Physics M.S. Assessment Plan

Designation	Title	1.1 Deep knowledge of Physics	1.2 Extensive knowledge of Specialty	2.1 Perform effective research	3.1 Communicate in writing.	3.2 Communicate in multiple ways
PHYS 683	Mathematical Physics II	2	2			
PHYS 721	Electrodynamics I	3				
PHYS 723	Electrodynamics II	3				
PHYS 733	Experimental Particle Physics	1	3			
PHYS 739	Condensed Matter Physics I	2	2			
PHYS 743	Statistical Mechanics	3				
PHYS 749	Condensed Matter Physics II	1	3			
PHYS 751	Theoretical Mechanics	3				
PHYS 761	Nuclear & Particle Physics	2	2			
PHYS 763	Advanced Particle Physics	1	3			
PHYS 765	Advanced Nuclear Physics	1	3			
PHYS 771	Quantum Mechanics I	3				
PHYS 773	Quantum Mechanics II	3				
PHYS 775	General Relativity	1	3			
PHYS 779	Group Theory	1	3			
PHYS 783	Quantum Field Theory	1	3			
PHYS 784	Advanced Quantum Field Theory	1	3			
PHYS 785	Astrophysics & Cosmology	1	3			
PHYS 790	Seminar		2	1	2	3
PHYS 788/798	Master's Research/Thesis	1	3	3	3	3

3	High Importance
2	Medium Importance
1	Low Importance
	No Importance

The Table above shows the mapping of the learning outcomes to the curriculum. M.S. students must take and pass a set of required courses that, together, provide the primary basis for Outcome

1.1, Deep Knowledge of Physics. Appropriate elective coursework as determined by the student's graduate committee provides the primary basis for Outcome 1.2, Extensive Knowledge of a Specialty Area. Continued enrollment in either graduate program requires the maintenance of at least a 3.00 grade point average. Course instructors are expected to evaluate student abilities in a given course using rubrics based on exams, homework assignments, and projects.

For M.S. students, there is no additional written comprehensive or qualifying exam. However, continued assessment of Objective 1 beyond course performance, and assessment of Outcome 2.1, the ability to Perform Effective Research, is the responsibility of the M.S. student's graduate committee, based on the defense of their M.S. thesis (for thesis-track students) or completion of their final project (for non-thesis students). When deemed necessary, committee members can recommend additional coursework to demonstrate proficiency in any areas deemed lacking.

Objective 3 is achieved primarily through a combination of the Seminar Course (taken once by each M.S. student) and individual work with the student's major advisor as part of the student's research. In the seminar course, a set of rubrics will be used to assess these learning outcomes.

Exit interviews of graduating students, tracking of job placement, and alumni surveys will provide additional assessment. In all courses, student opinion surveys (IDEA) and formative assessment measures such as open-ended questions and in-class discussions, analogy prompts, and muddiest-point feedback will be employed to assist faculty in continuous improvement of the curriculum.

PHYSICS M.S. OBJECTIVES & OUTCOMES

OBJECTIVE 1: Students will have deep knowledge of physics.

Outcomes

1. Physics M.S.'s should have deep knowledge of the theories that form the basis of classical mechanics, electromagnetism, quantum mechanics, and statistical mechanics.

2. Physics M.S.'s should have deeper knowledge of one or more specialized fields such as condensed matter physics, nuclear physics or particle physics.

OBJECTIVE 2: Students will be able to perform effective research in physics.

Outcomes

1a. Physics M.S.'s in experimental subfields should be able to design and conduct experiments in order to investigate physical phenomena. They should be able to analyze data.

1b. Physics M.S.'s in theoretical subfields should be able to apply or extend theories in order to describe or explain physical phenomena.

2. Physics M.S.'s should be prepared to follow a career path in a variety of industries or

education.

OBJECTIVE 3: Students will communicate effectively.

Outcomes

1. Students will communicate in writing about scientific and technical concepts concisely and completely.

2. Students will organize and communicate ideas using words, mathematical equations, tables, graphs, pictures, animations, diagrams, and other visualization tools.