Student Learning Summary Form AY2015-16

Due to your dean by June 1
Due from dean to assessment office by June 15

Degree Program Name: _Chemistry_____ **Contact Name and Email** ___Larry Rosenhein lrosenhein@indstate.edu

Before you complete the form below, review your outcomes library and curriculum map to ensure that they are accurate and up to date. If not, you may submit a new version along with this summary.

Part One

a. What learning outcomes did you assess this year? **If this is a graduate program, indicate the Graduate Student Learning Outcome* each outcome aligns with.**	**b. (1) What method(s)s did you use to determine how well your students attained the outcome? (2) In what course or other required experience did the assessment occur?**	**c. What expectations did you establish for achievement of the outcome?**	**d. What were the actual results?**	**e. (1) Who was responsible for collecting and analyzing the results? (2) How were they shared with the program's faculty?**
3.Students pursuing a baccalaureate degree in chemistry will be able to carry out basic laboratory procedures demonstrating appropriate use of instrumentation, quantitative measurement, and data analysis	Instructors in Chem 431L, 340, and 352L completed rubrics evaluating lab technique in those courses. In Chem 321L, the instructor assembled data for two experiments showing the percent relative error in results for all students.	100% of the targets in our rubric will be rated at least satisfactory. A satisfactory rating means that at least 80% of the students are rated satisfactory or better in that category.	The results from the Chem 321L data were judged by the instructor to be about one-third less than satisfactory, one-third good, and one-third very good. Results from 352L (32 students) were that in the categories judged, 12% were less than satisfactory, 34% were good, and 62% were very good. Results from 431L (14 students) were that in the categories judged, 18% were less than satisfactory, 54% were good, and 27% were very good. Results from 341 (10 students) were that in the categories judged, 13% were less than satisfactory, 37% were good, and 50% were very good.	Drs. Van Hoveln, Flurkey, Inlow, Rosenhein and Wolf contributed data. The data were shared and discussed in a meeting of the tenured/tenure-track chemistry faculty in April.

4. Students pursuing a baccalaureate degree in chemistry will be able to demonstrate professional communication skills.	For writing, sample lab reports were collected in Chem 340, Chem 461L, and Chem 431L. The quality of the writing was discussed with other faculty, "focus group" style. The discussion included evaluation of student work, both presentation and writing (abstracts for the presentations).	At least 80% of the chemistry majors will exhibit written communication skills appropriate for the level of the course.	In 461L, (29 students), based on two experiments with full lab reports, 59% were satisfactory on the first report, which improved on the second to 72%. In 431L, (14 students), discussions, including writing and graphs, were judged to be 50% satisfactory or better. In 405 (28 students), abstracts and powerpoints for presentations were judged to be 50% satisfactory or better. In 340 (10 students who finished), the reports were graded explicitly on a writing/ data presentation basis separately from the chemical results, and grades of A and B predominated after the first report or two, which means they were all good or very good.	Drs. Rosenhein, Inlow, Fitch, Noll and Van Hoveln contributed data. These were discussed at the same meeting as above.
3.				

* See https://www2.indstate.edu/graduate/forms/review.pdf.

If you would like to report on more than three outcomes, place the cursor in the last cell on the right and hit "tab" to add a new row.

Notes

a. Use your outcomes library as a reference.
b. Each outcome must be assessed by at least one direct measure (project, practica, exam, performance, etc.). If students are required to pass an examination to practice in the field, this exam must be included as one of the measures. At least one of the outcomes must use an indirect measure (exit interview, focus group, survey, etc.). Use your curriculum map to correlate outcomes to courses.
c. Identify the score or rating required to demonstrate proficiency (e.g., Students must attain a score of "3" to be deemed proficient; at least 80% of students in the program will attain this benchmark."
d. Note what the aggregate level of proficiency actually was and the number of students included in the cohort or sample (e.g., "85% of the 25 students whose portfolios were reviewed met the established benchmark).
e. This may be a specific individual, a position (e.g., assessment coordinator), or a group such as the department assessment committee. Minutes should reflect that results are shared with members of the department at least annually.

Part Two

In no more than one page, summarize 1) the discoveries assessment has enabled you to make about your students' learning, the curriculum, departmental processes, and/or the assessment plan itself; 2) the changes and improvements you have made or will make in response to these discoveries and/or the coordinator's feedback on the previous summary; and 3) what your assessment plan will focus on in the coming year.

If you would like to reference any supporting materials (departmental meeting minutes, detailed assessment results, etc.), please provide the URL at which they can be found.

1. Our assessment process measures four outcomes, with two measured on alternate years. This year, outcomes 3 and 4 were measured, having to do with laboratory work and communication skills.

For the laboratory skills, instructors in a variety of upper-level courses were asked to judge the numbers of students whose proficiency could be described as "fair," (which was interpreted as below satisfactory) "good," or "very good" in different categories of laboratory techniques. Based on this, it can be said that roughly 80% or more of our students were judged as good or better. However, in Chem 321, the instructor who collected data for results in two experiments felt that on that basis, about one-third of the class had below satisfactory technique. Overall, we do not see a need for action on this outcome, and this is not surprising considering the large number of hours of laboratory work required of our students.

Communication skills were evaluated based on a discussion among faculty whose courses include some significant component of written and/or oral communication. Results differ between courses, but the consensus would be that too many students are not demonstrating skills that are judged to be satisfactory. Next fall we plan to invite Nicole Bailey, a specialist in writing across the curriculum, to visit and provide suggestions for improvement.

2. To get a better picture of laboratory skills, instructors in organic chemistry and in biochemistry plan to collect data from student laboratory work, such as yield and purity of product for a particular synthesis, or activity of an isolated enzyme. This would give us quantitative data to accompany that which was assembled in the analytical chemistry class this year.

In terms of writing, a few years ago some faculty agreed to explicitly give a separate grade on lab reports for the writing component; in this past cycle this occurred in only one course. It was felt at least in that case, there was a resulting attention to the writing component on the part of students. An instructor in a different course adopted clear rubrics for the laboratory reports. A couple of courses require poster sessions at the end of the semester where students present work to classmates and faculty. The Senior Seminar course is the one that has the greatest component devoted to communication. By giving presentations, and observing other presentations including both of other students and visiting professional speakers, students gain insight into the attributes of good oral communication, but the learning curve may be too steep for one course.

3. Next year Outcomes 1 and 2 will be assessed; these are chemistry knowledge and problem-solving skills. For the former, we rely on a standardized exam ("Major Field Test" in chemistry) which allows comparison among programs at different institutions. For the latter, we have in the past used rubrics provided to instructors in targeted courses. It would be desirable to add a component to problem-solving skills that measured the result for a small set of problems in a few different courses, to obtain a more quantitative measure, similar to what was done in analytical chemistry this year.

Student Learning Summary Report Rubric :: Office of Assessment & Accreditation :: Indiana State University

Degree Program: BS in Chemistry Date: 8.17.16

	Level 0 – Undeveloped	Level 1 – Developing	Level 2 – Mature	Level 3 – Exemplary
1. Student Learning Outcomes	☐ No outcomes are identified. ☐ No Curriculum Map was provided.	☐ Outcomes were identified. ☐ Some of the outcomes are specific, measurable, student-centered, program-level outcomes. ☐ A Curriculum Map was provided.	☐ Outcomes are specific, measurable, student-centered, program-level outcomes. ☒ Outcomes at least indirectly support Foundational Studies Learning Outcomes or the Graduate Learning Goals. ☐ The Curriculum Map identifies where/to what extent each outcome is addressed. ☐ At least one outcome was assessed in this cycle.	☒ Outcomes are specific, measurable, student-centered program-level outcomes that span multiple learning domains. ☐ Outcomes directly integrate with Foundational Studies Learning Outcomes or the Graduate Learning Goals. ☐ Outcomes reflect the most important results of program completion (as established by an accreditor or other professional organization). ☐ Learning outcomes are consistent across different modes of delivery (face-to-face and online.) ☐ Outcomes are regularly reviewed (and revised, if necessary) by the faculty and other stakeholders. ☒ The Curriculum Map identifies where/to what extent each outcome is addressed and offers evidence that students have sufficient opportunity to master the associated learning outcomes. ☒ Two or more outcomes were

				assessed in this cycle.
2. Measures & Performance Goals	☐ No measures are provided. ☐ No goals for student performance are identified.	☐ Measures are provided, but some are vague and/or do not clearly assess the associated outcomes. ☐ Measures are primarily indirect. ☐ Measures include course and/or assignment grades, but there is no evidence that grades are calibrated to the outcomes. ☐ Performance goals are identified, but they are unclear or inappropriate.	☒ At least one direct measure was provided for each outcome. ☒ Some information is provided to suggest that measures are appropriate to the outcomes being assessed. ☐ Measures include course and/or assignment grades, and general information is provided to indicate that grades are calibrated to the outcomes. ☒ Clear and appropriate standards for performance are identified. ☐ Mechanisms (rubrics, checklists, criterion-referenced exams, etc.) were provided.	☐ Multiple measures were provided, and a majority are direct. ☐ Detailed information is provided to show that measures are appropriate to the outcomes being assessed. ☐ Measures include course and/or assignment grades, and specific evidence is provided to demonstrate that grades are calibrated to the outcomes. ☐ Clear and appropriate standards for performance are identified and justified. ☐ If students are required to pass a certification or licensure exam to practice in the field, this was included as a measure. ☐ Measures assess some high impact practices (internships, capstone course projects, undergraduate research, etc.) ☒ Some measures allow performance to be gauged over time, not just in a single course. ☐ Mechanisms (rubrics, checklists, criterion-referenced exams, etc.) were provided that demonstrate that the measure provides clear evidence of what students know/can do.

				☐ If a measure is used to assess more than one outcome, a clear explanation is offered to substantiate how this is effective.
3. Results	☐ No data are being collected. ☐ No information is provided about the data collection process. ☐ No results are provided. ☐ Students are meeting few of the performance standards set for them.	☐ Some data are being collected and analyzed. ☐ Some results are provided. ☐ Insufficient information is offered to demonstrate that data collection, analysis, and interpretation processes are valid. ☐ Students are achieving some of the performance standards expected of them.	☒ Data are being collected and analyzed. ☒ Results are provided. ☒ Some information is offered to demonstrate that data collection, analysis, and interpretation processes are valid and meaningful. ☒ Students generally are achieving the performance standards expected of them.	☐ Clear, specific, and complete details about data collection, analysis, and interpretation of results are provided to demonstrate the validity and usefulness of the assessment process. ☐ Students generally are achieving the performance standards expected of them and demonstrate continuous improvement on standards they have yet to achieve/achieve less well. ☐ If students are required to pass a certification or licensure exam to practice in the field, the pass rate meets the established benchmark.
4. Engagement & Improvement	☐ No one is assigned responsibility for assessing individual measures. ☐ Assessment primarily is the responsibility of the program chair. ☐ No improvements (planned or actual) are identified. ☐ No reflection is offered about previous results or	☐ The same faculty member is responsible for collecting and analyzing most/all assessment results. ☐ It is not clear that results are shared with the faculty as a whole on a regular basis. ☐ Plans for improvement are provided, but they are not specific and/or do not clearly connect to the results.	☒ Multiple faculty members are engaged in collecting and analyzing results. ☒ Results regularly are shared with the faculty. ☒ The faculty regularly engages in meaningful discussions about the results of assessment. ☒ These discussions lead to the development of specific, relevant plans for improvement.	☐ All program faculty members are engaged in collecting and analyzing results. ☐ Faculty regularly and specifically reflect on students' recent achievement of performance standards and implement plans to adjust activities, performance goals, outcomes, etc. according to established timelines. ☐ Faculty and other important

	plans.	☐ Little reflection is offered about previous results or plans.	☐ Improvements in student learning have occurred as the result of assessment.	stakeholders reflect on the history and impact of previous plans, actions, and results, and participate in the development of recommendations for improvement. ☐ Continuous improvement in student learning occurs as the result of assessment. ☐ Outcomes and results are easily accessible to stakeholders on/from the program website. ☒ Assessment is integrated with teaching and learning.
Overall Rating	☐ **Level 0 – Undeveloped**	☐ **Level 1 - Developing**	☒ **Level 2 – Mature**	☐ **Level 3 – Exemplary**

COMMENTS
Strengths, Concerns, Recommendations for Improvement

1. **Learning Outcomes**
   The two outcomes listed in the report are specific and measurable and require students to engage multiple learning domains. Does outcome #4 include both written and oral communication skills? I ask because while you did not assess the latter, you discuss doing so in Part Two.

2. **Measures & Performance Goals**
   Two direct measures are used to assess these outcomes, lab experiences and lab reports. Does assessment of the former occur through direct observation of students' lab techniques? I like your approach to assessing the written artifacts (i.e., in focus groups). It's an efficient way to get the work done, but it also engages faculty in important conversations about student learning. For both measures, I would appreciate knowing more about the instruments used to assess student achievement. In future reports, please summarize the knowledge and skill you expect students to demonstrate to earn a "satisfactory" rating, as well as include the actual rubrics in the college's Blackboard assessment site. For outcome #4, you note that performance expectations are geared to the level of the course. You might consider using one set of standards, since in addition to being simpler, it would enable you to gauge growth over time. Last, keep in mind that your plan will need to include an indirect assessment measure.

3. **Results**
   Students achieved outcome #3 but not #4. Sufficient detail is provided about the numerical results, but I would like to know more about what the numbers mean in terms of what students know and can do (or don't know/can't do).

4. **Engagement & Improvement**
   Multiple faculty members are engaged in collecting and analyzing data about student learning, which they appear to discuss regularly. In Part Two, you note that since students met the standards for outcome #3, no further action is warranted. But there always is room for improvement, and if your assessments pinpoint the specific areas in which students are less well prepared, they'll lead you to relevant solutions. Since students did not achieve outcome #4, I expected to see a plan for amelioration—and indeed you've identified a first step in inviting Bailey to assist you. (Don't forget about the experts in the English department, too.) I think you are wise to consider (re)requiring faculty to award separate grades for writing. And I like the idea of using the senior seminar to assess communication, since it would allow you to examine both written and oral communication.

   You have a simple, solid plan for assessment and you follow through on it. Thanks!