

PhD Chemical Engineering

Annual Program Report Template

Year:	2022 (submitted 3/30/2023)
Program:	PhD Chemical Engineering
Contact Person (include email & phone#)	Tracy Benson

Summary of Continuous Improvement Efforts since Last Report

Provide a brief description of how assessment results have been used for program improvement. Point to a specific example of how an assessment provided the program with data it could use for improvement and what that improvement was, if possible, also show evidence of the improvement. You may look at data from the two previous academic years to support this case.

Respond here:

The department has made the following improvements.

- 1. Adopted a new Qualifying Exam**
- 2. Adopted New Entrance Requirements**

1. Adopted a new Qualifying Exam

Identification: Using longitudinal data, the Qualifying Exam, in a traditional written format based on subjects that students have already taken, was shown not to be an indicator for a student's understanding of research-based performance (i.e., development of a hypothesis, design of experiments, analysis of data, and drawing of conclusions).

Improvement: The format of the Qualifying Exam was changed to a research proposal preparation where the topic may be tangential to the student's research project but not directly related. The topic is picked by, and the proposal is presented (both written and orally) to, a department committee, not the student's research committee. The department committee will ensure sufficient rigor for students across different research areas and groups.

Result: Implemented in 2023; no results at this time

2. Adopted New Entrance Requirements

Identification: Previous entrance requirements was mostly based on GRE performance. After examining the data from our department, along with national statistics, our department determined that GRE was not an indicator for students' performance, not in quality of work nor in time to graduation.

Improvement: The department developed a holist criteria based on BS (and/or MS) GPA, previous research at the BS or MS levels, recommendation letters, and GRE.

Result: Implemented in 2023; no results at this time

Program Highlights Since Last Report

Identify and briefly discuss any programmatic curriculum changes made since the last report (e.g. new courses, course changes, SLO changes, course deletions).

Table 1. Assessment Results and Analyses for Current Cycle.

STAGE 1: PLAN				STAGE 2: DO		STAGE 3: STUDY
Departmental Student Learning Goal	Program Student Learning Outcome	Assessment	Assessment Method/Location	Benchmark Expectations	Data Results	Actions/Goals Based on Data Results* What do the data tell you? How will you use this data? How were data from the last cycle used to make changes during this cycle, and What were the results of those changes?
An ability to apply the fundamental knowledge of mathematics, sciences, and engineering necessary to complete the PhD research and dissertation.	Math and Reasoning	Qualifying Exam (8 hour written exam with selected problems from Transport Phenomenon, Thermodynamics, Kinetics, and Engineering Mathematics	Written Exam	3.5	3.65 (2020) 3.90 (2021) 3.70 (2022)	Developed new Qualifying Exam using a proposal based method; student writes and defends a research proposal that is not based on his/her specific research project
The ability to apply the broad range of engineering knowledge and have the understanding of contemporary issues necessary to complete successfully the PhD research and dissertation.	Understanding contemporary issues	PhD Proposal outlining research plan based on discussions with student's PhD advisor	Written report and presentation	3.5	3.70 (2020) 3.88 (2021) 3.55 (2022)	Weak area just above minimum standard. Improvement plan includes implementing broader graduate seminar topics to include experts in contemporary issues related to PhD-level chemical engineering
An ability to use the techniques, skills, and modern engineering tools for complex engineering practice in a systematic manner	Quality of Analysis	PhD dissertation (written document reviewed by a committee of at least 5 faculty		3.5	3.73 (2020) 3.88 (2021) 3.67 (2022)	Ok

An ability to complete a PhD dissertation and effectively communicate the dissertation work orally and in writing	Dissertation significance	Completion and successful defense of doctoral dissertation	Written report and presentation defense	3.5	3.73 (20220) 3.83 (2021) 3.56 (2022)	Weak area just above minimum standard. Improvement plan includes workshops with university writing center and more opportunities to hone presentation skills.
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Table 2. Continuous Improvement Results Since Last Report

Stage 4: ACT		
Actions/Goals Based on Data Results <i>*Copy last cycle's actions/goals and report on progress toward continuous improvement on those here.</i>	Status <i>C=Complete P=Progressing N=No Action Taken</i>	Discussion of Status <i>If C, describe efforts that led to accomplishment of actions/goals. If P, provide update on progress made toward accomplishing actions/goals and what tasks remain If N, discuss why action toward accomplishing actions/goals has been delayed and what work will be initiated toward accomplishment.</i>
Beginning in 2023 - Developed new Qualifying Exam using a proposal based method; student writes and defends a research proposal that is not based on his/her specific research project		