Proposal for Ethics and Integrity requirement, Department of Physics

Required Topics:

1. Plagiarism and other violations of the Graduate Honor Code

2. Proper use of professional conventions in citation of existing research and scholarship, accurate reporting and ownership of findings, and acknowledgement of contributions to the work

3. Ethical standards in teaching, mentoring, and professional activities

4. Available avenues for reporting alleged misconduct

The Physics Department's approach to fulfill these requirements includes: (1) providing presentations by both Physics faculty and by experts outside the department, (2) small break-out discussion sessions, along with larger group discussions led by faculty, and (3) practical experience provided by students giving a talk and writing a paper which will be graded on e.g. appropriate citations, adequate reporting and ownership of findings, acknowledgement of contributions to the work, and so forth. We believe that a student's direct experience and actual engaged practice with these issues is the best approach. Additionally, our professional society, the American Physical Society (APS), already provides guidelines and best practices applicable to the required topics.

In this document we outline the specifics of how we will include these topics during a graduate student's first year. The presentations by faculty and outside experts, and small break-out sessions, will take place during an already required two-semester, 1-credit course, PHYS 5944. This course includes our weekly "Introduction to Research" seminar, and in addition, the students are also expected to give an oral presentation at the end of the Fall semester and a written paper at the end of the Spring semester. These activities are already used to explore topics such as plagiarism, correct citation, research skills, and so forth, in a field-specific manner, as well as to help them find thesis advisors and to gain experience in giving talks.

1. Plagiarism and other violations of the Graduate Honor Code

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Points 1 and 2 are related and are already addressed within the PHYS 5944 course. Each Fall semester, we include an honor code seminar given by someone from the Graduate Honor System. In addition to this, a separate seminar is given by a Library representative on the proper use of professional conventions for scholarship, citing existing research, and how to use library resources.

Students are required to follow these practices when they give a short talk at the end of the fall term, as part of the PHYS 5944 course. Their temporary advisors judge whether they have sucessfully:

1. used proper citation
2. provided adequate reporting of ownership and contributions of others
3. use appropriate presentation methods (flow of talk, graphics, etc.)

Every student giving an oral presentation gets feedback from their temporary advisors. In this fashion the students learn acceptable practices in our field and discipline. It should be emphasized that this is a nontrivial requirement: not all students pass, every year a small number of students are required to redo their oral presentations the following semester.

Similarly, at the end of each Spring semester, first-year graduate students must write a research paper as part of PHYS 5944, based on their Fall semester oral presentation. The temporary advisor will judge the paper (graded Pass/Fail or Incomplete) on the following criteria:

1. not plagiarized
2. used proper citations
3. provided adequate reporting of ownership and contributions of other
4. used appropriate (American Institute of Physics) AIP guidelines for the manuscript.

A major aim for both the oral and written assignments is to help students pinpoint their own misunderstandings on the issues of plagiarism, proper use of professional conventions in citation of existing research and scholarship, accurate reporting and ownership of findings, and acknowledgement of contributions to the work, in addition to giving them opportunities to practice their presentation skills.

It should be emphasized that passing these requirements is not trivial -- every year, we have a few students who fail either the oral or written components, and are asked to re-do these assignments at a later date.

In addition, some of our graduate classes (such as PHYS 5794, PHYS 6555) require APS-quality reports, meaning that students are expected to write reports with formatting, citation, and plagiarism requirements that are equivalent to those of an APS journal. Thus, students get further exposure to the same ideas as they progress in our program.

3. Ethical standards in teaching, mentoring, and professional activities

We propose to devote one to several "Introduction to research" sessions to group discussions on the topic of ethical standards in teaching, mentoring, and professional activities. The American Physical Society provides ethics cases that are readily available for use in a group discussion setting (Ethics in Physics Case Studies | American Physical Society (aps.org)). We propose to use these examples to further impress upon the students situations they may encounter and how to act accordingly. Some specific topics the American Physical Society addresses are: conflicts of interest, data acquisition, educational concerns, health and safety, human subjects research, issues of bias, mentoring, publication practices, and responsible conduct of research. Several of these also address portions of the optional seven topics in Ethics and Integrity requirements, and they are presented specifically for our field.

For example, one seminar discussion may begin with dividing students into several subgroups to examine some of the example cases. In a following seminar, the students will reconvene to review the subgroup discussions, which will be led by a faculty member.

We also require **all** of our new graduate students to attend the GTA training workshops, which include such the mandatory session as "Prevention and Handling Harassment and Discrimination in the Classroom", "Encouraging and Enforcing Honesty in the Classroom", as well as other pertinent sessions. Furthermore, our department's Associate Chair actively solicits input from the faculty regarding the performance of the TAs, and when necessary, individually meets with the TAs to help them with any issues.

After their first year in our program, graduate students in the Physics Department receive continuous education in proper procedures when conducting and reporting original scientific research which specifically includes adequate referencing, acknowledgements, and citations of other scholars' contributions; and professional and ethical conduct in general during their intensive work with their research advisers.

4. Available avenues for reporting alleged misconduct

For this requirement, we will also devote a session in the "Introduction to research" seminar, where we will review the professional guidelines described on the American Physical Society website: http://www.aps.org/publications/apsnews/200301/guidelines.cfm . We will follow the group discussion model led by a faculty member, who may also discuss VT-specific resources for reporting to specific people inside and outside the department.

In addition to the required topics above, the CGSP resolution also lists a number of optional topics that graduate committees may decide to also address, including for example professional ethics, fair use, lab procedures, and authorship. Some of these optional topics, including professional ethics and fair use, are implicitly addressed above through for example utilization of the APS materials discussed. However, others of these optional topics are not appropriate for

our department. For example, many of our students are theorists, who do not work in labs. There are no lab procedures they can or should learn, and so we are specifically not including any requirement to learn any sort of lab procedures. Students who do need any sort of additional training, already receive such training, and that will not change. Similarly, precise authorship standards, including for example whether authors on papers are listed alphabetically versus in order of contribution to the work, vary between subfields. Although students receive continuous training in such matters from their thesis advisors, both explicitly and implicitly through for example studying and writing research papers, no `standardized' training applicable to all subfields exists, and so we do not try to require any sort of uniformized authorship training.