

Master of Science (M.S.) in Physics Academic Assessment Plan 2012-13

College of Liberal Arts and Sciences
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Office of the Provost

*University of
Florida*

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2012-13 Academic Assessment Plan – M.S. in Physics

College of Liberal Arts and Sciences

A. Mission

Graduate Division

The M.S. Program in the Physics Department is designed to educate and train the next generation of physicists and educators. The focus of our program is on the Ph.D. degree, whose awardees learn how to apply fundamental laws of physics to specific situations, set up experiments, analyze and interpret experimental data, compose mathematical models of physical phenomena, and present results via written and oral communication. Externally funded research is the foundation of our graduate program, which prepares our students for scientific challenges in academia, private industry, and government labs. We promote the advancement of science through publications, public outreach, and other activities within our profession and beyond. A **Master's non-thesis** degree is similar to a Ph. D. degree in terms of coursework but does not require research. It is often taken by students who can pass the Department's academic requirements but do not choose to proceed to a Ph.D., or taken en route to a Ph.D. The Department's requirements for an M.S. non-thesis are that the student passes the preliminary examination by the end of their second year, obtain a GPA of at least 3.0 in the six "core courses", and satisfy the Ph.D. "distribution requirement". Graduate School regulations dictate a total of 30 credits of which a maximum of 6 credits are "S/U" type credits; the above program will satisfy these requirements.

College

Our mission is to prepare exemplary qualified physicists and to generate new knowledge about Nature from the physics perspective. The College of Liberal Arts and Sciences is the home for some of the world's most respected educators and scholars who advance the value and practice of exact and natural sciences in the modern society. The faculty are committed to preparing professionals and scholars to practice and teach in a global society, providing leading research and service while generating and sharing knowledge.

University

The mission of the University of Florida is to offer broad-based, exclusive public education, and opportunities for cutting-edge research and service to the citizens of Florida, the nation and the world. The fusion of these three endeavors stimulates a remarkable intellectual vitality and generates a synthesis that promises to be the university's greatest strength. The university maintains its dedication to excellent teaching and researching by creating a strong and flexible foundation for higher education in the 21st century. The university welcomes the full exploration of our intellectual boundaries and supports our faculty and students in the creation of new knowledge and the pursuit of new ideas. Teaching is a fundamental purpose of this university at both the undergraduate and graduate levels. Research and scholarship are integral to the education process and to the expansion of our understanding of the natural world, the intellect and the senses. Service reflects the university's obligation to share the benefits of its research and knowledge for the public good.

Shared Mission

We seek to produce scholars conducting cutting-edge research to create new knowledge and new ideas. These diverse graduates will be skilled in independent thinking and problem-solving to become the leaders in academic and professional environments.

B. Student Learning Outcomes and Assessment Measures

SLO Type	SLO	Assessment method	Delivery Method
Knowledge	Students will describe, define and explain the foundations of physics.	All M.S. students must complete 4 core courses in Mechanics, Electromagnetism, Quantum Mechanics, and Statistic Physics with an average GPA not lower than 3.0. The grades for these courses are based on midterm and final exams, and on solution of homework problems, but not on attendance and participation. Students are required to pass (within the first 2 years in the program) a written examination comprising 12 physics problems, set and graded by 12 faculty members. The pass/fail mark for each exam is determined by the faculty as a whole.	Campus
Knowledge	Students will identify and explain key open questions in modern physics.	All M.S. students are required to take at least three advanced courses in three different subfields of physics (distribution requirement). The grades for these courses are based on midterm and final exams, and on solution of homework problems, but not on attendance and participation.	Campus
Skills	Student will communicate clearly scientific ideas in both written and oral form.	Should a student decide to leave the programs with Masters, they have to take a final exam administered by the Graduate Coordinator. The exam will test their general understanding of the various subfields of physics. In addition, the Department hosts journal clubs where graduate students give talks on recent research developments.	Campus
Professional Behavior	Students will demonstrate ethical behavior, cultural sensitivity, and professional conduct.	All students are required to attend a training seminar of ethical behavior in science and to sign a pledge, acknowledging familiarity with the University of Florida policies on plagiarism.	Campus

C. Research

Masters degree candidates are not required to be involved in research, but are encouraged and have ample opportunities to do so. The Department's faculty members have active and productive research programs. Over the past five years, the members of our Department have published an average of 240 papers per year, about 5 articles per tenure-accruing faculty member per year, in peer-reviewed scientific journals, and they are frequently invited to present the results of their research at national and international conferences. Many of the faculty members have received national and international recognition for their research accomplishments, and are extremely active in national and international physics committees and national panel.

D. Assessment Timeline

Assessment	Assessment 1	Assessment 2
SLOs		
Knowledge		
Foundations of physics	Upon completion of core courses	Preliminary Exam
Advanced topics in physics	Upon completion of each advanced-level class	Final exam
Skills		
Communication of scientific ideas	Upon completing the program	Final exam
Professional Behavior		
Ethics and professional conduct	Upon completion of training seminar on scientific ethics (1 st year in the program)	

E. Assessment Cycle

Analysis and Interpretation:	Carried out in May-June
Program Modifications:	Completed by August 31
Dissemination:	Completed by September 30

SLOs	Year	10-11	11-12	12-13	13-14	14-15	15-16
Knowledge							
Foundations of physics				X	X	X	X
Advanced topics in physics				X	X	X	X
Skills							
Communication of scientific ideas				X	X	X	X
Professional Behavior							
Ethics and professional conduct				X	X	X	X

F. Measurement Tools

The measurement tools involve a combination of methods. The “Foundations of physics” SLO is measured through the performance of students in core courses, in which they have to maintain an average GPA of 3.0, and through the preliminary exam. In the first case, faculty who teach the core courses derive individual student’s grade, while the Graduate Coordinator monitors the overall process. The grades for these courses are based on midterm and final exams, and on solutions of homework problems but not on attendance and participation. In the second case, the preliminary exam is constructed and graded by a team of 12 faculty members supervised by the Chair of the Preliminary Exam Committee. The pass/fail mark for each exam is decided on by the whole faculty. A successful MS degree candidate will have passed the exam by the end of his/her 2nd year in the program. The “Advanced topics in physics” SLO is measured by faculty who teach advanced-level courses, while the Graduate Coordinator monitors the overall process. It is also measured by the members of the Final Exam committee appointed by the Graduate Coordinator. The “Communication of scientific ideas” SLO is measured by the final exam and through faculty assessment of guided participation in journal clubs. The “Ethics and professional behavior” SLO is measured by completion of the mandatory training seminar on scientific ethics and professional conduct.

G. Assessment Oversight

Name	Department Affiliation	Email Address	Phone Number
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Figure 1: University of Florida Graduate/Professional Program Assessment Plan Review Rubric

Related resources are found at <http://www.ua.assessment.edu>

Program:

Year:

Component	Criterion	Rating			Comments
		Met	Partially Met	Not Met	
Mission Statement	Mission statement is articulated clearly.				
	The program mission clearly supports the College and University missions, and includes specific statements describing how it supports these missions.				
Student Learning Outcomes (SLOs) and Assessment Measures	SLOs are stated clearly.				
	SLOs focus on demonstration of student learning.				
	SLOs are measurable.				
	Measurements are appropriate for the SLO.				
Research	Research expectations for the program are clear, concise, and appropriate for the discipline.				
Assessment Map	The Assessment Map indicates the times in the program where the SLOs are assessed and measured.				
	The Assessment Map identifies the assessments used for each SLO.				
Assessment Cycle	The assessment cycle is clear.				
	All student learning outcomes are measured.				
	Data is collected at least once in the cycle.				
	The cycle includes a date or time period for data analysis and interpretation.				
	The cycle includes a date for planning improvement actions based on the data analysis.				
	The cycle includes a date for dissemination of results to the appropriate stakeholders.				

University of Florida Graduate/Professional Program Assessment Plan Review Rubric, continued

Component	Criterion	Rating			Comments
		Met	Partially Met	Not Met	
Measurement Tools	Measurement tools are described clearly and concisely.				
	Measurements are appropriate for the SLOs.				
	Methods and procedures reflect an appropriate balance of direct and indirect methods.				
	The report presents examples of at least one measurement tool.				
Assessment Oversight	Appropriate personnel (coordinator, committee, etc.) charged with assessment responsibilities are identified				

Appendix A. Qualifying Exam Rubric – Preliminary Exam in Physics

Objective	Exceeds expectations	Near expectations	Below expectations
To test understanding of basic sub-disciplines of Physics: Classical Mechanics, Electromagnetism, Statistical Mechanics and Thermodynamics, Modern Physics and Quantum Mechanics.	Student is able to solve most of the problems offered at an advanced undergraduate level, and achieve significant progress towards the solution of the remainder of the problem. Student's performance is above the bar determined by decision of the faculty for each particular instance the exam is administered. A student is allowed to proceed towards the advanced degree.	The exam is graded on the pass/fail scheme. There is no conditional pass for this exam.	Students can solve only some of the problems; his or her performance is below the bar set by the faculty meeting. The exam is to be retaken, up to a maximum number of four attempts. If a student does not pass the exam on the fourth attempt, he or she has to leave the program.