

Graduate Program in Physics and Astronomy

Ph.D. Degree Learning Goals and Assessment

The doctoral program in Physics and Astronomy trains students at the highest level to conduct research into forefront areas in physics and astronomy.

Learning Goal 1 for Students: Master the fundamental knowledge of the field; develop the problem solving skills and analytical thinking required to begin research.

Assessment of student achievement of Goal 1:

- Performance on homework, exams, class participation in graduate courses
- Written and oral qualifying exam to assess knowledge of field, problem solving skills, and analytical thinking

Role of the program in helping students to achieve Goal 1:

- Assure that students are being prepared in a coherent and academically rigorous fashion
- Assure breadth of knowledge by requiring courses outside primary area of interest
- Effective monitoring of student progress
- Provide guidance on preparing for the qualifier
- Evaluations of teaching effectiveness of instructors in graduate courses
 - If effectiveness below expectations, work with instructors to improve effectiveness
- Periodic review of curricular offerings and assessment tools

Learning Goal 2 for Students: Engage in and conduct original research

Assessment of graduate student achievement of Goal 2:

- Annual meetings of Ph.D. committee
- Preparation of and defense of Ph.D. dissertation
- Assessment of quality of Ph.D. dissertation
 - Public defense of dissertation
 - Critical reading of dissertation by a committee consisting of graduate faculty members and someone from outside of the Graduate Program in Physics and Astronomy
 - Submission and acceptance of conference papers and peer-reviewed articles based on the dissertation
- Achievement of students as evidenced by professional placements, selection to give conference presentations, peer-reviewed publications, and the awarding of individual grants and fellowships.

Role of graduate program in helping students achieve Goal 2:

- Research adviser guides and advises student on methods of research, finding thesis topic, and completion of research
- Acquaint students with research in department through the seminar in physics
- Provide an early introduction to research methods and opportunities for research
- Provide opportunities to present research and receive feedback
- Provide guidance toward timely completion of degree

Learning Goal 3 for Students: Master the skills required for careers in basic and applied research, development, and/or teaching.

Assessment of graduate student achievement of Goal 3:

- Review evidence of papers presented, publications, and professional networking
- Evaluations of teaching effectiveness of graduate student instructors
- Collection of placement data
- Survey graduates

Role of the program in helping students achieve Goal 3:

- Help students develop effective presentation and communication skills through annual committee meetings and presentations at group meetings, conferences, and other forums. Develop programs related to job and networking skills, including activity in professional societies
- Develop discipline-specific programs in concert with the Teaching Assistant Project
- Encourage enrollment in Introduction to College Teaching I and II
- Teach students how to do self assessments in their future professional capacities
- Acquaint students with career opportunities outside of physics and astronomy

The leadership of the Graduate Program of the Department of Physics and Astronomy will regularly review the structure and content of the program and feedback received from assessments and surveys. These reviews are used to help improve the program so that it provides the best possible education for our students.