



## MS in Molecular Biotechnology 2018-19 Learning Outcome Assessment Report

### Learning Outcome 1 – Mastery of Field

#### Methods

We assessed students' mastery of their field using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey addressing this learning outcome included "Mastery of Field" and "Mastery of Current Literature in Field", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Our current data set for MS Biotech students for Learning Outcome #1 is very small, with information for only 2 students from 2017, because data collection was discontinued for 2018. Data collection will resume for all students beginning in 2019. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

#### Results

One of the two MS-Biotech students completing their program in 2017 obtained a minimum mean score of 3.0 from their committee members on the "Mastery of Field", question, but neither obtained a minimum score of 3.0 on the "Mastery of Current Literature in the Field" question. The average score across the two students was 2.67 for "Mastery of Field" and 2.17 for "Mastery of Current Literature". The proportion of students (50%) meeting the minimum standard falls below our stated goal of 75%.

2018-19 MS-Biotech Program Learning Outcome Assessment - Mastery of Field				
Student	1	2	Mean	
Mastery of Field	2.33	3.00	2.67	50
Mastery of Current Literature	1.67	2.67	2.17	0
			Total number of students	2
			Students scoring > 3.0 on Q1	1
			Percent of students, Q1	50%
			Students scoring > 3.0 on Q2	0
			Percent of students, Q2	0%

### Learning Outcome 2 – Mastery of Research Design and Methods

#### Methods

We assessed students' mastery of research design and methods using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey

addressing this learning outcome included “Mastery of Research Design” and “Mastery of Research Design and Execution”, with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Our current data set for MS Biotech students for Learning Outcome #2 is very small, with information for only 2 students from 2017, because data collection was discontinued for 2018. Data collection will resume for all students beginning in 2019. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

## Results

In 2017, only one of the MS-Biotech students completing their theses in Biological Sciences obtained a mean score of at least 3.0 from their committee members on the “Mastery of Research Design” and the “Mastery of Research Design and Execution” questions. The average score across the two students was 2.34 for “Mastery of Research Design” and 2.5 for “Mastery of Research Design and Execution”. The proportion of students (50%) meeting the minimum standard for each question falls below our stated goal of 85%.

2018-19 MS-Biotech Program Learning Outcome Assessment - Mastery of Research Design and Methods				
Student	1	2	Mean	
Mastery of Research Design	1.67	3.00	2.34	50
Mastery of Research Design and Execution	2.00	3.00	2.50	50
	Total number of students			2
	Students scoring > 3.0 on Q1			1
	Percent of students, Q1			50%
	Students scoring > 3.0 on Q2			1
	Percent of students, Q2			50%

## Learning Outcome 3 – Mastery of Communication

### Methods

We assessed students’ mastery of research design and methods using a survey distributed to the thesis committee within 10 days of the thesis defense. Questions on the survey addressing this learning outcome included “Mastery of Communication” and “Mastery of Written Communication”, with students scored on a range of 1 (unsatisfactory) to 4 (outstanding). We also distributed an exit survey will be given to each student to report the number of national or regional conferences they attended, the number of posters or oral presentations given, and the number of publications they had submitted or accepted in peer-reviewed journals at the time of their defense.

Our current data set for MS Biotech students for Learning Outcome #3 is very small, with information for only 2 students from 2017, because data collection was discontinued for 2018. Data collection will resume for all students beginning in 2019. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding

the minimum criteria (3.0) are reported here. The percent of students meeting the minimum criteria for meetings attended, presentations given, and publications submitted or accepted in peer-reviewed journals will be reported.

## Results

Again only 50% of MS-Biotech students completing their program in 2017 obtained a mean score of at least 3.0 from their thesis committee members on the “Mastery of Communication” and for the goals and results portions of the “Mastery of Written Communication” questions. The average score across the eight students was 2.84 for “Mastery of Communication” and 3.00 and 2.67 for the goals and results portion of the “Mastery of Written Communication” questions, respectively. Neither student obtained a satisfactory score for the methodology portion of the “Mastery of Written Communication”. All students fell below our stated goal of 80% for all questions in this Learning Outcome.

2018-19 MS-Biotech Program Learning Outcome Assessment - Mastery of Communication				
Student	1	2	Mean	
Mastery of Communication	2.67	3.00	2.84	50
Mastery of Written Communication: Goals	2.00	4.00	3.00	50
Mastery of Written Communication: Methods	2.33	2.50	2.42	0
Mastery of Written Communication: Results	2.33	3.00	2.67	50
Total number of students				2
Students scoring > 3.0 on Q1				1
Percent of students, Q1				50%
Students scoring > 3.0 on Q2.1				1
Percent of students, Q2.1				50%
Students scoring > 3.0 on Q2.2				0
Percent of students, Q2.2				0%
Students scoring > 3.0 on Q2.3				1
Percent of students, Q2.3				50%

Only one of the two MS-Biotech students attended a regional or national meeting during the course of their program (short of our goal), but both gave at least one presentation (both meeting our goal). Neither student published or submitted a paper at the time of their defense.

2018-19 MS-Biotech Program Learning Outcome Assessment - Mastery of Communication				
Student	1	2	Mean	
# Meetings Attended	0	1	0.50	50
# Posters + Talks	4	3	3.50	100
# Publications Accepted + Submitted	0	0	0.00	0
Total number of students				2
Students with a meeting attended				1
Percent of students, meetings				50%
Students with a presentation				2
Percent of students, presentations				100%
Students with a paper				0
Percent of students, papers				0%

## Learning Outcome 4 – Mastery of Work

### Methods

We assessed students' mastery of their work using a survey distributed to the thesis committee within 10 days of the thesis defense. The question on the survey addressing this learning outcome included "Mastery of Work", with students scored on a range of 1 (unsatisfactory) to 4 (outstanding).

Our current data set for MS Biotech students for Learning Outcome #4 is very small, with information for only 2 students from 2017, because data collection was discontinued for 2018. Data collection will resume for all students beginning in 2019. Scores were averaged across respondents for each of the two questions for each student; the number of students exceeding the minimum criteria (3.0) are reported here.

### Results

Neither of the MS-Biotech students completing their program in 2017 obtained a minimum mean score of 3.0 from their committee members on the "Mastery of Work" question; the average score across the two students was 2.5. This proportion of students meeting the minimum standard falls below our stated goal of 70%.

2018-19 MS-Biotech Program Learning Outcome Assessment - Mastery of Work				
Student	1	2	Mean	
Mastery of Work	2.33	2.67	2.50	0
			Total number of students	2
			Students scoring > 3.0 on Q1	0
			Percent of students, Q1	0%

### 2019-20 Action Plan

Data were too few from the 2018-19 assessment results to determine rigid action plans, but we suggest three action items for the 2019-20 academic year:

1. Continued and improved emphasis on student familiarity with the current literature and the major issues in their fields. Emphasis will take place in coursework where possible but also within individual laboratories.
2. Continued emphasis on communication of research by students, particularly oral communication in the form of presentations at meetings. We note a significant number of publications among the MS students, but fewer opportunities to present their research compared to our PhD students.
3. Continued and improved emphasis students' mastery of their work, as evidenced by their ability to openly reason and answer probing questions of their research.

## **Timeline for Action Plan**

A timeline for the implementation of the action plan for the 2019-20 academic year follows:

1. Student familiarity with the current literature and the major issues in their fields will continue to be emphasized in courses and individual laboratories. The department will emphasize the importance of these issues to all PIs having MS students in their labs, with significant improvements expected within 3 years.
2. The department will emphasize the importance of presenting MS students with oral opportunities to present their research beginning in Fall 2019.
3. Student mastery of their work will continue to be emphasized in courses and individual laboratories. The department will emphasize the importance of MS students' abilities to reason and answer questions about their research, with significant improvements expected within 3 years.