

Department of Chemistry and Biochemistry proposed assessment plan for

BS and BA in Chemistry programs

(to include BS Chemistry, chemistry concentration; BS Chemistry, management concentration; and BA Chemistry)

Summary of plan:

Data will be collected each year by the assessment committee, provided by the students themselves (in the form of graduating student surveys and exit interviews), alumni (in the form of surveys), faculty (in the form of rubric or scores on specific items), and from ETS (in the form of the major field test).

Please note that as the concentrations / degrees here involve very different curricular requirements, at times the SLOs are subdivided between the different programs to better reflect their experiences.

Year 2 reports.

Our BS Chemistry, chemistry concentration program is accredited by the American Chemical Society, while the other two programs included here are not. We will provide a copy of the annual report to the assessment report, but this report mainly requires reporting enrollment / matriculation numbers, faculty composition and educational background, and course offerings and enrollment. Thus we plan to include our own raw data as an appendix. Thus the year 2 report will consist of a cover letter, evidence of ongoing accreditation / annual report, and an appendix of collected assessment data.

Our BS Chemistry, chemistry program undergoes an extensive review encompassing seven different areas at least every 6 years, with the next one due in June 2022. These will be included in the next appropriate review period.

Year 4 reports.

The requisite evidence of ongoing accreditation and annual accreditation reports will be as above, along with the summary of assessment data by student learning objectives.

Year 4

Student Learning Outcomes (SLOs) for Academic Programs

Please list all of the student learning outcomes for your program as articulated in the assessment plan.

1. Students will learn fundamental principles and applications in each of the major sub-disciplines in chemistry. The subdisciplines encompass analytical, biochemistry, inorganic, organic, and physical.
2. Students will be able to execute experiments in chemistry utilizing modern methods & equipment.
3. Students will be able to critically analyze data from experiments as well as a breadth of chemical problems.
4. Students will be able to utilize computer applications in chemistry.
5. Students will be able to properly utilize chemical information and database sources.
6. Students will be able to, using the scientific method, generate and contribute to the process of expanding new knowledge and data in the field.
7. Students will be able to communicate technical material effectively in speaking & writing.
8. Students will be aware of and practiced in working safely in chemical labs

Overview of Measures / Instruments

SLO(s)	ULG*	Measures/Instruments <i>Please include a clear description of the instrument including when and where it is administered</i>	How is the information Used? <i>(include target score(s), results, and report if target(s) were met/not met/partially met for each instrument)</i>
<p><i>Note: Measures might be used for more than 1 SLO</i></p> <p>1. Fundamental principles and applications</p>	C, W, Q	<p>(a) Grades in foundation courses (2310, 2440, 2730, 3300/3450, 3910/320) and in in-depth courses (2840, 3460, 3780, 3910/3920, 4900, as applicable. Will be collected at end of each semester.</p> <p>(b) Scores on ETS Major Field test, administered to graduating seniors in SP semesters. Fall graduates will be tested in the SP prior to degree completion.</p> <p>(c) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(d) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 75% of students obtaining an A or B grade on first attempt.</p> <p>(b) For all students, scores of $\geq 50^{\text{th}}$ percentile. For BS chem, chem students, $\geq 50^{\text{th}}$ percentile on remaining 3 subdisciplines. For BS chem, management and BA students, $\geq 35^{\text{th}}$ percentile on the remaining 3 subdisciplines.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>

2. Execute experiments in chemistry	C, W, Q	<p>(a) Grades in laboratory courses of 2445, 2730, 2845, 3455, 3780, 3915, and 4915, as applicable. Will be collected at end of each semester.</p> <p>(b) Grade in research course CHM 4400, as applicable.</p> <p>(c) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(d) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 75% of students obtaining an A or B grade on first attempt.</p> <p>(b) 75% of students obtaining an A or B grade on first attempt.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>
3. Critically analyze data.	C, W, Q	<p>(a) Rubric scores from instructors on 1 selected student report in CHM 2845, 3455, 3780, 3915, and 4915 as applicable. Scores will be provided by end of semester course taken.</p> <p>(b) Critical thinking component of Major Field Test</p> <p>(c) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(d) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 75% of students obtaining score of ≥ 2.5 (on 4pt scale).</p> <p>(b) Mean percentile correct \geq national mean.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>
4. Utilize computer applications.	NA	<p>(a) Rubric scores from instructors on 1 selected experiment as specified in following items: (1) use of spreadsheet / graphing / plotting programs in CHM 2730 and 3915; (2) use of word processing software in CHM 2845, 3780, and 3915; (3) use of structure drawing software in CHM 2845; (4) computational chemistry packages in CHM 1315, 2845, 3915. Scores will be provided by end of semester course taken.</p> <p>(b) Seminar evaluation items on use of structure drawing software and presentation software in CHM 3001 and 4001. Scores will be provided by end of semester course taken.</p> <p>(c) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(d) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 75% of students obtaining score of ≥ 2.5 (on 4pt scale).</p> <p>(b) Average response of ≥ 2 on seminar evaluation, where 1 = needs improvement and 3 = excellent.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>

<p>5. Properly use chemical information and database sources.</p>	<p>C</p>	<p>(a) Rubric scores from instructors on 1 exercise as specified in following items: (1) SciFinder and journal databases, including PubChem, in CHM 2845, 3450, 3500, and 4915; (2) use of Protein Database and NIST database in CHM 3450 and 3500. Scores will be provided by end of semester course taken.</p> <p>(b) Seminar evaluation items on sources used in CHM 3001 and 4001. Scores will be provided by end of semester course taken.</p> <p>(c) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(d) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 75% of students obtaining score of ≥ 2.5 (on 4pt scale).</p> <p>(b) Average response of ≥ 2 on seminar evaluation, where 1 = needs improvement and 3 = excellent.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>
<p>6. Generate and contribute to the process of expanding new knowledge and data in the field.</p>	<p>C, Q</p>	<p>(a) Participation in CHM 4400 Undergraduate Research. Will be collected at end of each semester.</p> <p>(b) Participation in summer research experiences, including internships or CoOPs. Will be collected at end of each semester.</p> <p>(c) Published abstracts for presentations or posters at external meetings. Will be collected at end of each semester.</p> <p>(d) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(e) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) For BS Chem, chem majors at least 70% of majors completing 1 semester of 4400; at least 50% of majors completing. For BS chem, management and BA students at least 50% of majors complete 1 semester of 4400.</p> <p>(b) At least 15% of majors involved in a summer experience.</p> <p>(c) At least 50% of students listed on at least 1 abstract.</p> <p>(d) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(e) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>
<p>7. Communicate effectively in speaking and writing.</p>	<p>W, S</p>	<p>(a) For speaking, 3 items on the back page of CHM 3001, 4001 seminar evaluations</p> <p>(b) For writing, seminar evaluation item on abstract for CHM 3001, 4001..</p> <p>(c) For writing, rubric scores from instructors on 1 report from CHM 2845, 3780, 3915, and 4915, as appropriate.</p> <p>(d) For speaking, published results from speech rubrics in CMN1310G and EIUXXX.</p> <p>(e) For writing, rubric scores submitted by CHM faculty instructors.</p>	<p>(a) Average response of ≥ 2 on seminar evaluation, where 1 = needs improvement and 3 = excellent.</p> <p>(b) Average response of ≥ 2 on seminar evaluation, where 1 = needs improvement and 3 = excellent.</p> <p>(c) 75% of students obtaining score of ≥ 2.5 (on 4pt scale).</p> <p>(d) averages of ≥ 3.2 in CHM1310G and ≥ 3.6 in EIUXXX.</p> <p>(e) average of ≥ 3.3.</p>

		<p>(f) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(g) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(f) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(g) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>
8. Aware of and practiced in working safely.	R	<p>(a) Completion of CHM 3500.</p> <p>(b) Reflective items on exit surveys to graduating seniors, to be completed by the end of their last semester of courses.</p> <p>(c) Reflective items on alumni surveys sent to students who graduated 3- and 8-yrs prior. Surveys will be sent in late SP or over SU.</p>	<p>(a) 100% of majors complete</p> <p>(b) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p> <p>(c) Average response of ≥ 3 on 5pt scale, where 1 = strongly disagree and 5 = strongly agree.</p>

CLAS Deans' comments on Chemistry B.S. and B.A. reports

Reviewer: Michael Cornebise

Please note: This is a **STARTING POINT** for conversation, with no rubric per se. We will be developing a rubric collaboratively (amongst chairs, Associate Deans, and our new EIU Assessment Coordinator, Yvette Smith) in the spring of 2021 based on peer/aspitant institution models, then we'll evaluate it by that. Meanwhile, if you'd like to modify your document based on these comments, feel free. We appreciate your patience with this process as it evolves!

1. SLOs are generally clear and measurable, using a good mix of high-level, mid-level, and low-level Bloom's Taxonomy verbs.
2. The assessment plan includes a nice combination of measurements to gather data at different levels: exit and alumni surveys, writing and speaking rubrics, seminar evaluation items, scores from ETS Major Field test, and faculty developed course assessment rubrics.
3. While the targets are clearly identified in the plan and student progress can be closely monitored, how will the data be shared with the department, and used to potentially improve the program?

Overall, though, the plan seems comprehensive and ready for data collection.