Chemistry

FELO Data for 1e: FA2021-SP2022

Learning Outcome: FELO 1e. Quantitative Reasoning

Students will be able to solve problems that are quantitative in nature.

Outcome Measure: Problems on the final exam that are quantitative in nature.

CHE101 / 1001 Chemistry and Society
CHE103 / 1003 Introduction to General, Organic, and Biological Chemistry CHE152 / 1052 General Chemistry I
PSC110 Physical Science (chemistry portion)
PSC111 / 1014 Physical Science for Teachers (chemistry portion)

Criteria for Success: At least 70% of students will score 3 or higher.

Longitudinal Data:

CHE1001 (formerly CHE101)

	Assessment Data for FELO 1e. Quantitative Reasoning								
	Spring 2018	**Fall 2018**	**Spring 2019**	**Fall 2019**	**Spring 2020**	**Fall 2020**	**Spring 2021**	**Fall 2021**	**Spring 2022**
Number of students	n=19	n=20	n=20	n=19	n=20	n=18	n=19	N/A	n=20
Percentage	57.9%	50.0%	55.0%	47.4%	75.0%	77.8%	55.0%	Course not offered	70%

CHE1003 (formerly CHE103)

		Assessment Data for FELO 1e. Quantitative Reasoning								
	Fall 2017	**Spring 2018**	**Fall 2018**	**Spring 2019**	**Fall 2019**	**Spring 2020**	**Fall 2020**	**Spring 2021**	**Fall 2021**	**Spring 2022**
Number of students	n=30	n=20	n=40	NA	n=29	n=20	n=33	n=19	n= 34	N/A

Percentage	86.7%	65.0%	90.0%	NA	89.7%	90.0	90.9%	47.4%	82.9%	Not assessed

*No assessment data for FELO 1e in CHE103 Spring 2019 and Spring 2022, due to changes made to final exam.

CHE1052 (formerly CHE152)

	Assessment Data for FELO 1e. Quantitative Reasoning							
	Fall 2014	**Fall 2015**	**Fall 2016**	**Fall 2017**	**Fall 2018**	**Fall 2019**	**Fall 2020**	**Fall 2021**
Number of students	n=40	n=48	n=55	n=51	n=52	n=48	n=47	n= 45
Percentage	80.0%	79.2%	89.1%	84.3%	96.2%	83.0%	76.6%	32.6%

PSC1014 (formerly PSC110 & PSC111)

	Assessment Data for FELO 1e. Quantitative Reasoning								
	Fall 2015	**Spring 2016**	**Fall 2016**	**Spring 2017**	**Fall 2017**	**Fall 2018**	**Fall 2019**	**Fall 2020**	**Fall 2021**
Number of students	n=20	n=20	n=20	n=18	n=20	n=19	n=20	n=20	n=19
Percentage	55.0%	95.0%	95.0%	94.4%	90.0%	63.2%	85.0%	70.0%	78.9%

Conclusions Drawn from Data: FELO 1e (quantitative reasoning) is assessed in 4 of our 5 chemistry FE courses. For General Chemistry I (CHE 1052), our criteria for success were not met. In fact, it was the lowest score we ever obtained (32.6% instead of 84% average). We think this can be attributed to two factors: 1- we used multiple choice questions instead of short answers for the first time which did not allow for partial credits and 2- with students having had a mostly online high school senior experience due to COVID-19, there were less prepared for this course. We will keep monitoring this over the next few years and adjust our assessment method accordingly. More specifically, we will most likely switch back to using short answers for this assessment.

Chemistry and Society (CHE 1001) was not offered in the Fall 2021 because we did not have an instructor to teach it. About 15 students were added to CHE 1003 and others decided to take another course. When the course was offered in the Spring 2022 the criteria for success was met. Regarding PSC 1014 and CHE 1003, the criteria for success were met 79% and 83% of the time respectively which is good. It is worth noting that due to a change in the final exam for CHE 1003 (spring 2022), no data were collected.

Changes to be Made Based on Data: The chemistry department has met during the Spring 2021 to discuss how we assess our FE courses and have come up with an agreed upon set of questions for each course. Moving forward, these questions will be used consistently regardless of the instructor so that we can collect consistent data. We also have agreed to use short answers, when possible, in order to offer partial credits. This will also be true for CHE 1003 where we have now decided to use the widely used ACS exam to which we add a few assessment questions.

Rubric Used: The following scale was used.

	4	**3**	**2**	**1**
% of points earned on quantitative problems	80 – 100%	60 – 79%	40 – 59%	39% or lower