Graduate Student Advising Handbook
Department of Physics
Colorado School of Mines

August 2013

Comments/corrections to mailto:dmwood@mines.edu
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I. Introduction
This document is intended to serve as a manual, for graduate students and faculty alike, for how to navigate the procedures and requirements established for graduate students by the CSM physics department. Links to CSM Grad School information are also provided for convenience. Academic issues relevant to incoming students are addressed in Sec. II, Arriving at CSM, but a number of important non-academic issues are specified in Sec. V, Additional information. Wherever possible, links to the relevant documents have been placed, but be warned that the location of these links may change slightly as the Graduate School changes the structure of its web pages.


At present many forms distributed by the Graduate School are spreadsheets: YOU the student download them, fill them out, and then print them out, typically to get signatures prior to submitting the paper copy to the Grad School.

Additional questions should be addressed to the current chair of the departmental graduate council, David Wood (dmwood@mines.edu).

II. Arrival at CSM
Whether you are a new CSM M.S. or Ph.D student in physics, an M.S. student in one of our “combined programs”, or a graduate student within the Materials Science or Nuclear Engineering graduate program working in our department, we welcome you to graduate school at the Colorado School of Mines! The School has a number of resources for new graduate students, including

http://organizations.mines.edu/gsa/ [The Graduate Student Association]

http://gradschool.mines.edu/ [Recent changes at the Graduate School and useful links]

http://www.mines.edu/Costs_GS [Current list of tuition, fees, and insurance costs]

http://inside.mines.edu/LBGuide_Grad Library resources for graduate students

Generally, incoming graduate students become employees of CSM, and are thus required to do some initial paperwork for our Human Resources office

Contracts: http://gradschool.mines.edu/GS-Grad-Contracts

No matter what your role in our department, the following are useful guidelines:

A. Establishing residency
Due to the large difference in tuition charged Colorado residents vs. others, it is mandatory that incoming graduate students establish residency in Colorado as quickly as possible. The procedures for becoming a Colorado resident are outlined in the University Graduate Bulletin and at http://inside.mines.edu/Petitioning-for-In-State-Tuition-Classification. Because it takes a full year to establish residency, you must begin the process before the first day of classes to be eligible for in-state tuition at the beginning of the second year. If tuition support through the department has been granted,
it is assumed students will become residents, so this support will be based on in-state tuition after the first year. International students are exempt from this rule; they should organize their visa status through the CSM International Office [http://inside.mines.edu/International-Student-Information]

B. Student identification card and computer account
Immediately upon arriving on campus, a new graduate student needs to obtain a student Blaster Card (an identification card, named after the CSM mascot Blaster, an irritable-looking burro with a stick of dynamite clenched in his teeth—see the cover): http://www.is.mines.edu/BlasterCard. This is needed to (i) enter the building after normal business hours, and to (ii) establish a campus computer account and campus email address via an “Ekey”:

http://ccit.mines.edu/Getting-Started

Finally, (iii) the student should fill out a form (available from the physics department administrative assistant Barbara Pratt-Johnson [bpjohnso@mines.edu] in the departmental office on the third floor of Meyer Hall) to start an account on the physics department network, which provides access to many physics-specific tools. Be nice to Barbara and her assistant Summer Jackson: they are crucial to the smooth functioning of the Department and are repositories of vast wads of useful information.

The student’s academic advisor (named in the admission letter) and the Physics Department administrative assistant (Barbara Pratt-Johnson, bpjohnso@mines.edu) need to be notified of your new campus email address as soon as possible in order for you to be included in the distribution list for important notifications from the Department.

Additional useful links concerning campus-wide graduate school deadlines can be found at http://inside.mines.edu/GS-Graduation-Information-and-Deadlines

C. Transfer credit
University policy generally allows for up to 24 credit hours of courses to be transferred (i.e., to be applied toward your graduate degree requirements). If a student enters the Ph.D. Program with a thesis-based M.S. (or international equivalent) a total of up to 36 credit hours for combined courses and research can be transferred. Courses transferred must not have been used as (required for) credit toward your undergraduate degree. This information is used in the Admission to Candidacy form available at https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy, which should be consulted for restrictions of transfer credit.

Obtaining transfer credit is not simply a way of saving yourself time. The Graduate Bulletin states, “Students enrolled in thesis-based degree programs who have completed the minimum course and research requirements for their degree are eligible to continue to pursue their graduate program full time at a reduced registration [tuition] level.” The sooner you have your Admission to Candidacy form approved the sooner you (and your thesis advisor's grant) qualify for reduced tuition. “An approved Admission to Candidacy form must be on file in the Graduate Office within the first week of the semester you are applying for reduced thesis registration.” See the front of the current Graduate Bulletin.

The physics department’s Graduate Student Advisory Committee (GSAC) reviews applications for transfer credit. See the form entitled Transfer of Course Credit at the end of this document. You
should apply to the GSAC (current chair: Ulrike Hager, uhager@mines.edu) in the first week of your first semester at CSM. This process can actually begin when you are admitted into the program so you can confirm, before accepting admission, how much transfer credit you will probably be granted. In making decisions, the GSAC (or sometimes faculty who have recently taught a particular graduate or undergraduate course) will evaluate degrees, theses, transcripts, and course materials (text, syllabus, and assignments) from courses the applicant has taken, so please be prepared to bring in this material.

The GSAC also decides which courses taken elsewhere can be used in fulfillment of the requirements for the “quality control process” (used in lieu of a qualifying examination) in our department. To be considered for this purpose, these courses must have (i) been passed with a course grade of B (or better) or (ii) the contents of these courses must have been subject to a comprehensive examination (with a grade of B or better) for a graduate degree at your previous graduate institution. Foreign grading scales will be evaluated by the committee as needed.

D. Deficiency courses
Deficiencies in your academic preparation are usually identified and communicated to you during the admissions process. Depending on the nature of the deficiencies your admission can in fact be probationary. Courses which must be taken to make up deficiencies, generally undergraduate courses in the physics program, are identified to the student. Progress will be monitored by the student’s academic advisor. If additional deficiencies become obvious, the student should immediately consult with the academic advisor. If a satisfactory agreement between student and advisor on a course of action cannot be found, the Graduate Student Advisory Committee will mediate and set benchmarks for the student to fulfill.

III. M.S. in Applied Physics

A. Department's recommended degree timetable – M.S.

<table>
<thead>
<tr>
<th>Task</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Identify deficiency courses</td>
<td>Before start of first semester of classes</td>
</tr>
<tr>
<td>2) Apply for transfer credit</td>
<td>First week of first semester</td>
</tr>
<tr>
<td>3) Identify research advisor</td>
<td>During first semester</td>
</tr>
<tr>
<td>4) Form thesis committee; see the form <a href="https://inside.mines.edu/GS-Committee">https://inside.mines.edu/GS-Committee</a></td>
<td>By end of first semester</td>
</tr>
<tr>
<td>5) Apply for admission to candidacy</td>
<td>As soon as all course requirements are met</td>
</tr>
</tbody>
</table>

Use the form at https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy

6) Complete core courses and electives | Before graduation |
7) Complete thesis proposal | At least one semester before thesis defense |

9) Apply for graduation, via the form at http://inside.mines.edu/GS-Grad-Application |
10) Check out and graduation; see forms at https://inside.mines.edu/FormatReview and https://inside.mines.edu/GS-Forms | Before departure |
B. Remarks for CSM “Combined Program” students

CSM's “Combined Program” results (under ideal circumstances) in an M.S. one year after completion of an undergraduate degree in Engineering Physics, our Department's baccalaureate program. This requires a compressed schedule. We suggest that

i. The Thesis Committee be formed by the end of the first month of graduate school;

ii. Most research be completed by the end of the first semester of graduate study

iii. The Admission to Candidacy form be approved as early as the registration period for the last (second) graduate semester

iv. The thesis proposal, consisting of a 5-page proposal and a 10-minute oral defense, be completed by October in order to graduate in May

v. The M.S. thesis be defended well before the end of the second (Spring) semester.

C. Course requirements

Core courses: [usual sequence indicated]
PHGN511 Mathematical Physics I [Fall first year]
PHGN520 Quantum Mechanics I [Spring first year]

One additional course selected from:
PHGN505 Classical Mechanics I [Fall]
PHGN507 Electromagnetic Theory I [Spring]
PHGN521 Quantum Mechanics II [Fall]
PHGN530 Statistical Mechanics [Fall]

Electives - 9 hours

Graduate Seminar: PHGN 501-502 - 2 hours cumulative credit.
A full time student must also register for and attend the Graduate Seminar (the Department's regularly-scheduled colloquium, Tuesdays at 4 PM). Part of the Seminar series includes training in the responsible conduct of research (RCR), now mandated by some federal granting agencies. See Sec. V Additional information, below.

Research Credit and Master’s Thesis

Note: The sum of all course and research credit hours per semester should add up to 15 in order to take full advantage of reduced tuition policies in the later years of study. Summer registration should be arranged in consultation with your academic advisor since regulations depend on your employment situation.

D. Thesis proposal
Shortly after forming a thesis committee and at least one semester before the thesis defense, the M.S. candidate will prepare a thesis proposal and present it to the committee, which will approve the proposed program of research. While the advisor and committee provide overall guidance on the style
and content of the thesis proposal, in general it should:

1. Include adequate background to allow the committee to understand the importance of the proposed research.
2. Discuss the project within the framework of prior research and place it in context within the relevant field of study. Include an adequate bibliography to demonstrate that you have a complete grasp of the relevant literature.
3. Present and justify the techniques and approaches that will be used to achieve the proposed goals. While not always necessary, preliminary results are often included to help justify the direction and approach.
4. Include a time table for completion of the thesis, and a list of courses that have been taken (or will be taken) to meet the degree course requirements.

E. Thesis preparation and defense

M.S. students in Physics must prepare and defend a thesis. The thesis is prepared by the student, based on the student's original research. While a thesis tends to include more detail than a journal article, it is expected that the technical quality of the thesis, and the writing itself, are of journal quality. See also https://inside.mines.edu/GS-Thesis-Writing-Guide. In general a physics thesis discusses an application of the scientific method to a substantive research issue and demonstrates mastery of a research topic by the student. In preparing the thesis, the student coordinates the writing with the thesis advisor. The advisor provides guidance on the content of the thesis, writing style, and time frame for its submission. Once the advisor has approved the thesis, the student arranges a meeting of the thesis committee to defend the thesis. In addition to the rules and procedures in the university Graduate Bulletin [http://inside.mines.edu/Bulletins and https://inside.mines.edu/UserFiles/File/gradSchool/ThesisDefenseRequest.pdf] the departmental guidelines for thesis defense given below must be followed.

1. Final copies of the thesis must be given to the committee members at least a week before the defense date.
2. A copy of the thesis should be left with the department administrative assistant at the same time it is distributed to the committee to allow non-committee members, who might wish to attend the defense to review the thesis in advance.
3. An email announcement which includes the student's name, thesis title, location, and time of defense should be sent to physics department faculty, staff, and graduate students at least one week before the defense. You can use the form Notice of Thesis Defense at the end of the Handbook.
4. An advertisement for the thesis defense, using the form given in the forms section of the brochure, should be printed and given to the department administrative assistant at least one week in advance of the defense.
5. The defense should be scheduled for two hours. This includes an oral presentation by the student of a summary of the thesis, followed by questions from the committee and guests. The length and style of presentation is determined by the committee chair in conjunction with the student although talks are typically 30–40 minutes long.

Possible outcomes of the defense are discussed in the Graduate Bulletin, available at http://inside.mines.edu/Bulletins.
6. After a successful defense, and completion of any corrections to the thesis, the thesis is formally submitted. Note: the possibility of strictly electronic submission is currently being considered. The Statement of Work Completion form [https://inside.mines.edu/UserFiles/File/gradSchool/workcomplete.pdf] is submitted to the Graduate School office. A copy must go to the department administrative assistant and to the thesis advisor.

The check-out procedure for graduation is discussed in the Graduate Bulletin.

IV. Ph.D. in Applied Physics

A. Department’s recommended degree timetable – Ph.D.

<table>
<thead>
<tr>
<th>Task</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Identify deficiency courses</td>
<td>Before start of first semester of classes</td>
</tr>
<tr>
<td>2) Apply for transfer credit</td>
<td>First week of first semester</td>
</tr>
<tr>
<td>3) Identify research advisor</td>
<td>Typically during second semester</td>
</tr>
<tr>
<td>4) Form thesis committee; see the form at <a href="https://inside.mines.edu/GS-Committee">https://inside.mines.edu/GS-Committee</a></td>
<td>By end of third semester</td>
</tr>
<tr>
<td>5) Complete core courses and “quality control process”</td>
<td>Between end of first and end of second year</td>
</tr>
<tr>
<td>6) Complete electives requirement</td>
<td>Before admission to candidacy</td>
</tr>
<tr>
<td>8) Apply for admission to candidacy; see the form at <a href="https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy">https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy</a></td>
<td>Recommended by end of second calendar year</td>
</tr>
<tr>
<td>7) Thesis proposal defense</td>
<td>End of third year</td>
</tr>
<tr>
<td>9) Defense of thesis; see the form at <a href="https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy">https://inside.mines.edu/GS-Application-for-Admission-to-Candidacy</a></td>
<td>During last semester</td>
</tr>
<tr>
<td>10) Apply for graduation, via the form at <a href="http://inside.mines.edu/GS-Grad-Application">http://inside.mines.edu/GS-Grad-Application</a></td>
<td></td>
</tr>
<tr>
<td>11) Check out and graduation; see forms at <a href="https://inside.mines.edu/FormatReview">https://inside.mines.edu/FormatReview</a> and <a href="https://inside.mines.edu/GS-Forms">https://inside.mines.edu/GS-Forms</a></td>
<td></td>
</tr>
</tbody>
</table>

B. Course requirements

The Ph.D. program in Applied Physics requires a series of core courses which students are expected to complete in their first three semesters of graduate study. These include: [usual sequence indicated]:

**Core courses**
- PHGN505 Classical Mechanics I [Fall first year]
- PHGN507 Electromagnetic Theory I [Spring first year]
- PHGN511 Mathematical Physics I [Fall first year]
- PHGN520 Quantum Mechanics I [Spring first year]
PHGN521 Quantum Mechanics II [Fall second year]
PHGN530 Statistical Mechanics [Fall second year]

In some instances students may not follow precisely this sequence. Examples might include students with transfer credit or with deficiency requirements. In such cases an alternative sequence can be pursued with approval of the student's advisor and the Graduate Student Advising Committee.

Electives - 12 hours
In addition, each student must complete 12 credit hours of elective courses. These are selected in consultation with first the student’s advisor and later with his/her thesis committee and can be in one of the three focus areas established within the Physics Department (Optical Science and Engineering, Photovoltaics and Electronic Materials, and Nuclear Physics and Astrophysics).

Graduate and Advanced Graduate Seminar – PHGN 601-602 – 1 hours cumulative credit
Each full time student must also register for the graduate student seminar (colloquium) as outlined below in section V. Part of the Seminar series includes training in the responsible conduct of research (RCR), now mandated by some federal granting agencies.

Research credit and Ph.D. thesis

Note: The sum of all course and research credit hours per semester should add up to 15 in order to take full advantage of reduced tuition policies in the later years of study. Summer registration should be arranged in consultation with the academic advisor as regulations depend on your employment situation.

C. Quality control process and admission to candidacy
All Ph.D. programs must include a “quality control process”. According to the current CSM Graduate Bulletin: “To demonstrate adequate preparation for the Ph.D. degree in Applied Physics, each student must pass the physics graduate core courses with a grade point average of 3.0 or better. Students not achieving this standard must pass oral examinations covering the areas of weakness identified in the core courses or retake the respective course with a grade of 3.0 or better within one year.

The graduate student advising committee (GSAC), described above and selected by the physics faculty, administers this policy. The GSAC guides the progress of the incoming physics graduate students, organizes the necessary oral examinations, and makes recommendations of graduate students to the physic faculty for admission to Ph.D candidacy. Each student passing the core courses identified above with a grade point average of 3.0 or better will be eligible to apply for Ph.D. Candidacy. See the form entitled Quality Control Completion at the end of the Handbook.

Students who do not meet this standard will be required to take an oral examination in areas of weakness as determined by the GSAC, typically in those core courses were the student received a grade lower than B (3.0). Members of the physics faculty will administer the necessary oral examinations during as scheduled, generally as soon as possible after the student has completed the core sequence. The GSAC may grant students postponements in emergency circumstances. If the student fails the oral examination, the student may either (a) repeat the subject course or courses or (b) retake the oral examination at the next regularly scheduled opportunity. Students electing to repeat courses who fail to attain a grade point average of 3.0 or better in the physics graduate core with the new grade substituting
for the previous may not become Ph.D. candidates. Likewise, students who fail the oral examinations twice may not become Ph.D. candidates.

Students with previous graduate training may request the GSAC to consider substitution of earlier courses for core courses within one month of initiating graduate studies at CSM. Students admitted to the physics graduate program with a M.S. degree or a foreign equivalent, will have their previous course work, thesis, and other academic materials evaluated by the GSAC which will determine which courses, if any, can be substituted for core courses. Please see Section II. C. for more information on transfer credit.

D. Thesis proposal
Typically within the first year at CSM (and definitely before the end of the second year) the student will consult with the GSAC to identify a potential area of thesis research and a thesis advisor. The student and advisor will identify a thesis committee. Pay careful attention to campus guidelines for committee membership given in the Graduate Bulletin [http://inside.mines.edu/Bulletins]. The Ph.D. candidate will, after finishing the above outlined course requirements, prepare a thesis proposal, which should be defended no later than one year after admission to Ph.D. candidacy and must be completed at least one year before the thesis defense. While the advisor and committee provide overall guidance on the style and content of the thesis proposal, in general it should:

1. Include adequate background to allow the committee to understand the importance of the proposed research.
2. Discuss the project within the framework of prior research and place it in context within the relevant field of study. Include a comprehensive bibliography to demonstrate that you have a complete grasp of the relevant literature.
3. Present and justify the techniques and approaches that will be used to achieve the proposed goals. While not always necessary, preliminary results are often included to help justify the direction and approach.
4. Include a time table for completion of the thesis and a list of courses that have been taken (or will be taken) to meet the degree course requirements.

The thesis proposal should not, however, be a mini-thesis; it needs to be a proposal. It need not be a long document. Something less than 30 pages with less than 20 pages of actual written discussion is more than adequate.

The format of the thesis proposal defense is set by the committee but typically is scheduled for two hours with a short presentation followed by questions from the audience and committee. Upon successful completion, the committee and advisor will complete the form entitled Ph.D. Thesis Proposal Defense, at the end of the Handbook.

Ph.D. candidates have two attempts to defend their thesis proposal. If necessary, the second thesis proposal defense must occur within six months of the first attempt. A student who fails to successfully defend his or her thesis proposal after two attempts will be removed as a physics Ph.D. candidate but may petition the GSAC for permission to pursue a M.S. degree.

E. Thesis preparation and defense
Ph.D. students in Physics must prepare and defend a thesis. The thesis is prepared by the student,
based on the student's original research. While a thesis tends to include more detail than a journal article, it is expected that the technical quality of the thesis, and the writing itself, are of journal quality and that the central results of the thesis will be published. See also https://inside.mines.edu/GS-Thesis-Writing-Guide. In general a physics thesis discusses an application of the scientific method to a substantive research issue and demonstrates mastery of a research area by the student. In preparing the thesis, the student coordinates the writing with the thesis advisor. The advisor provides guidance on the content of the thesis, writing style, and the time frame for its submission. Once the advisor has approved the thesis, the student arranges a meeting of the thesis committee to defend the thesis. In addition to the rules and procedures in the university Graduate Bulletin [http://inside.mines.edu/Bulletins and https://inside.mines.edu/UserFiles/File/gradSchool/ThesisDefenseRequest.pdf] the departmental guidelines for thesis defense given below must be followed:

1. Copies of the thesis must be given to the committee members at least a week before the defense date.
2. A copy of the thesis should be left with the department administrative assistant at the same time it is distributed to the committee to allow non-committee members who might wish to attend the defense to review the thesis in advance.
3. An email announcement which includes the student's name, thesis title, location, and time of defense should be sent to physics department faculty, staff, and graduate students at least one week before the defense.
4. An advertisement for the thesis defense, using the form given in the forms section of the brochure, should be printed and given to the department administrative assistant at least one week before the defense.
5. The defense should be scheduled for two hours. This includes oral presentation by the student of a summary of the thesis. This is followed by questions from the committee and guests. The length and style of presentation is determined by the committee chair in conjunction with the student although talks are typically 30-40 minutes long. Possible outcomes of the defense are discussed in the Graduate Bulletin.
6. After a successful defense, and completion of any corrections to the thesis, the thesis is formally submitted. Note: the possibility of strictly electronic submission is currently being considered. The Statement of Work Completion form [https://inside.mines.edu/UserFiles/File/gradSchool/workcomplete.pdf] is submitted to the Graduate School office. A copy must go to the department administrative assistant and to the thesis advisor.
7. The check out procedure for graduation is discussed in the university Graduate Bulletin.

V. Additional information
A. Physics colloquium
An important activity in the physics department is the weekly colloquium. The colloquium organizer tries to bring speakers covering interesting and important topics from all fields of physics. The current schedule is generally at the URL

http://physics.mines.edu/mediawiki/index.php/Physics_Department_Colloquium_Schedule

It is important and enriching for graduate students to be exposed to problems from different areas, thus they are required to register for and attend the colloquium. During fall and spring term students in the
M.S. Program register for PHGN501 and 502, respectively. Ph.D. students register for PHGN601 and 602. Each semester students are awarded either a PRG (satisfactory progress) or a PRU (unsatisfactory progress). Credit is not awarded each term, but credit and a letter grade are given at the time of graduation. M.S. Students receive a total of 1 credit hours and Ph.D. students are awarded 1.

Note that this series also generally includes (1) in the Fall semester, a mandatory refresher version of the Environmental Health and Safety safety training for faculty, staff, postdocs, continuing grad students, and undergraduates working in laboratories, and (2) in the Spring semester, administration of the Department's policy on responsible conduct of research (RCR), included at the end of the Handbook.

B. Other training for graduate students required by the Graduate School
Please carefully examine regulations generally posted at http://gradschool.mines.edu/. These currently include the full Environmental Health and Safety training course during their first semester and sexual harassment prevention training.

C. Obtaining financial support
Graduate students in the physics department are usually supported via full or partial teaching and research assistantships. Before admission, support is negotiated with the chair of the departmental graduate student admissions committee (current chair: Tim Ohno, tohno@mines.edu) for the first year. After this year support should be arranged through the student’s academic advisor and is typically in the form of a research assistantship. If a research advisor has not been identified after the first year is complete, and a student needs a teaching assistantship to maintain continuous funding, it is important to communicate this early to the student's first year advisor and to the Department Head (currently Tom Furtak), who generally manages the teaching assistantship budget. In general teaching assistantship support is limited and hence not guaranteed after the first year, which makes identification of a research advisor and project important. Priority for teaching assistantships is given to first year graduate students in the Ph.D. program followed by Ph.D. students who have not identified a research advisor, and then M.S. students.

D. Responsible conduct of research
Graduate students are required to demonstrate familiarity with and adherence to the Department's policy, specified in the page entitled Responsible Conduct of Research Policy, attached at the end of the Handbook.

E. Departmental and campus facilities
The Physics Department employs a machinist and an electronics technician who control a mechanical/machine shop and an electronics workshop respectively. Students can, after consultation with their thesis advisors, submit orders for fabrication or repairs to these workshops. After appropriate training they can also use the facilities by themselves. All other technical equipment in the physics department is under control of one of the research groups and can be used only after coordination with and training through the responsible faculty. There are also facilities in other departments available for use by physics graduate students; these are subject to their own regulations.
Colorado School of Mines, Physics
Transfer of Course Credit

Student Name: ______________________________ Date: ____________

Student CWID#: ______________ Degree Sought: ______________

Credits to be transferred:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Equivalent Credits (Semester)</th>
<th>Grade</th>
<th>Date</th>
<th>CSM Course Name/Number to be replaced</th>
<th>CSM Course Instructor Approval</th>
</tr>
</thead>
</table>

Advisor Name: ______________________________

Advisor Approval: ___________________________ Date: ____________

Departmental Graduate Student Advising Committee Chair Approval:

________________________________ Date: ____________

13
Colorado School of Mines, Physics
Proposal Defense

Student Name: ______________________________    Date: __________________

Student CWID#: ______________    Degree Sought: ______________

By affixing signatures below, the advisor(s) and thesis committee members affirm that the student
named above has successfully defended his/her thesis proposal in accordance with the following guide
lines:

Shortly after forming a thesis committee and at least one semester before the thesis defense, the M.S.
candidate will prepare a thesis proposal and present it to the committee that will approve the proposed
program of research. While the advisor and committee provide overall guidance on the style and con-
tent of the thesis proposal, in general it should:
1. Include adequate background to allow the committee to understand the importance of the proposed
research.
2. Discuss the project within the framework of prior research and place it in context within the relevant
field of study.
3. Present and justify the techniques and approaches that will be used to achieve the proposed goals.
4. While not always necessary, preliminary results are often included to help justify the direction and
approach. The proposal should not, however, be a mini-thesis. It needs to be a proposal.
5. Include an adequate bibliography to demonstrate the student has a complete grasp of the relevant lit-
erature.
6. Include a time table for completion of the thesis, and a list of courses that have been taken (or will be
taken) to meet the degree course requirements.

The thesis proposal does not need to be a long document and an MS thesis proposal is anticipated to be
shorter than a PhD proposal. Something less than 20 pages with less than 15 pages of actual written
discussion is more than adequate. The format of the thesis proposal defense is set by the committee but
typically is scheduled for 1.5 hours with a presentation followed by questions and discussion with the
audience and committee.

__________________________________    __________________________________
Advisor/Date                                                                 Advisor/Date

__________________________________    __________________________________
Committee Member/Date                 Committee Member /Date

__________________________________    __________________________________
Committee Member/Date                 Committee Member /Date

__________________________________    __________________________________
Committee Member/Date                 Committee Member /Date

Reviewed by Chair of the Physics Graduate Student Advising Committee:

__________________________________    Date: ____________
Student Name: ______________________________ Date: ____________

Student CWID#: ____________________________

This form is used to document that the six core classes in Physics have been passed with at least a B (3.0) average. Students not achieving this standard must pass oral examinations covering the areas of weakness identified in the core courses or retake the respective course within one year.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Grade</th>
<th>Date Taken</th>
<th>Instructor</th>
</tr>
</thead>
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Advisor Name: ______________________________

Advisor Approval: ___________________________ Date: ____________

Reviewed by Chair of the Physics Graduate Student Advising Committee:

______________________________ Date: ____________

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Background
The nature of science itself places a strong ethical requirement on its practitioners. Scientific progress relies on members of the community having confidence in the reliability of reported results and how they fit within the context of prior work. Effective collaboration relies on assigning proper credit to colleagues. The credibility of science with the public relies on their trust that ethical standards are followed in scientific pursuits.

At the same time, the proper conduct of research from an ethical standpoint can be confusing. It can be difficult to distinguish between an honest error and misconduct. Different scientists may use different guidelines in assigning authorship to papers. Accepted behavior may differ between cultures. For this reason, guidance in the Responsible Conduct of Research (RCR) is an essential part of the education of science students. This both protects the integrity of the collective results of the scientific community and helps students avoid potential ethical lapses that could have far reaching implications for their career. For example, ethical misconduct such as falsification of data or plagiarism of a paper would likely lead to dismissal from CSM.

Procedure
The goal RCR education in the Physics Department at the Colorado School of Mines will be for students to have a clear understanding of the ethical standards expected of scientists and of how to apply them in a given situation. RCR education for graduate students in the Physics Department occurs through two avenues:

1. At the first colloquium of each spring term RCR training will be discussed and students will be assigned one of the excellent web-based modules available for RCR training at
   http://www.responsibleresearch.org/
   [for which the CSM Department of Physics is a registered institutional user]
   with a one week time frame for completion of the module. Satisfactory completion will be a requirement to receive a passing grade (PRG) in the Graduate Seminar course (PHGN502 and 602).

2. As part of our on-going work with students in research groups, advisors will discuss student questions about the on-line training and guide students in proper ethical conduct as part of the degree process. This will occur when, for example, the students are reporting their research in group meetings, documenting their results, working on their thesis proposal and its defense, writing their first papers, preparing and presenting their first talks, and applying for employment.