Program Plan and Findings: Four Column Layout

Program (CEAT) - CHE - Chemical Engineering (PhD) - 043

Program Mission Statement: A Ph.D. in Chemical Engineering from Oklahoma State University signifies that the recipient has demonstrated a breadth of advanced knowledge in the subjects that form the foundation of chemical engineering. In addition, the graduate will have demonstrated the ability to independently and efficiently make creative, relevant, significant contributions at the forefront of knowledge in traditional or emerging fields within the Chemical Engineering discipline. The program is designed to prepare the graduate with the widest possible career opportunities as a leader in industrial and academic arenas.

Program Information

2019 - 2020

Program Information

Assessment Coordinator's Name: Heather Fahlenkamp
Assessment Coordinator's E-mail Address: heather.fahlenkamp@okstate.edu
Number of Students Enrolled in the Program: 35
Total Number of Students Graduated: 3
Number of Student Graduates from Stillwater Campus: 3
Were university assessment funds used by the department/program for assessment activities?: No
If yes, describe how funds were used and the contribution the funds had on the assessment process:
Number of Student Graduates from Tulsa Campus: 0

Annual Executive Summaries

2019 - 2020

Program Assessment Coordinator: Heather Fahlenkamp

Plan Review and Approval

Date Current Plan Was Reviewed and Approved: 04/01/2017
Date of Future Plan Review and Approval: 04/01/2022

Summary of Assessment Findings

Describe overall assessment findings and faculty members' interpretation of the assessment results: OSU Office of University Assessment and Testing (UAT) conducted i) a survey of Alumni in March 2020 through April 2020 and ii) Graduate Student Satisfaction Survey in February 2012 through May 2012. Further, we also administered exit interviews for the graduating students, a summary of which is attached in our document repository. Most of the comments were positive with their experiences and the previous changes made to the program, as summarized in the 2017-2018 Annual Assessment Report. Students continue to excel and win a number of local awards, including

an OSU Foundation Distinguished Graduate Fellowship, a Robberson Summer Dissertation Fellowship/Research and Creative Activities Grant, a Dr. Homer and Mrs. May Tang Graduate Fellowship, and a Student Government Association Outstanding Graduate Teaching Assistant Award. Students also received national-level awards from the American Institute of Chemical Engineers.

Dissemination of Findings

Describe the individual(s) or committee responsible for reviewing and interpreting assessment data: Currently all faculty in the department are involved in the review and interpretation of the assessment data. The graduate program coordinator is responsible for compiling the final report.
Describe the process for sharing and discussing assessment findings with program faculty: At faculty meetings, the graduate program coordinator shares the information from various assessments.

Program Improvements Based on Assessment

Based on data collected this year, what changes are being considered or planned for the program?: Increase the number of graduate-level elective courses available for students. A survey of the OSU Course Catalog will be performed by the curriculum committee to list all approved courses that are related to students' research areas and/or career objectives. New graduate-level elective courses will be added to the chemical engineering curriculum. A schedule of all elective courses will be compiled to aid in advising and preparing plans of study.
Based on this year's findings, what (if any) changes are planned for the assessment process?: No changes planned.
Describe the process for implementing these changes/planned program improvements:
Program Improvements Made in the Last Year: Curriculum Improvements, Other Improvements
"Other" Improvements: Reduced student credit hours required for the PhD degree with the goal of aiding with recruitment, making our program more competitive with other programs that have reduced total credit hours.
Goals for the Coming Year: List all graduate-level approved courses from the OSU Course Catalog that are related to students' research areas and/or career objectives.
Add more chemical engineering graduate-level electives to the curriculum.
Prepare a schedule of all approved graduate-level electives to aid in advising and preparing plans of study.
Is this Summary Report Complete?: Yes
List all individuals associated with this report preparation: Heather Fahlenkamp, Beth Kelly
Related Documents:
Chemical Engineering Exit Interviews 2019-20.pdf

Outcomes	*Assessment Methods*	*Findings*	*Use of Findings (Actions)*
Depth in Education - Build upon and expand the student's undergraduate education by emphasizing depth in thermodynamics, transport phenomena, kinetics and mathematical modeling **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Knowledge **Reason for Archival:**	**Performance or Jury -** Student performance in core courses on comprehensive exams, oral presentations, and course projects was evaluated by course instructors. *** Learning Outcome** **Goal/Benchmark:** Students must make a grade of "B" or better. Any CHE course with a grade of "C" must be repeated at the next offering of the course. A grade of "C" in a second course will again result in a review of the student's progress. In all but the rarest cases, a second "C" in a CHE course (or a "D" or "F" in	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) All students in core courses received "B" or higher. Students who receive a grade of "B" or higher have demonstrated depth in thermodynamics, transport phenomena, kinetics, and mathematical modeling beyond the undergraduate level. (08/31/2020) **Number of Students Assessed:** 11 **Number of Successful Students:** 11 **How were students selected to participate in the assessment of this outcome?:** All students are required to take the core courses during their first two semesters. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	any course) will result in dismissal from the graduate program. The core courses include: CHE 5123 - Advanced Chemical Reaction Engineering CHE 5213 - Selected Diffusional Unit Operations CHE 5743 - Chemical Engineering Process Modeling CHE 5843 - Principles of Chemical Engineering Thermodynamics **Timeline for Assessment:** Each Semester **Other Assessment Type:**		
	Survey - Student survey of instruction *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in the core courses. The core courses include: CHE 5123 - Advanced Chemical Reaction Engineering CHE 5213 - Selected Diffusional Unit Operations CHE 5743 - Chemical Engineering Process Modeling CHE 5843 - Principles of Chemical Engineering Thermodynamics **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 11 **Number of Successful Students:** 11 **How were students selected to participate in the assessment of this outcome?:** All students in the core courses complete a student survey of instruction. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator. *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in core courses. The core courses include:	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews are conducted with graduating students.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	CHE 5123 - Advanced Chemical Reaction Engineering CHE 5213 - Selected Diffusional Unit Operations CHE 5743 - Chemical Engineering Process Modeling CHE 5843 - Principles of Chemical Engineering Thermodynamics **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	**What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	
Applications of Chemical Engineering - Expand personal knowledge of the broad range of applications of chemical engineering **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Knowledge **Reason for Archival:**	**Survey -** Student survey of instruction. *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in CHE 6010 - Chemical Engineering Seminar. All students must have a minimum of 6 credits (3 credits for those entering with a MS degree) prior to graduation. **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 31 **Number of Successful Students:** 31 **How were students selected to participate in the assessment of this outcome?:** All students in seminar class complete the student survey of instruction. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator. *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in CHE 6010 - Chemical Engineering Seminar. All students must have a minimum of 6 credits (3 credits for those entering with a MS degree) prior to graduation. **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews were conducted with all graduating students. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	Performance or Jury - Student performance in CHE 6010 - Chemical Engineering Seminar was evaluated by course instructor. *** Learning Outcome** **Goal/Benchmark:** All students must have a minimum of 6 credits (3 credits for those entering with a MS degree) prior to graduation. This course includes outside speakers for technical presentations related to the broad range of applications of chemical engineering and for professional development. **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students achieved a broader understanding about applications in chemical engineering and professional development skills. (08/31/2020) **Number of Students Assessed:** 31 **Number of Successful Students:** 31 **How were students selected to participate in the assessment of this outcome?:** All students are required to take the seminar class each semester, unless there is a scheduling conflict or it is the student's last semester. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
Additional Knowledge Related to Chemical Engineering - Attain additional knowledge (breadth and/or depth) in topics related to chemical engineering **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Knowledge **Reason for Archival:**	**Performance or Jury -** Student performance in elective courses on comprehensive exams and course projects was evaluated by course instructors. *** Learning Outcome** **Goal/Benchmark:** All students must have a minimum of 15 credits (up to 6 credits for those entering with a MS degree) prior to graduation. Students complete graduate-approved elective courses related to the student's research project and/or career objectives. **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students attained additional knowledge (breadth and/or depth) in topics related to chemical engineering. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As degree requirements, students must complete 15 credit hours of graduate-approved elective courses related to the student's research project and/or career objectives (up to 6 credits hours for those entering with a MS degree). **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Survey - Student survey of instruction *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in graduate-approved elective courses.	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences for the following courses: CHE 5743 - Chemical Engineering Modeling CHE 5110 - Special Topics in Chemical Engineering	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	Students complete 15 credit hours (up to 6 credit hours for those entering with a MS degree) of graduate-approved elective courses related to the student's research project and/or career objectives. **Timeline for Assessment:** Each Semester **Other Assessment Type:**	(08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As degree requirements, students must complete 15 credit hours of graduate-approved elective courses related to the student's research project and/or career objectives (up to 6 credits hours for those entering with a MS degree). **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator. *** Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in graduate-approved elective courses. Students complete 15 credit hours (up to 6 credit hours for those entering with a MS degree) of graduate-approved elective courses related to the student's research project and/or career objectives. **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences in elective courses. Students request more elective courses related to their research areas and for the courses to be offered on a regular basis. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews were conducted with all graduating students. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Use of assessment information to facilitate curriculum discussions at faculty meetings and curriculum committee meetings focused on developing more elective courses. (09/10/2020)
Define a Research Problem and Develop a Plan - Refine the ability to define a research problem and develop a plan for its solution. **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Skills	**Oral Presentation -** Student performance on the oral presentation of the preliminary exam was evaluated by the advisory committee. *** Learning Outcome Goal/Benchmark:** Students must pass the preliminary exam. The exam consists of (a) a written proposal regarding the student's thesis research project and (b) an	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to define a research problem and develop a plan for its solution. (08/31/2020) **Number of Students Assessed:** 6 **Number of Successful Students:** 6 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a preliminary exam prior to admission to PhD candidacy. **What do the findings suggest about student achievement**	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
Reason for Archival:	oral defense of the proposal. The written proposal has to conform to National Science Foundation formatting requirements for text, length, bibliography and budget. Some students also enroll in grantsmanship courses and/or events offered at the college and/or university level. **Timeline for Assessment:** After the student has completed requirements for the preliminary exam. **Other Assessment Type:**	**of this learning outcome?:** Student achievement of this learning outcome was met.	
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator. *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences from the preliminary exam. The exam consists of (a) a written proposal regarding the student's thesis research project and (b) an oral defense of the proposal. The written proposal has to conform to National Science Foundation formatting requirements for text, length, bibliography and budget. Some students also enroll in grantsmanship courses and/or events offered at the college and/or university level. **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews were conducted with all graduating students. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Analysis of Written Artifacts - Student performance on the written element of the preliminary exam was evaluated by the advisory committee.	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to define a research problem and develop a plan for its solution. (08/31/2020) **Number of Students Assessed:** 6	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	*** Learning Outcome** **Goal/Benchmark:** Students must pass the preliminary exam. The exam consists of (a) a written proposal regarding the student's thesis research project and (b) an oral defense of the proposal. The written proposal has to conform to National Science Foundation formatting requirements for text, length, bibliography and budget. Some students also enroll in grantsmanship courses and/or events offered at the college and/or university level. **Timeline for Assessment:** After the student has completed requirements for the qualifying exam. **Other Assessment Type:**	**Number of Successful Students:** 6 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a preliminary exam prior to admission to PhD candidacy. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	
	Performance or Jury - Student performance in CHE 5302 - Introduction to Science and Engineering Research was evaluated by course instructor *** Learning Outcome** **Goal/Benchmark:** All students must take CHE 5302 (unless they enter with a MS degree from OSU). **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) All students in CHE 5302 - Introduction to Science and Engineering Research received "B" or higher. Students who receive a grade of "B" or higher have demonstrated depth in the ability to define a research problem and develop a plan for its solution. (08/31/2020) **Number of Students Assessed:** 21 **Number of Successful Students:** 21 **How were students selected to participate in the assessment of this outcome?:** All students are required to take CHE 5302 - Introduction to Science and Engineering Research. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Survey - Student survey of instruction *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding experiences in CHE 5302 - Introduction to Science and	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 21 **Number of Successful Students:** 21 **How were students selected to participate in the**	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	Engineering Research. All students must take CHE 5302 (except for those entering with a MS degree from OSU) **Timeline for Assessment:** Each Semester **Other Assessment Type:**	**assessment of this outcome?:** All students in CHE 5302 - Introduction to Science and Engineering Research complete a student survey of instruction. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	
Conceive, Plan, Execute, Complete and Defend Research Work - Demonstrate the independence, initiative and ability to conceive, plan, execute, complete, and defend research work at the frontier of scientific and/or engineering knowledge. **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Skills **Reason for Archival:**	**Oral Presentation -** Student performance on the oral presentation for the dissertation was evaluated by the advisory committee. *** Learning Outcome Goal/Benchmark:** Students must successfully complete and defend a dissertation, which includes a clear advance in the state of knowledge in the field of chemical engineering. **Timeline for Assessment:** After the student has completed the research. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the independence, initiative and ability to conceive, plan, execute, complete, and defend research work at the frontier of scientific and/or engineering knowledge. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a written dissertation and defend it before the student's advisory committee. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Review of Thesis/Dissertation/Creative Component - Student performance on the dissertation was evaluated by the advisory committee. *** Learning Outcome Goal/Benchmark:** Students must successfully complete and defend a dissertation, which includes a clear advance in the state of knowledge in the field of chemical engineering. **Timeline for Assessment:** After the student has completed the research. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the independence, initiative and ability to conceive, plan, execute, complete, and defend research work at the frontier of scientific and/or engineering knowledge. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a written dissertation and defend it before the student's advisory committee. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator.	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	*** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experiences in completion and defense of dissertation. Students must complete and defend a dissertation, which includes a clear advance in the state of knowledge in the field of chemical engineering. **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	(08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews are conducted with all graduating students. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	
Develop Communication Skills - Develop effective written and oral communication skills. **Outcome Status:** Active **Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020 **Start Date:** **Archived Date:** **Outcome Type:** Skills **Reason for Archival:**	**Analysis of Written Artifacts -** Student performance on the written element of the preliminary exam was evaluated by the advisory committee. *** Learning Outcome** **Goal/Benchmark:** Students must pass the preliminary exam. **Timeline for Assessment:** After the student has completed the requirements for the preliminary. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to complete a written component of the preliminary exam. (08/31/2020) **Number of Students Assessed:** 6 **Number of Successful Students:** 6 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a preliminary exam prior to admission to PhD candidacy. **What do the findings suggest about student achievement of this learning outcome?:** Students developed effective written and oral communication skills. Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Presentation/Performance - Deliver a formal presentation at a technical society meeting or a CHE seminar. *** Learning Outcome** **Goal/Benchmark:** Students must present his/her findings in a national forum, such as the AIChE or ACS technical conferences, or in CHE 6010 - Chemical Engineering Seminar. **Timeline for Assessment:** After the student has completed requirements for the preliminary exam and the	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to present their findings in a national forum or in CHE 6010 - Chemical Engineering Seminar. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students present their findings in a national forum or in CHE 6010 - Chemical Engineering Seminar. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	research project. **Other Assessment Type:**	learning outcome was met.	
	Review of Thesis/Dissertation/Creative Component - Student performance on the written dissertation and oral defense was evaluated by the advisory committee. *** Learning Outcome** **Goal/Benchmark:** Students must successfully complete a written dissertation and defend it before an advisory committee. **Timeline for Assessment:** After the student has completed requirements for the preliminary exam and the research project. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to complete a written component of the dissertation. Students demonstrated the ability to present and defend their dissertation orally to the advisory committee. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must complete a written dissertation and defend it before the student's advisory committee. **What do the findings suggest about student achievement of this learning outcome?:** Students developed effective written and oral communication skills. Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Interviews - Exit interviews of graduates were conducted by Graduate Program Coordinator. *** Learning Outcome** **Goal/Benchmark:** Student feedback regarding learning experience of developing their written and oral communication skills. Students must complete a written component of the preliminary exam and a dissertation. Present and defend both orally to the advisory committee. Deliver a formal presentation at a technical society meeting or a CHE seminar. Some students also enroll in grantsmanship courses and/or events offered at the college and/or university level. **Timeline for Assessment:** During the final semester for graduating students **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Positive feedback from students' experiences. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** Exit interviews were conducted with all graduating students. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)

Outcomes	Assessment Methods	Findings	Use of Findings (Actions)
	Oral Presentation - Student performance on the oral presentation of the preliminary exam was evaluated by the advisory committee. *** Learning Outcome** **Goal/Benchmark:** Students must pass the preliminary exam. **Timeline for Assessment:** After the student has completed the requirements for the preliminary exam. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students demonstrated the ability to present and defend the qualifying exam orally. (08/31/2020) **Number of Students Assessed:** 6 **Number of Successful Students:** 6 **How were students selected to participate in the assessment of this outcome?:** As a degree requirements, all PhD students must complete a preliminary exam prior to admission to PhD candidacy. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)
	Analysis of Written Artifacts - Students must submit two manuscripts for publications in refereed journals *** Learning Outcome** **Goal/Benchmark:** Students are expected to demonstrate a successful completion of research, as indicated by level of fruition and external acceptance. This may be accomplished by submitting: two manuscripts for publications in refereed journals or one refereed journal submission may be substituted for by two conference proceedings, or one patent application, or evidence for industrial process implementation. **Timeline for Assessment:** After the student has completed requirements for the preliminary exam and the research project. **Other Assessment Type:**	**Reporting Period:** 2019 - 2020 **Conclusion:** 3 - Meets Program Expectations (Proficient) Students submitted two manuscripts for publications in refereed journals. (08/31/2020) **Number of Students Assessed:** 3 **Number of Successful Students:** 3 **How were students selected to participate in the assessment of this outcome?:** As a degree requirement, all PhD students must submit two manuscripts for publications in refereed journals. **What do the findings suggest about student achievement of this learning outcome?:** Student achievement of this learning outcome was met.	**Use of Findings (Actions):** Meets program expectations; no changes for assessment type. (09/10/2020)