Chemistry [CHEM]

Cycles included in this report:
Jun 1, 2024 to May 31, 2025

Program Name: Chemistry [CHEM]

Reporting Cycle: Jun 1, 2024 to May 31, 2025

1 Is this program offered via Distance Learning?

100% Traditional or less than 50% Distance/Traditional

2 Is this program offered at an off-site location?

No

2.1 If yes to previous, provide addresses for each location where 50% or more of program credits may be earned.

3 Example of Program Improvement

2020-2021:
This year the department faced many different issues from the continuation of the COVID-19 pandemic, as well as multiple hurricanes hitting the campus. This forced all instruction online and has possibly skewed the data for the 2020-21 academic year, since the student's didn't get the hands-on experience with this equipment.

The ICP-MS, HPLC, and GC-MS were delivered and commissioned for use in 2020.

Unfortunately, Hurricane Laura severely damaged the building and the equipment was impacted. We anticipate a return to the building and access to test the equipment in the summer of 2021.

2021-2022:
The program will be getting a new general chemistry lab and organic chemistry lab.

2022-2023:

2023-2024:
Department is working on making some changes to curriculum and planning to introduce new analytical lab section. Got new rotary evaporator for organic chemistry labs and new hood for inorganic lab.

2024-2025:
Department made some changes to curriculum and introduced a new analytical lab section.

4 Program Highlights from the Reporting Year

2020-2021:
The highlights from the 2020-21 academic year are difficult to identify because the department continued to go through the COVID-19 pandemic mixed with two hurricanes damaging Kirkman Hall, which has lead to all instruction being online or hybrid.

2021-2022:
Due to the low enrollment of the program, the highlights are rather small for chemistry education. For the department as a whole, a student did go present at the ACS national conference.

2022-2023:

2023-2024 :
Department highlights includes three student presentations at ACS conference. Additionally 3 students presented at LAS meeting. One graduate student successfully defended master thesis and joined Texas Tech university for Ph.D. One of our undergraduate student joined graduate school in Kansas State University.

2024-2025:
Two students will join graduate schools Ph.D programs.

5 Program Mission

The mission of the Department of Chemistry & Physics includes the following components: (a) offering a quality educational program for all students enrolled in courses presented by the department, (b) providing an atmosphere conducive to (i) academic inquiry, (ii) the exchange of knowledge, and (iii) the advancement of knowledge through scientific research and/or other scholarly activities, and (c) providing service to the College of Science, the University, and the community. The department seeks to broaden and enhance the educational experiences for all students enrolled in chemistry courses, to optimize the productivity of the faculty and staff, and to provide service to the academic and industrial communities and to the citizens of Southwest Louisiana.

6 Institutional Mission Reference

The department's mission mirrors that of the University in the provision of educational opportunities to students seeking a B.S. in Chemistry, and in providing support courses for students from other disciplines across the campus. In conjunction with the Department of Agricultural Sciences, we offer a M.S. in Environmental & Chemical Sciences. We conduct faculty-led research at both the undergraduate and graduate levels and interface many of our research efforts with local industries. The B.S program is approved by the American Chemical Society (ACS) and our program has received laudable reviews from them and from the Louisiana Board of Regents. Students are encouraged to present their research findings in oral or poster form in local, regional, and national meetings and student publication in scientific peer-reviewed journals is a departmental priority. Faculty serve as ad hoc consultants for a number of local industries, leveraging our technical expertise for the solution of industrial problems. In association with the Southwest Louisiana Crime Laboratory and SASOL North America we offer opportunities for students to intern in and conduct research in practical workplaces prior to graduation. Additionally, through collaboration with the Science Coordinator for Calcasieu Parish, we have a vibrant outreach program to local high schools and elementary schools aimed at sparking and sustaining student interest in science.

7 Assessment and Benchmark CHEM 301L Lab Report Grades

Assessment: Chemistry majors will demonstrate competence in the full range of classical experimental methodologies and techniques as demonstrated by lab report grades.

Benchmark: 70% of students will earn an average score of 80% on CHEM 301L lab reports.

7.1 Data

Academic Year	Students with 80%		Benchmark met?
	#	%	
2020-2021	139/149	93.3%	Yes
2021-2022	81/90	90%	Yes
2022-2023	—	—	—
2023-2024	77/81	95%	Yes
2024-2025	83/84	98.8%	Yes

7.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
The students meant the benchmark. This could be due to the online teaching of the labs due to COVID-19 pandemic and the hurricanes that hit the area.

Plan for improvement, gather more data to see if this was a one time spike.

2021-2022:
The students met the benchmark. This shows that the 93.3% from last cycle wasn't necessarily a one time spike. However, the department wants one more year of data before making any major changes to the assessment. This is due to the fact that labs are being updated for Fall 2022 and might make more experiments possible.

2022-2023:

2023-2024:
The students met the benchmark.

2024-2025:
The students met the benchmark.

8 Assessment and Benchmark CHEM 361 Lab Report Grades

Assessment: Chemistry majors will demonstrate competence in the full range of classical experimental methodologies and techniques as demonstrated by lab report grades.

Benchmark: Students will earn an average score of 80% on CHEM 361 lab reports.

8.1 Data

Academic Year	Students with 80%		Benchmark met?
	#	%	
2020-2021	4/5	80%	Yes
2021-2022	9/11	82%	Yes
2022-2023	8/9	89%	Yes
2023-2024	7/7	100%	Yes
2024-2025	6/6	100%	Yes

8.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
The students met the benchmark. This again was a completely online course, due to hurricanes Laura and Delta damaging Kirkman Hall. In Spring 2022 we will look at data to see how students do in a fully in-person lab.

2021-2022:
Most of the students met the benchmark. It was up just shy of 2% from the previous lab that was completely online. The department is going to see how next spring's section of CHEM 361L does and evaluate the benchmark to see if it needs to be updated.

2022-2023:

2023-2024:
The students met the benchmark of 80% or above.

2024-2025:
The students met the benchmark of 80% or above

9 Assessment and Benchmark CHEM 303 Final Examination

Assessment: Chemistry majors will demonstrate competence in sample preparation & analysis, data acquisition & analysis, chromatographic separations, optical atomic spectroscopy, and optical mass spectrometry as demonstrated by CHEM 303 Final Examination.

Benchmark: Students will earn an average score of 70% on the CHEM 303 final examination.

9.1 Data

Academic Year	Students with 70%		Benchmark met?
	#	%	
2017-2018	—	100%	Yes
2018-2019	0	0	No
2019-2020	11/17	65%	No
2020-2021	5/9	60%	No
2021-2022	10/12	83%	Yes
2022-2023	7/7	100%	Yes
2023-2024	5/8	63%	No

9.1.1 Analysis of Data and Plan for Continuous Improvement

2019-2020:
The students did not meet the benchmark this year. This could be do to multiple factors such as the course going completely online after March of 2020 due to the COVID-19 Pandemic.

2020-2021:
The students failed to meet the benchmark during the 2021 offering of the CHEM 303 course, due to Hurricanes Laura and delta doing damage to the buildings and forcing the course to be taught online completely. This course requires a lot of hands on learning to understand the instrumentation.

2021-2022:
As noted in last year's assessment analysis, CHEM 303 was taught completely online, which effected the students knowledge. This year, Dr. Vaughan had a small group of students that got hands on experience with most of the equipment in the department through this course and students benefited from this. To continue the success of this course benchmark, the department is looking into adding a certification along with a course that will either be hosted in this course or this course will be part of the sequence to obtain the certification.

2022-2023:

2023-2024:
Students did not meet the benchmark this year. Dr. Paudyal will introduce more qualitative and quantitative analytical techniques to enhance students understanding. The department did not meet the benchmark. The department is in the process of introducing lab section to aid students to understand analytical methods and techniques.

2024-2025:
Students did not meet the benchmark this year. Students with 70% is 100%. All 9 students scored above 70%.

10 Assessment and Benchmark CHEM 441 Oral Presentation Score

Assessment: CHEM 441 oral presentation score from rubric.

Benchmark: Students will earn a score of 80% or higher on the oral presentation in CHEM 441.

10.1 Data

Academic Year	Students with 80%		Benchmark met?
	#	%	
2020-2021	6/8	75%	No
2021-2022	7/7	100%	Yes
2022-2023	11/11	100%	Yes
2023-2024	4/4	100%	Yes
2024-2025	7/7	100%	Yes

10.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
To improve the course, we will need to let the students present in a face-to-face environment where the instructor can give better feedback.

2021-2022:
The seminar students did very well this year, especially being back in a face-to-face environment where they got to learn from several professionals about how to make their presentations better. It's important to note that many students in the spring session were set to take CHEM 442, however with the professor leaving suddenly they had to take seminar.

To improve the course, the department is thinking about getting freshman and sophomore students to attend the seminar so that the speakers can have a bigger audience with more questions.

2022-2023:

2023-2024:
The benchmark was met. To improve the quality, the departmental seminar had a few guest lectures this year. Additionally, all the students who registered for CHEM 451 research are required to attend.

2024-2025:
The benchmark was met.

11 Assessment and Benchmark CHEM 451 Research Paper

Assessment: Students will demonstrate ability to perform laboratory/computing research as well as literature research in their research project papers in CHEM 451.

Benchmark: 80% of program graduates will earn an average score of 80% or higher in CHEM 451. As well, 33.3% of program graduates will present their research findings at a state/regional/national scientific meeting and/or publish in a peer-reviewed journal.

11.1 Data

Academic Year	Students with 80%		Benchmark met?	Students that presented findings		Benchmark met?
	#	%		#	%	
2020-2021	13/13	100%	Yes	1/13	7.7%	No
2021-2022	21/21	100%	Yes	1/21	4.7%	No
2022-2023	20/20	100%	Yes	4/20	20%	No
2023-2024	10/10	100%	Yes	4/10	40%	Yes
2024-2025	18/18	100%	Yes	7/18	39%	Yes

11.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
The benchmark was met for all students in CHEM 451 on conducting research and one student did present results of there work. Presenting was very difficult with COVID-19 pandemic and multiple hurricanes in the local area.

2021-2022:
The benchmark was made for all students who conducted research with their advisors in CHEM 451. However, the benchmark wasn't made in presenting their results, however it is good to note that the one student who did present was at the ACS national conference in San Diego, California. To improve on the student presentation of their findings, the department is looking into making that part of their overall grade for the course.

2022-2023:

2023-2024:
The benchmark was made for all students in CHEM 451. But, the benchmark wasn't made in presenting their results. Therefore, the department is planning to have one day departmental oral presentation session to present research accomplishments for students who registered for CHEM 451.

2024-2025:
The benchmark was made for all students in CHEM 451.