

# Program Plans: Outcomes and Assessment Methods



## Program (CEAT) - CHE - Chemical Engineering (MS) - 042

**Program Mission Statement:** An MS degree in Chemical Engineering from Oklahoma State University signifies that the recipient has demonstrated advanced knowledge of fundamental chemical engineering topics. In addition, an MS graduate has exhibited the ability to integrate this knowledge, successfully and independently, to solve complex quantitative problems in a logical manner.

### Program Information

*2017 - 2018*

#### Program Information

**Assessment Coordinator's Name:** Heather Fahlenkamp

**Assessment Coordinator's E-mail Address:** heather.fahlenkamp@okstate.edu

**Total Number of Students Graduated:** 9

**Number of Students Enrolled in the Program:** 38

**Number of Student Graduates from Stillwater Campus:** 9

**Were university assessment funds used by the department/program for assessment activities?:** No

### Annual Executive Summaries

*2017 - 2018*

**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 January 2015 through May 2015 and ii) Graduate Student Satisfaction Survey in February 2012 through May 2012. Further, we also administered exit surveys for the graduating students, summary of which is attached. Most of the comments were positive with their experiences and the previous changes made to the program, as summarized in the 2016-17 Annual Assessment Report. Students continue to excel and win a number of local and national awards, including the OSU Women's Faculty Council Research Award, an OSU Foundation Distinguished Graduate Fellowship, 3rd place in OSU 2018 Health Data Shootout, 2nd place in the 2018 Oklahoma Love's Entrepreneur's Cup, a ACM SIGHPC/Intel Computational and Data Science Fellowship, an ISA ChemPID Scholarship, and selected to Attend the PepsiCo Journey Through Science Day. Based on the assessment results, some changes were made to the graduate program and are described in the following section.

#### 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?:** Add more CHE graduate level electives to the curriculum.

Update the CHE Graduate Program Handbook to clarify departmental graduation requirements.

Remove CHE 6703 Research Methods in Chemical Engineering and add a CHE 5XX2 Introduction to Science and Engineering

Research that all new graduate students will take their first year.

Decrease the total number of student credit hours required for the PhD degree, in order to decrease the total amount of student fees paid.

**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:** Establish small working groups of faculty to recommend changes to the program. Survey current students for feedback on proposed changes to the program. Hold a faculty retreat to discuss program changes and implementation. Revise the graduate student handbook with program changes, send to faculty to review, and vote to confirm changes by the entire faculty.

**Program Improvements Made in the Last Year:** Course Improvements, Curriculum Improvements

**Goals for the Coming Year:** ??

**List all individuals associated with this report preparation:** Heather Fahlenkamp

## Outcome: 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

**Outcome Type:** Knowledge

### Assessment Methods

**Performance or Jury** - Student performance in core courses on comprehensive exams, oral presentations, and course projects was evaluated by course instructors. (Active)

**\* 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 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

**Survey** - Student survey of instruction (Active)

**\* 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

**Interviews** - Exit interviews of graduates were conducted by the department head. (Active)

**\* Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in core courses.

The core courses include:

CHE 5123 - Advance 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

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## Outcome: 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

**Outcome Type:** Knowledge

### Assessment Methods

**Performance or Jury** - Student performance in CHE 6010 - Chemical Engineering Seminar was evaluated by course instructor. (Active)

\* **Learning Outcome Goal/Benchmark:** All students must have a minimum of 3 credits prior to graduation.

**Timeline for Assessment:** Each Semester

**Survey** - Student survey of instruction (Active)

\* **Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in CHE 6010 - Chemical Engineering Seminar. All students must have a minimum of 3 credits prior to graduation

**Timeline for Assessment:** Each Semester

**Interviews** - Student exit interviews of graduates were conducted by the department head. (Active)

\* **Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in CHE 6010 - Chemical Engineering Seminar. All students must have a minimum of 3 credits prior to graduation

**Timeline for Assessment:** During the final semester for graduating students

## Outcome: Solve Unique Problems in Chemical Engineering

Develop the skills required to work independently to solve unique problems in chemical engineering.

**Outcome Status:** Active

**Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019

**Outcome Type:** Skills

### Assessment Methods

**Oral Presentation** - Student performance on an oral defense of the research project was evaluated by the advisory committee. (Active)

\* **Learning Outcome Goal/Benchmark:** Students must successfully complete a written thesis and defend it before an advisory committee.

**Timeline for Assessment:** After the student has completed the research project.

**Review of Thesis/Dissertation/Creative Component** - Student performance on a written thesis of the research project was evaluated by the advisory committee. (Active)

\* **Learning Outcome Goal/Benchmark:** Students must successfully complete a written thesis and defend it before an advisory committee.

**Timeline for Assessment:** After the student has completed the research project.

**Interviews** - Student exit interviews of graduates were conducted by the department head. (Active)

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**\* Learning Outcome Goal/Benchmark:** Student feedback regarding learning experience during research project. Students are assigned to research projects and are supervised by a research advisor. Students work independently to complete an MS thesis.  
**Timeline for Assessment:** During the final semester for graduating students

## Outcome: 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

**Outcome Type:** Knowledge

### Assessment Methods

**Performance or Jury** - Student performance in elective courses on comprehensive exams and course projects was evaluated by course instructors. (Active)

**\* Learning Outcome Goal/Benchmark:** All students must have a minimum of 6 credits prior to graduation. Students complete 6 credits of graduate-approved elective courses related to the student's research project and/or career objectives.

**Timeline for Assessment:** Each Semester

**Survey** - Student survey of instruction (Active)

**\* Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in graduate-approved elective courses. Students complete 6 credits of graduate-approved elective courses related to the student's research project and/or career objectives.

**Timeline for Assessment:** Each Semester

**Interviews** - Exit interviews of graduates were conducted by the department head. (Active)

**\* Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in graduate-approved elective courses. Students complete 6 credits 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

## Outcome: Develop Communication Skills

Develop effective written and oral communications skills.

**Outcome Status:** Active

**Planned Assessment Year:** 2016 - 2017, 2017 - 2018, 2018 - 2019

**Outcome Type:** Skills

### Assessment Methods

**Oral Presentation** - Student performance on an oral defense of the research project was evaluated by the advisory committee. (Active)

**\* Learning Outcome Goal/Benchmark:** Students must successfully complete a written thesis and defend it before an examining committee. The research advisor and graduate committee provides feedback to the student.

**Timeline for Assessment:** After the student has completed the research project.

**Review of Thesis/Dissertation/Creative Component** - Student performance on a written thesis of the research project was evaluated by the advisory committee. (Active)

## Program (CEAT) - CHE - Chemical Engineering (MS) - 042

**\* Learning Outcome Goal/Benchmark:** Students must successfully complete a written thesis and defend it before an examining committee. The research advisor and graduate committee provides feedback to the student.

**Timeline for Assessment:** After the student has completed the research project

**Interviews** - Exit interviews of graduates were conducted by the department head. (Active)

**\* Learning Outcome Goal/Benchmark:** Student feedback regarding learning experiences in the development of written and oral communications skills. Students must complete a written thesis and give an oral defense of the thesis work before an examining committee. The research advisor and graduate committee provides feedback to the student.

**Timeline for Assessment:** During the final semester for graduating students