

Outcomes Assessment of the Materials Science Graduate Program

May 2017,

Standard Graduate Assessment Plan

MSU's Mission

Montana State University, the state's land grant institution, educates students, creates knowledge and art, and serves communities by integrating learning, discovery and engagement.

Materials Science PhD Program Mission

Students who graduate with a Ph.D. in Materials Science will go on to assume leadership roles in their respective fields at nationally and internationally recognized institutions.

Ph.D. Learning Outcomes

All students in the program will:

1. Understand how classes of materials derive their properties from the atomic and molecular properties of their constituents and be familiar with the growing set of materials fabrication, assembly, processing and characterization tools and techniques.
2. Demonstrate effective oral and written communication skills.
3. Show awareness of the economic, societal, and broader impacts of materials research and application.
4. Demonstrate the ability to conceive, plan, design, conduct, analyze, defend, publish, and communicate original and creative research that advances understanding in an area important to materials science.
5. Demonstrate knowledge of basic laboratory safety and the requirements to assist in establishing a safe laboratory environment.
6. Understand ethical issues and responsibilities especially in matters related to professionalism, data collection, the laboratory setting and in writing and publishing theses, dissertations and scientific papers.
7. Professionalization into the field of study: publications, presentations, attended conferences, received funded fellowships, and professional association activities.

Doctoral Programs

	Outcomes						
	1	2	3	4	5	6	7
Qualifying Exam	x						
Comprehensive Exam ¹	X	X					
Doctoral Dissertation ¹	X	X	X	X			
Dissertation Defense ¹	X	X	X	X			
Lab Safety Training ²					X		
Ethics training in responsible conduct of research ²						X	
Thesis Points ³		x					X

¹ The Program will keep track of qualifying/comprehensive/ thesis/dissertation defenses. The rubrics for outcomes 2-4 are to be completed at the exam/defense. These rubrics will not be used to assess or evaluate individual students and will not inform the decision regarding whether a student passes a defense or course. The data will be aggregated for all students in the program over a two-year period in order to assess the success of the program in meeting its program learning outcomes (see sample rubric attached).² The rubric for outcomes 5 and 6 is the completion of lab safety and ethics training.³ Thesis Points of students will be collected at the time of their defense. The thesis points document will be used to provide evidence of appropriate professional activities to the particular field of study (these may be published papers, research training, fellowships received and presentations at conferences).

Response Threshold

- 100% of students will be ranked at a level 2 (acceptable) or 3 (exceptional) in subject content knowledge, written communication, and oral communication skills.
- 100% of our students will pass their Ph.D defense on their first attempt.
- 100% of students will successfully complete the ethics training and lab safety training.
- 100% of students will demonstrate more than one form of professionalization in their field.

Schedule of Assessment

- Assessment reports for Doctoral programs will be submitted in September of odd-numbered years.

Process for Assessing the Data

Data are collected as students advance through the degree program. The graduate assessment coordinator will tabulate the scores from the rubrics after defense of the comprehensive exam and PhD defense. The program coordinator will also prepare lists of students taking qualifying/comprehensive

exams and the results (pass or fail) of such exams. The coordinator will also identify, based on an analysis of thesis points documents, the percent of students demonstrating acceptable professionalization into the field of study. The coordinator will write an assessment report and share it with MTSI stakeholders in order to improve programming and learning.

- If an acceptable performance threshold (as outlined in the plan) has NOT been met, a response from the Director of the MTSI program is required. It should include some strategy for addressing improving areas where the threshold has not been met.
 - Gather additional data next year to verify or refute the result.
 - Change something in the curriculum or program to try to improve performance.
 - Change the acceptable performance threshold (must provide reasoning behind such a strategy).
- If MTSI faculty members identify new strategies for meeting the learning outcomes, they may respond to assessment results even if the acceptable performance threshold has been met.
- Acceptable outcomes include deciding that changes are not needed when students are demonstrating proficiency with each learning outcomes. In this case participating MTSI will note (in writing) that they are satisfied with student outcomes and, based on assessment data, that the program is achieving its goals.

A summary of the year's assessment activities and faculty decisions are reported to the Dean of the Graduate School.