The Department of Physics and Astronomy Graduate Program Committee has compiled the following information to guide you through the process of earning graduate degrees in physics. The information given in this document may be changed at any time. The most current information is posted at the Physics & Astronomy Department web pages. If you have any questions, you should consult your advisor.

I. BULLETIN

The University of Denver Graduate Bulletin contains detailed information about the requirements for graduate degrees. The Office of Graduate Studies has the most current version: http://bulletin.du.edu/graduate/gradpolicy/. You should read carefully the relevant parts and thoroughly acquaint yourself with the procedures and requirements pertaining to the degree you seek. Your advisor will assist you in every way; however, it is your responsibility to make sure that all the requirements are met in a timely fashion.

II. ADVISING

The department is eager to help you to go through the formalities of earning degrees. It is to your advantage to complete course work and general examinations as early in your program as you can and to select a research area in which to do your thesis and dissertation work. To assist you in this, the department has established the following advising procedure.

A. INITIAL ADVISOR

Your initial advisor will be Dr. M. Mercedes Calbi (303.871.3547, mcalbi@du.edu).

You must see your advisor each quarter before registration to plan the courses you will take. If you wish to add or drop any of these courses for any reason, you must get your advisor’s signature. Your advisor can help you better if he or she is knowledgeable about your goals, your work, and the progress you are making in your degree program.

B. INTRODUCTION TO RESEARCH

During your first year, you will register in a 3-course sequence, Introduction to Research (PHYS 4001-3). This sequence is designed to provide incoming graduate students with the basic tools and advisement to conduct independent research and practice your oral and written communication skills. In the fall (PHYS 4001), by the end of the second week of classes, you will be required to choose a faculty member to work on your first research project. This faculty member may not necessarily be your final dissertation research advisor as described below.

C. RESEARCH ADVISOR

After you pass the Comprehensive Examination, the department encourages you to select a thesis or dissertation research area, unless you are seeking an M.S. degree without thesis. You should plan to see several faculty members and find a professor who will agree to accept you to do research in a mutually agreeable area. You should try to complete this process within one quarter after you pass the written part of the Comprehensive Examination. This faculty member will then become your advisor. (A non-thesis M.S. student may remain with his or her initial advisor.) You and your advisor must then form a Research Advisory Committee who will guide you to the completion of your remaining degree requirements.
III. REGISTRATION

You are normally required to register for a full load (8 quarter hours) every quarter in consultation with your advisor.

IV. DEPARTMENTAL EXAMINATIONS

A. COMPREHENSIVE EXAMINATION

All graduate students are required to take the graduate Comprehensive Examination in their second year. Incoming graduate students with graduate credits that have been transferred from another institution may petition the Graduate Committee to take the Comprehensive Examination during their first year as a graduate student. The Examination has two components, written and oral. Further guidelines are as follows:

I. Choosing the Topic:
The Examination topic is proposed by the student and must be approved by the Graduate Committee. The topic for the Examination is clearly distinct from that of the primary research of the student. The topic proposal consists of a one-paragraph overview of the topic that briefly describes its importance to Physics and Astronomy and the elements of core graduate-level topics that it entails. Before the final submission of the topic, consultation with the Graduate Committee Chair and the research advisor, to guide the choice of the topic, is strongly advised. The deadline for submission of the topic proposal is the end of the 6th week of classes in Autumn Quarter.

II. Written Component: Submitting the Outline of the Paper
Once the topic proposal has been approved, the student prepares an outline of the written component consisting of a brief description of its main sections, including appropriate sources and references. This outline must be submitted no later than February 1st. The corresponding Examination Committee provides feedback to the student on the proposed outline as a way of guiding the student toward the completion of the final paper.

III. Written Component: Submitting the Final Paper
For the completion of the written component of this Examination, the student prepares a paper of >2500 words in length, due by March 31st. The paper should describe in detail the key elements of the proposal and include rigorous mathematical derivations at the core graduate level. The paper should clearly address one or two key elements of the topic in depth, as opposed to a broad literature overview of all aspects of the chosen topic. All revisions of the written component must be completed by the end of the second week of May. Upon approval of the written component, the oral component may be scheduled.

IV. Oral Component:
The oral component is based on the written component, but also addresses related topics of the student’s graduate core curriculum. It consists of a ~30 minute presentation on the topic by the student, followed by questions from the committee. The oral component must be completed by the end of May.

V. Possible Outcomes:
The possible outcomes of the Comprehensive Examination, as decided by the Comprehensive Examination Committee, are: Pass at PhD level, Pass at MS level, or Fail. The outcome of the Examination is provided to the student.

If the outcome of the Examination is not satisfactory, a second and final attempt can be undertaken. This would normally take place during the following year’s Examination sequence. Administration of the Examination at an earlier date is possible if extenuating circumstances exist and if approved by the Graduate Committee.
B. MASTER’S FINAL EXAMINATION

Students seeking the Master of Science degree in physics must pass the M.S. Final Examination. This Examination is oral. For thesis-option students, the Examination is primarily a thesis defense (see below). For non-thesis option students, the examination will primarily cover your course work.

C. DISSERTATION RESEARCH PROPOSAL

Students who hold the preliminary Ph.D. candidacy (after passing the Comprehensive Examination at the PhD level) are required to give an oral presentation on his or her proposed Dissertation research in front of the Dissertation Committee so that the Dissertation Committee can assess if the proposed research is appropriate to grant a Ph.D. degree when completed as proposed.

This examination is based on the content of the proposed Dissertation research of the Candidate. At the presentation, the Dissertation Committee may ask any questions, particularly those relating to the proposed Dissertation research areas of the candidate.

This Examination is administered by the Dissertation Committee at least one year prior to the expected term of graduation. However, it is recommended to have this examination done as soon as the outline of the research is formulated by the Candidate and his or her Research Advisor and preliminary results have been obtained.

After passing this Examination successfully, the student is advanced to the final PhD Candidacy, and the Office of Graduate Studies must receive the Dissertation Oral Defense Committee Recommendation Form within 30 calendar days.

D. M.S. THESIS AND Ph.D. DISSERTATION DEFENSE

This is an oral examination, given by your research committee. The Examination is chaired by a faculty member outside the Physics and Astronomy Department who is appointed by the Associate Provost for Graduate Studies. Your committee decides whether your thesis or dissertation is acceptable as submitted or requires revisions. Information regarding the preparation of theses and dissertations can be obtained from the Department of Physics and Astronomy. See the Graduate Bulletin for further details regarding theses and dissertations.

V. COURSES REQUIRED FOR THE M.S. and Ph.D. DEGREES

You and your advisor (or Advisory Committee, once formed) have the responsibility of establishing a course of study for the advanced degree sought. The particular series of courses will vary somewhat with your interests, background, and desired goals.

Your Committee may require you to satisfy a foreign language or other tool requirements, such as computer programming competence, as described in the Graduate Bulletin.

PH.D. DEGREE

Degree Requirements:
- 90 graduate-level quarter hours, of which a minimum of 60 must be in Physics and Astronomy
- Maximum of 60 hours of transfer work (45 for earned masters + 15 hours after the masters was earned)
- Minimum GPA: 3.0
- Minimum grade for individual courses counted toward degree: C-. No more than one-fourth of the hours accepted toward the degree may be of C+, C, or C- grade.

Non-Course Requirements:
- Regular attendance at Physics and Astronomy colloquia
- Present a colloquium each year based on student’s current research
- Comprehensive Examination
- Preliminary Doctoral Advancement to Candidacy
- Formation of a Doctoral Advisory Committee
- Dissertation Research Proposal
- Final Doctoral Advancement to Candidacy
- Dissertation
- Oral Examination in defense of dissertation

**Course Requirements:**
A minimum of 90 credit hours beyond the baccalaureate including:

PHYS 4001, 4002, 4003 Introduction to Research I, II, III
PHYS 4111, 4112 Quantum Mechanics I, II
PHYS 4511 Advanced Dynamics
PHYS 4611, 4612 Advanced Electricity and Magnetism I, II
PHYS 4811 Statistical Mechanics

Students may omit one or more of these courses if content mastery is demonstrated by transfer credit or individual examinations. PHYS 3111, 3112, 3113 Quantum Physics I, II, III and PHYS 3711 Optics I may be applied to the degree. Other 3000-level PHYS courses and graduate-level courses in other departments may be applied to the degree, with the approval of the departmental Graduate Committee or the student's Doctoral Advisory Committee.

**(M.S. DEGREE)**

**Track:** THESIS TRACK

**Degree Requirements:**
- 45 graduate-level quarter hours in an approved course of study, of which a minimum of 30 must be in Physics and Astronomy
- Maximum of 10 hours of transfer work
- Minimum GPA: 3.0
- Minimum grade for individual courses counted toward degree: C-. No more than one-fourth of the hours accepted toward the degree may be of C+, C, or C- grade.

**Non-Course Requirements:**
- Regular attendance at Physics and Astronomy colloquia
- Present a colloquium each year based on student's current research
- Comprehensive Examination
- Advancement to Candidacy
- Formation of a Masters Advisory Committee
- Thesis
- Oral Examination in defense of thesis

**Course Requirements:**
A minimum of 45 credit hours beyond the baccalaureate, including:

PHYS 4001, 4002, 4003 Introduction to Research I, II, III
PHYS 4111, 4112 Quantum Mechanics I, II
PHYS 4511 Advanced Dynamics
PHYS 4611, 4612 Advanced Electricity and Magnetism I, II
PHYS 4811 Statistical Mechanics

Students may omit one or more of these courses if content mastery is demonstrated by transfer credit or individual examinations. PHYS 3111, 3112, 3113 Quantum Physics I, II, III and PHYS 3711 Optics I may be applied to the degree. Other 3000-level PHYS courses and graduate-level courses in other departments may be applied to the degree, with the approval of the departmental Graduate Committee or the student’s Masters Advisory Committee.
Track: NON-THESIS TRACK

Degree Requirements:
• 45 graduate-level quarter hours in an approved course of study, of which a minimum of 30 must be in Physics and Astronomy
• Maximum of 10 hours of transfer work
• Minimum GPA: 3.0
• Minimum grade for individual courses counted toward degree: C-. No more than one-fourth of the hours accepted toward the degree may be of C+, C, or C- grade.

Non-Course Requirements:
• Regular attendance at Physics and Astronomy colloquia
• Comprehensive Examination
• Advancement to Candidacy
• Oral Examination

Course Requirements:
A minimum of 45 credit hours beyond the baccalaureate, including:

PHYS 4001, 4002, 4003 Introduction to Research I, II, III
PHYS 4111, 4112 Quantum Mechanics I, II
PHYS 4511 Advanced Dynamics
PHYS 4611, 4612 Advanced Electricity and Magnetism I, II
PHYS 4811 Statistical Mechanics

Students may omit one or more of these courses if content mastery is demonstrated by transfer credit or individual examinations. PHYS 3111, 3112, 3113 Quantum Physics I, II, III and PHYS 3711 Optics I may be applied to the degree. Other 3000-level PHYS courses and graduate-level courses in other departments may be applied to the degree, with the approval of the departmental Graduate Committee.

By signing below, I acknowledge that I have read and understood this document.

_________________________________________  ___________________________________
Signature      Date

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