Expected Outcome: Communications Skills

Our students will demonstrate proficiency in their communication skills through completion of a doctoral dissertation on the research topic, an oral defense of that dissertation, and through scholarly publications in the open literature and through presentations to professional audiences.

Assessment Method 1: Communications Skills - Faculty Evaluation

Assessment Method Description
To fulfill degree requirements for the Ph.D. in Polymer and Fiber Engineering, the candidate must have a written dissertation of his/her research work approved by the graduate committee and must successfully defend this dissertation in an oral defense. After the defense, a standardized form will be completed by all members of the committee dealing with various issues including the following questions:

- Evaluate the student’s written document in terms of its clarity, organization and logic, and the ability of the student to communicate technical ideas in written form
- Evaluate the student’s oral defense in terms of the clarity of the oral presentation, organization and logic of the presentation, and the ability of the student to communicate technical ideas orally

The form for the evaluation of PhD students by committee members is below. The student’s performance will be ranked on the standardized assessment form as poor (1 pt), fair (2 pts), good (3 pts), very good (4 pts) and excellent (5 pts). As the success criteria, average response from the students should be greater than or equal to 3.

We anticipate that the average score of our students in each category will be 3.0 or higher.
Evaluation of the Ph.D. students by Committee Members

a. Evaluate the student’s ability to undertake focused study
b. Evaluate the creativity of the student’s research
c. Evaluate the independence of the student’s research
d. Evaluate the significance of the problem addressed in the student’s research
e. Evaluate the student’s written document in terms of its clarity, organization and logic, and the ability of the student to communicate technical ideas in written form
f. Evaluate the student’s oral defense in terms of the clarity of the oral presentation, organization and logic of the presentation, and the ability of the student to communicate technical ideas orally

• Response Key

1: Poor
2: Fair
3: Good
4: Very Good
5: Excellent

Findings
Three students completed their Ph.D. degree in polymer and fiber engineering during this evaluation period. These students’ committee members responded to the questions above regarding the students’ performance.

The range for both questions was 3 to 5, with an average of score 4.00 for both, which is greater than the anticipated score of 3.0

How did you use findings for improvement?
The average scores on the above survey questions exceeded the anticipated
level of performance. This method of assessment will be continued for all Ph.D. students during the next evaluation period.

**Additional Comments**

**Assessment Method 2: Publications and Presentations**

**Assessment Method Description**

Students in the Ph.D. program in Polymer and Fiber Engineering are expected to communicate their research work to the scientific community through scholarly publications in the open literature and through presentations to professional audiences. Data on the number of publications and presentations by each graduate of the program will be collected and reviewed. A Ph.D. student survey (attached) is used to get the feedback from the students. The following questions were asked to the students in the survey:

- How many publications resulted from your Ph.D. work?
- How many presentations to professional audiences did you make related to your Ph.D. studies?

We anticipate that the average number of publications per Ph.D. graduate in our program will be 2 or more. We also anticipate that the average number of presentations to professional audiences per Ph.D. graduate will be 1 or more.
Ph.D. Student Survey

a. To what degree did your Ph.D. education in Polymer and Fiber Engineering provide you with a thorough understanding of the principles, sciences, and technologies that are broadly associated with polymer and fiber engineering?

b. To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to undertake focused study?

c. To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to undertake creative research?

d. To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to perform independent research?

e. How many publications resulted from your Ph.D. work?

f. How many presentations to professional audiences did you make related to your Ph.D. studies?

• Response Key

1: Poor
2: Fair
3: Good
4: Very Good
5: Excellent

Findings
Data were collected on the number of publications and presentations by each graduate who completed their Ph.D. during this evaluation period as follows.

Average number of publications = 3 (no range)

The range for number of presentations = 0 to 10
Average number of presentations = 3.67

All students met the goal of minimum 2 publications. One student did not
meet the goal of minimum 1 presentation.

**How did you use findings for improvement?**
The anticipated goal of the average number of publications of 2 or more was met by 100% of the students. We will continue to encourage our Ph.D. students to have a high number of publications so that each graduate will continue to meet and exceed this anticipated goal.

The anticipated goal of the average number of presentations to professional audiences of 1 or more was not met by one student. However, we will strongly encourage our Ph.D. students to increase this number of presentations so that each graduate might exceed this anticipated value in the future.

This method of assessment will be continued for all Ph.D. students during the next evaluation period

**Additional Comments**

**Expected Outcome 3: Comprehensive Polymer and Fiber Engineering Knowledge**
Our graduates will demonstrate a thorough understanding of the principles, sciences, and technologies that are broadly associated with the area of polymer and fiber engineering.

**Assessment Method 1: Ph.D. qualifying examination**
**Assessment Method Description**
Every Ph.D. student is required to pass a written PhD qualifying examination after the core courses are completed. The PhD qualifying examination is given in the areas of the core graduate courses: PFEN 6200 Advanced Polymer Processing, PFEN 6250 Advanced Engineering Fibrous Structures, PFEN 6510 Polymer Chemistry, PFEN 7310 Structure and Properties of Polymers, PFEN 7700 Advanced Methods in Polymer Characterization, PFEN 7950 Graduate Seminar.
We expect that our students’ success rate should be 60% or better in the PhD qualifying exam.

**Findings**
All the students that took the Ph.D. qualifying exam passed successfully.

**How did you use findings for improvement?**
The results were communicated to the faculty as well as other stakeholders. We will continue to look for opportunities to improve the program and the learning experience for the students. By requiring that
a grade of B or higher in the core courses be obtained by every Ph.D. student our program, we ensure that every Ph.D. student has demonstrated a thorough understanding of the principles, sciences, and technologies that are broadly associated with the area of polymer and fiber engineering. We are looking into adding more course(s) into core courses.

Additional Comments

Assessment Method 2: Polymer and Fiber Engineering Knowledge-Student Survey

Assessment Method Description

Upon completion of the degree requirements for the Ph.D. in Polymer and Fiber Engineering, each student will be asked to fill out a graduation survey covering several items including the following question:

- To what degree did your Ph.D. education in Polymer and Fiber Engineering provide you with a thorough understanding of the principles, sciences, and technologies that are broadly associated with polymer and fiber engineering?

The student’s performance will be ranked on the standardized assessment form as poor (1 pt), fair (2 pts), good (3 pts), very good (4 pts) and excellent (5 pts). As the success criteria, average response from the students should be greater than or equal to 3.

Findings

The range of scores for this question was 4 to 5, with an average score of 4.33 which exceeded the target level.

How did you use findings for improvement?

The results were communicated to the faculty as well as other stakeholders. We will continue to look for opportunities to improve the program and the learning experience of the students.
Expected Outcome 3: Creative and Independent Research

Our graduates will demonstrate an ability to undertake focused study and advanced creative and independent research of a significant unsolved problem, such as the development of new theoretical methodologies, experimental techniques, or significant advances in knowledge and understanding of the discipline of polymer and fiber engineering. As a result, our graduates will make a contribution to the scientific literature.

Assessment Method 1: Research Expertise-Faculty Evaluation

Assessment Method Description

To fulfill degree requirements for the Ph.D. in Polymer and Fiber Engineering, a Ph.D. candidate must have a dissertation of his/her research work approved by the graduate committee (typically made up of at least three faculty and an outside reader appointed by the Graduate School) and must successfully defend his/her dissertation in an oral defense. During the oral defense of the students research work, a standardized form will be completed by all members of the committee dealing with various issues including the following:

- Evaluate the student’s ability to undertake focused study
- Evaluate the creativity of the student’s research
- Evaluate the independence of the student’s research
- Evaluate the significance of the problem addressed in the student’s research

The student’s performance will be ranked on the standardized assessment form as poor (1 pt), fair (2 pts), good (3 pts), very good (4 pts) and excellent (5 pts). As the success criteria, average response from the students should be greater than or equal to 3.

We anticipate that the average score of our students in each category will be 3.0 or higher.

Findings

Eight students completed their Ph.D. degree in polymer and fiber engineering during this evaluation period. These students’ committee members responded to the questions regarding the students performance. The scores on these four survey questions were respectively as follows:

- range: 3 to 5; average: 4.25,
How did you use findings for improvement?
The average scores on the above survey questions exceeded the anticipated level of performance. The results were communicated to the committee members and constituents. More data will be collected to evaluate this outcome.

Additional Comments

Assessment Method 2: Research Expertise-Student Survey

Assessment Method Description
Upon completion of the degree requirements for the Ph.D. in Polymer and Fiber Engineering, each student will be asked to fill out a graduation survey covering several items including the following questions:

- To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to undertake focused study?
- To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to undertake creative research?
- To what degree did your Ph.D. education in Polymer and Fiber Engineering enhance your ability to perform independent research?

The student’s performance will be ranked on the standardized assessment form as poor (1 pt), fair (2 pts), good (3 pts), very good (4 pts) and excellent (5 pts). As the success criteria, average response from the students should be greater than or equal to 3.

We expect that our student’s responses should average a score of 3 or better on these questions.

Findings
Eight students completed their Ph.D. degree in polymer and fiber engineering during this evaluation period and responded to the questions above.
The range and average scores on these survey questions are respectively as follows:

- range: 3 to 5; average: 4.00
- range: 3 to 4; average: 3.67
- range/average: 4.00
The average scores on the above survey question exceeded the anticipated level of performance.

**How did you use findings for improvement?**
The results were communicated to the faculty and constituents. This method of assessment will be continued for all Ph.D. students during the next evaluation period.

**Additional Comments**