Emory University
Graduate Program in Physics

GRADUATE STUDENT GUIDE:

ROTATIONS

Introduction and Rationale
The rotation is a 12 week period of work on a research project under the direction of a faculty member. In the laboratory of an experimentalist faculty member, the rotation project is expected to involve the acquisition, analysis and interpretation of data, usually obtained with instrumentation that is the laboratory's specialty. In the group of a theorist faculty member, the rotation project could involve work on an aspect of theory, or the development and application of a computational or simulation approach. In each case, the student is not only engaged in the "hands on" research project, but also in the activities associated with the laboratory, such as group meetings. In essence, the student is treated as a member of the laboratory during the rotation period.

The purposes of the rotation are many-fold. A principal goal of the rotation sequence is to prepare the student for the PhD Qualifier Proposal. In addition to an emphasis on literature assimilation, and quasi-independent acquisition, analysis, and interpretation of data, the written rotation report and oral rotation presentation are designed to hone organization and communication skills that will benefit the preparation and presentation of the Qualifier Proposal.

From the student's perspective, the rotation is an opportunity to pursue research and interact closely with a potential dissertation supervisor. The sustainability of the student's interest in the subject area and the experimental/theoretical methods can be gauged, and the desireability of the group leader as a dissertation mentor can be judged. A parallel intent of the rotation program is that the student will gain an in-depth education and training in an area of research and, most importantly, a chance to participate directly in the "scientific method". This is an experience that is not attainable in the classroom.

From the faculty's perspective, the rotation is an opportunity to interact closely with a student and thus, to gain an idea of the student's abilities as a potential dissertation student researcher. The student's performance (including aptitude, level of intellectual engagement and work ethic) in the rotation will be regarded as an indication of suitability for continued work in the faculty member's group. The rotations also allow faculty an opportunity, outside of classes, to become familiar with students in the program.

Timetable
The first rotation will be performed during the summer following the first year. A summer rotation time period of 12 weeks could run, for example, from mid-May through mid-August. The second rotation should be performed prior to the end of the second academic year, either in the Fall or the Spring semester. To obtain the 4 hours of credit
for each rotation, students enroll in PHYS 597R, "Directed Study". For the summer rotation, students enroll in PHYS 597R for the following Fall semester. The grade for the summer rotation is awarded by the rotation supervisor after the completion of the written report and oral presentation, and submitted to the DGS. This grade is then received for PHYS 597R at the end of the Fall semester.

For the second rotation, students enroll in PHYS 597R for the Spring semester of their second year, regardless of whether the rotation is performed in Fall or Spring of the second year. For Fall rotations, supervisors report the grade to the DGS at the end of the Fall term. The grade for the second rotation is officially recorded at the end of the Spring semester.

Choosing the Rotation Supervisor
It is recommended that the faculty supervisor for the first rotation (in the summer following the first year) be the student's chosen dissertation supervisor (if known), or the faculty member who the student has identified as a possible dissertation supervisor. The summer offers a time relatively free of distractions, so that the student can take full advantage of the opportunity to learn and perform in the potential future dissertation research laboratory.

Conduct of the Rotation Research
The day-to-day details of the conduct of the rotation are defined by the rotation supervisor.

Graduate Program Requirements and Grading Criteria
Number of Rotations. Two rotations are required. In the event that a student desires to add an additional, third rotation, the Graduate Program will be supportive.

Rotation Report. A rotation report will be written by the student at the end of the rotation project. A copy of the report will be submitted to the Director of Graduate Studies at least three days prior to the date of the oral presentation. The report shall be a minimum of 10 pages (typed, double spaced; not including illustrations, figures and tables), and be composed as follows:

• Title.

• Abstract. (≤200 words)

• Introduction. (≥3 pages) The Introduction includes the background for the rotation project's main aim(s), which could range from the solution of a particular problem to the testing of the efficacy of a technique. The Introduction also includes a clear statement of the aim(s), and the current context for the particular problem or technique addressed.

• Methods. (≥2 pages) The experimental and/or analysis techniques used should be briefly described.
• Results. (≥3 pages) The principal results should be reported. The text of the results section should describe the data presented in Figures and Tables.

• Discussion. (≥2 pages) The interpretation of the data and any analysis that requires the assumption of a model should be described and explained. Future experiments should be suggested.

• Conclusions. The principal conclusion(s) should be briefly summarized.

• References. At least 3 publications in the area of the rotation should be referenced. It is assumed that the student has a reasonable understanding of the content of these references.

Rotation Oral Presentation.
The rotation oral presentation will be a 20-25 minute presentation (an additional 5 minutes will be allotted for questions after the presentation) of the elements of the rotation report. All students engaged in rotations will give their oral presentations together at a session held at the end of the Summer (the summer session will take place within the first two weeks of September), Fall or Spring terms. The date will be set by the DGS. Attendance will be open to all students and faculty. The oral presentations offer an excellent opportunity for both the graduate faculty and graduate students to become better acquainted and to learn basic features of the research currently being performed in the Department.

Letter Grade
The rotation supervisor will give a letter grade for the rotation project, which will be recorded for the PHYS 597R class corresponding to the rotation (see details under Timetable, above). The supervisor's evaluation will be based on the following factors: quality of the student's work, conscientiousness and degree of time and intellectual commitment, trainability, and sophistication in the level of approach to the project, and performance on the written report and oral presentation. Note that these evaluation factors are distinct from any emphasis on the significance, importance or publishability of the results obtained.

Given the clear description of the procedure and evaluation criteria for performance in the rotations, coupled with the ample opportunity for close interactions between student and rotation supervisor, a grade of B or less in a rotation is a significant departure from expectation, and will be a cause for concern. Cases of B or lower grades will be reviewed by the Director of Graduate Studies.

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