion of the third semester the student will have satisfied the 32 credit course requirements for the M. S. degree. The average grade for all courses taken for graduate credit must be at least B.

The candidate should take at least two specialty courses including at least one elective course outside the student's dissertation research area and one specialty course inside the student's dissertation research area. The choice of elective and specialty courses should be made in consultation with the student's research advisor.

If a Ph. D. candidate receives a grade below B- in any of the non-specialty courses, he or she must either repeat it or demonstrate to the course instructor or to a special committee appointed by the Departmental Graduate Studies Committee knowledge of the subject matter equivalent to a B grade. The instructor will inform the Departmental Graduate Studies Committee in writing of the student involved and will, in due course, recommend final disposition to the Departmental Graduate Studies Committee. Students should complete any make-up requirements as soon as possible.

## Teaching Experience

Teaching is an integral part of the educational process for those who seek an advanced degree and therefore the following regulations have been adopted for resident students: Degree candidates will be assigned teaching duties for at least two semesters and are expected to register for at least two semesters of Physics 651/652 Teaching Physics in conjunction with their teaching assignment. There will be an evaluation upon

completion of the assignment and the grade for this course is based on their performance of their teaching duties.

**Proficiency in English**

All graduate students who were required to take the TOEFL exam for admission will also be required to take courses on written or spoken English (listed as COL in the Graduate Course Catalog) as recommended by the Graduate Center. A student and his/her adviser can jointly petition the Graduate Studies Committee to waive this requirement.

**Qualifying Examination**

The full-time student with the usual undergraduate preparation must take the qualifying examination within one calendar year after he/she begins graduate study. The examination is given just before the beginning of both the fall and the spring semesters.

The qualifying examination consists of three half-day written examinations. The examination deals with undergraduate material, with the contents of the first year graduate courses, and with material that a first-year graduate student should have obtained from seminars, colloquia, and journals. The results of the written examination are considered together with the candidate's course grades, recommendations from the faculty, and all other aspects of the candidate's academic record. The possible results are: pass sufficient for the Ph. D. program, or not pass sufficient for the Ph. D. program. Any student not passing the examination will be evaluated by the faculty to determine if his or her performance was adequate to warrant awarding the M. S. degree upon completion of the core curriculum.

The following guidelines have been adopted by the physics faculty:

(a) Candidates are normally allowed two attempts to pass the qualifying examination. Further attempts may be allowed by the Departmental Graduate Studies Committee on the basis of a petition by the candidate.

(b) Entering graduate students without a master's degree may, with the consent of their advisors, take the qualifying examination without it counting as one of their two attempts when they arrive or after they have been in residence for one semester.

(c) Those entering students who already have an M. S. or an M. A. degree in physics are normally required to take the examination on arrival. Special circumstances will be dealt with by the Graduate Studies Committee on a case by case basis.

(d) Entering students taking undergraduate courses will have their qualifying exam clock postponed appropriately in consultation with the Graduate Studies Committee.

**Annual Review of Progress in Research**

Upon starting their research projects students will select a committee in consultation with their advisor. This committee will consist of the advisor and at least two others whom the student has chosen from among the physics faculty. Starting from the second year of graduate study, the student is required to have an annual review every academic year, which is typically carried out early in the Spring semester and must occur before April 1 of that year. This review will normally consist of a presentation of recent progress by the student followed by discussion with the committee. (Students in their second year of study are expected to present the direction of their chosen research; the committee may choose to further examine the student's course preparation and give recommendations as appropriate.) The committee will then give a written evaluation to the student and a copy to the Graduate Studies Committee. Requests for exemption will only be considered for special circumstances (e.g., students in their last year with a defense date already scheduled) and they must be made as a joint petition of the student and adviser to the GSC.

The physics department expects that students will be able to complete the Ph. D. within six years of entering the program (or four years from passing the qualifying examination for transfer or special students). Extension of financial support for the sixth and subsequent years requires the endorsement of the student's evaluation committee and the approval of the Graduate Studies Committee. Extension of financial support beyond seven years will not normally be given.

**Financial Support**
The department will endeavor to provide financial support to Ph. D. students who are making satisfactory progress in their course work and research. Satisfactory progress is measured in different ways depending on the student's standing in the program.

- For students who have not passed the qualifying examination, satisfactory progress consists of achieving at least a B (3.0/4.0) average in course work and satisfactory teaching (or, if appropriate, research) evaluations. A student who does not achieve a B average in any given semester will be placed on probation. A student can be removed from probationary status by achieving a B average (not including research credits) in the following semester. While on probationary status a student may have summer support withheld. If the student is taking the qualifying exam for the first time in August while on probation the student must present a performance adequate to warrant awarding the M. S. degree upon completion of the core curriculum as determined by the faculty to have support for the fall semester; if taking the second attempt in January while on probation, the student must pass to have support for the spring semester. (If the student is taking the qualifying exam for the first time in January this will be modified accordingly.)
- Regardless of performance in the courses, if a student does not pass the qualifying exam after two attempts the student will be placed on probation. If the student chooses to appeal to the Graduate Studies Committee for a third attempt (see the discussion regarding the qualifying examination above), then support may be withheld in the interim.
- For all students with teaching assistantships: teaching evaluations will be collected both from the students and from the faculty instructor. Satisfactory evaluations of teaching are necessary for continued support as a teaching assistant.
- Research students will be evaluated annually as described above.
- Students in good standing who decide to terminate their study at the Master's degree will ordinarily have their support discontinued. Students may petition the graduate committee to have their support continued for a brief period if an abrupt cessation of support would cause hardship.

**Outside Employment**
The Physics Department considers acceptance of a stipend by a student to imply a full-time commitment to his/her research and teaching obligations. The intention of the Department is to keep to a minimum the number of years that a student spends pursuing an advanced degree. Thus with rare exception (for which the student must receive explicit approval of the Graduate Study Committee), paid employment outside the Department while the student holds a research or teaching stipend is not permitted.

**Outside Support or Internships**
The purpose of our graduate program is to prepare students for rewarding and productive scientific careers. Some students might be interested in non-traditional research opportunities afforded by paid fellowships, internships, co-op programs, or other forms of study involving outside support. By ‘outside support’ we mean support paid for by an institution other than the College of William and Mary. If such research opportunities provide good training and allow our students to do good science, the department will be open to considering them. However, students must get approval in writing from the Physics Graduate Committee prior to making an application, or any kind of commitment, to an outside institution. Guidelines for such non-traditional research activities should be negotiated with the two institutions involved ahead of time and be grounded on general policies, not after-the-fact on a case-by-case basis. Interested students are responsible for finding out whether such inter-institutional policies are in place by speaking to the Chair of the Graduate Committee. In addition, the following Physics Department policies must also be followed in order for the Graduate Committee to grant approval:

(a) By its very nature, such off-site research activities will imply that day-to-day research supervision will be carried out by someone other than a William and Mary Physics faculty member. However, the student must find a regular (i.e. tenure line) faculty member within the Physics Department who will act as the local advisor. Except for day-to-day advising, the responsibilities of the local advisor

are understood to be the same as those of any other PhD advisor: responsibility for overseeing the student's overall research progress and academic preparation, and making sure that the student's work is leading to a thesis that is acceptable to the physics department.

(b) A three-person committee, composed of regular faculty of the physics department, should be appointed at the start of the project. The local advisor will chair this committee. The committee must meet at least once a year as part of the student's regular annual review, but they should meet as often as they think necessary to make sure the student is making adequate progress and receiving sufficient guidance. It is the responsibility of the local advisor to inform the Graduate Committee of any concerns regarding the student's progress. The Graduate Committee retains final authority for either continuing, or discontinuing, its approval based upon input from the review committee and any other information it may have.

(c) The financial aspects of the relationship must be clarified by the student for the Graduate Committee before approval can be given. A full support package is understood to include: full stipend, tuition, fees and health insurance. If the support is in the form of a contract or grant to the College, then appropriate indirect costs should also be part of the support package. Ideally, all of these should be covered by the outside institution, but exceptions can be granted in special circumstances. In cases where the student's support package is more generous than that of the department, they will be expected to cover their own tuition, fees and health insurance if these are not provided by the other institution.

**Health Insurance Benefits**

The College requires all full-time students, as a condition of enrollment, to have health insurance coverage. Full-time students will be enrolled in the College-endorsed Student Insurance Plan and the cost will be billed to their student account, unless proof of other adequate health insurance coverage is provided. Students who already have health insurance for the entire academic year must submit a waiver request by the posted deadline each academic year, and the waiver request must be approved, in order to avoid being enrolled in the Student Insurance Plan. Such a waiver does not affect eligibility for services at the Student Health Center.

For graduate students receiving financial support in the form of teaching or research assistantships, the department will cover the cost of the Student Insurance Plan, or will cover the incremental cost to the student of their alternate insurance up to the equivalent cost of the Student Insurance Plan. For students with a spouse or dependents, whose spouse is not eligible for employer-provided health insurance, the student may request consideration for up to one-half the cost of the health insurance premium for their dependent(s).

For the international student any policy other than the one sponsored by the College must be approved by the King Student Health Center.

**Departmental Graduate Studies Committee**

The Departmental Graduate Studies Committee consists of faculty members, including the Director of the Graduate Studies Program, and a graduate student elected by the graduate students of the Department. This committee recommends changes in the graduate curriculum and procedures to the faculty of the Department, oversees the general structure of the graduate program, and grants exceptions to the regulations under special circumstances.

**Ph. D. Dissertation**

Advanced students undertaking Ph. D. dissertation research under the guidance of a faculty advisor should register for Physics 800, Physics Dissertation. This research is subject to an annual review as noted above.

The dissertation must be approved by a Ph.D. Dissertation Committee, which consists of at least five members, one of whom must be from outside the Physics Department. At least three members of the committee must be tenured or tenure-track members of the Physics faculty. The composition of the committee must be approved by the Director of the Graduate Studies Program and the Dean of Graduate Studies.