Physics (PHY) Masters Degree

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ACADEMIC YEAR COVERED BY THIS REPORT: 2021-2022

I. PROGRAM LEARNING OUTCOMES

Graduates will be able to • Apply and integrate knowledge and content mastery in the following physics subjects Quantum Mechanics, Electricity and Magnetism, Mathematical Methods, Optics, Statistical Mechanics, Classical Mechanics, and at least one elective technical subject area (Outcome 1). • Demonstrate the ability to understand, design, and conduct research (Outcome 2). • Demonstrate the ability to apply content knowledge in either physics research or work environments to solve scientific problems using theoretical, computational, and experimental skills (Outcome 3). • Effectively communicate scientific work and results in both written and oral formats (Outcome 4). • Demonstrate both the understanding and execution of ethical research (Outcome 5). • For M.S.T. students, understand and apply current and advanced physics pedagogy and related approaches and techniques (Outcome 6).

II. PROCEDURES USED FOR ASSESSMENT

A. Direct Assessment

Direct Assessment 1. Physics content understanding is assessed via monitoring of the graduate students' academic performance in coursework (Outcome 1). 2. The ability to conduct research and communicate research results is assessed by monitoring the number of successful dissertations and thesis defenses (Outcomes 2-4). 3. For students in the MST program, the ability to conduct research and communicate research results is assessed by monitoring of successful end-of-program pedagogy projects (Outcome 6). The American Physical Society (APS) is currently finalizing the Effective Practices for Physics Programs (EP3) Project. EP3 will provide a guide for self-assessment of undergraduate physics programs founded on documented best practices linked to measurable outcomes. The American Physical Society (APS) is a nonprofit membership organization working to advance and diffuse the knowledge of physics through its outstanding research journals, scientific meetings, and education, outreach, advocacy, and

international activities. It had been expected that the EP3 guide would have been available by now, but its release was delayed and is now scheduled for early 2021. The Wright State University Department of Physics has delayed making any significant modifications to its assessment design and implementation until access to EP3 is possible. The WSU Physics Department is committed to developing and utilizing an assessment approach that is viewed as the gold standard, as outlined in the EP3 guide, as regarded by the national physics community.

B. Scoring of Student Work

At the present time, assessment is performed via qualitative examination of course performance data. The Department is working to develop a comprehensive rubric for assessing student course performance and the student thesis work.

C. Indirect Assessment

Further assessment is accomplished by tracking student outcomes post-graduation i.e. employment or graduate school admissions. Exit interviews with recent graduates will be used to measure all three outcomes. Every third year an alumni survey will be conducted.

III. ASSESSMENT RESULTS/INFORMATION:

1. Direct 2. Indirect

1. No direct assessment has been performed for 2021-22. 2. a. For the 2021-22 academic year, no graduate students in Physics were dismissed from the graduate school for academic performance issues, meaning that no student's GPA fell below a cumulative value of 3.0, indicating that graduate students in Physics maintained a "B" average in their coursework. b. Of the 11 students enrolled in Fall 2021, 9 were in the M.S. program and 2 were in the M.S.T program. Of these, 4 M.S students and zero M.S.T students graduated during the 2021-22 academic year. Of the remaining 7 students, 5 continued in the program to the next academic year, 1 left for graduate school before completing the M.S. degree, and 1 left for unknown reasons. c. Of the 4 students who graduated, 3 are known to be working locally for technology companies (KBR and Riverside Research). As part of the effort to revamp both the Learning Outcomes and Assessment strategies, the Department is developing a more organized and statistically robust assessment plan that will build upon the previous one, but also provide a more useful and organized collection of qualitative and quantitative feedback.

[Analysis]

IV. ACTIONS TO IMPROVE STUDENT LEARNING

The Physics Department Graduate Studies Committee meets regularly to discuss and assess graduate student performance and progress. The Graduate Studies Committee is currently working to develop a formalized assessment program.

V. SUPPORTING DOCUMENTS

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.