SAINT LOUIS UNIVERSITY

Program Assessment: *Annual Report*

Program(s): PhD

Department: Chemistry

College/School: Arts and Sciences

Date: 6/25/2019

Primary Assessment Contact: Scott Martin and Dana Baum

1. Which program student learning outcomes were assessed in this annual assessment cycle?

Outcome 1: Demonstrate advanced level knowledge in both (i) synthesis and materials chemistry and (ii) analytical and physical chemistry methods, with a higher level of knowledge expected in the student's area of focus.

Outcome 2: Use standard search tools and retrieval methods to obtain information about a topic, substance, technique, or an issue relating to chemistry and assess relevant studies from the chemical literature.

Outcome 3: Communicate scientific findings from literature and original findings from the student's own independent research in written publications and oral presentations.

Outcome 4: Acquire the basic tools, including chemical practices and theories, needed to conduct advanced chemical research. Students will become proficient in their specialized area of chemistry and complete an advanced, independent research project resulting in peer-reviewed publications.

2. What data/artifacts of student learning were collected for each assessed outcome? Were Madrid student artifacts included?

For Outcome 1, the 2nd year research update and research proposal were used for assessment by asking the chair of the committee to fill out a rubric.

For Outcome 2, performance on a class project/presentation was collected. Assessment data was typically in the form of a rubric from the course instructor. For this outcome, only 1 course for the year had multiple students enrolled, so it was used for assessment. Course: CHEM 5470 Medicinal Chemistry (rubric attached)

For Outcome 3, the 4th year seminar was used for assessment by asking the Graduate Program Coordinator to fill out a rubric (attached).

For Outcome 4, the research proposal was used for assessment by asking the chair of the committee to fill out a rubric.

Madrid does not have a graduate program in Chemistry.

3. How did you analyze the assessment data? What was the process? Who was involved?
NOTE: If you used rubrics as part of your analysis, please include them in an appendix.

Outcomes were assessed by rubrics, which are attached. Data was provided without names.

Data was provided to Department's Assessment Committee.

4. What did you learn from the data? Summarize the major findings of your analysis for each assessed outcome.
   NOTE: If necessary, include any tables, charts, or graphs in an appendix.

For Outcome 1, the majority of our PhD students completing their 2nd year update rated good or above in the majority of categories on the rubric. For students doing their research proposal, all were rated good or above. They met expectations in their display of advanced knowledge.

For Outcome 2, all of our PhD students were rated satisfactory to exemplary on all categories on the presentation rubric.

For Outcome 3: The majority of our PhD students rated good or above on all categories on the rubric for their 4th year seminar. They met expectations in their ability to communicate scientific findings (both published and their own results).

For Outcome 4: All of our PhD students completing their research proposal were rated good or above. They met expectations in their ability to participate in an independent research project.

5. How did your analysis inform meaningful change? How did you *use the analyzed data to make or implement recommendations for change* in pedagogy, curriculum design, or your assessment plan?

Based on our analysis, our PhD students are meeting expectations, but there is room for improvement, particularly at the 2nd year update when students transition to the PhD program. It is recommended that student committees provide more in-depth feedback to the student and mentor prior to the 2nd year update.

The results of the assessment will be shared with the full faculty during our annual department retreat later this summer. Additional actions may be proposed at that point.

6. Did you follow up ("close the loop") on past assessment work? If so, what did you learn? *(For example, has that curriculum change you made two years ago manifested in improved student learning today, as evidenced in your recent assessment data and analysis?)*

This is our first year assessing these outcomes using these metrics.

IMPORTANT: Please submit any revised/updated assessment plans to the University Assessment Coordinator along with this report.

SLU Chemistry Department – Second Year Research Update Exam

	1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)	Score
Mastery of Chemical Concepts and Knowledge of Chemical Literature	*Demonstrates limited knowledge of chemical concepts. Does not appear familiar with relevant scientific literature*	*Demonstrates adequate knowledge of chemical concepts in primary area, but limited in other areas. Demonstrates some knowledge of the relevant scientific literature*	*Demonstrates in-dept knowledge of chemical concepts in primary area and some knowledge in other areas. Demonstrates knowledge of relevant scientific literature*	*Demonstrates knowledge of concepts in more than one area of chemistry. Demonstrates knowledge of relevant scientific literature*	
Experimental Approach	*The experimental approach is neither clearly defined nor logical. The expected outcomes are not discussed.*	*The experimental approach is clearly defined and logical, however the expected outcomes are either not discussed or are not plausible.*	*The experimental approach is clearly defined and logical. The expected outcomes are discussed and plausible. Alternative outcomes have not been sufficiently addressed.*	*The experimental approach is clearly defined and logical. The expected outcomes have been discussed and are plausible. Alternative outcomes have been sufficiently addressed.*	
Research Progress	*Limited progress has been made.*	*Some progress has been made.*	*Sufficient progress has been made.*	*Significant progress has been made.*	
Oral Communication	*Fails to clearly communicate results and conclusions.*	*Adequately communicates results and conclusions, however supporting information and explanations are missing.*	*Successfully communicates results and conclusions, supporting information and explanations are provided.*	*Results and conclusions are not only successfully summarized and supported, but are also analyzed in the context of the field.*	

Comments:

Please return to the Chemistry Graduate Program Coordinator

SLU Chemistry Department – Research Proposal (Written Proposal and Oral Defense)

	1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)	Score
Research Proposal Format	*The organization of the proposal is confusing and/or the length is not appropriate. More than one of the required sections is missing. The references may not be appropriately formatted.*	*The organization of the proposal is, in places, confusing and/or the length is not appropriate. References may not be appropriately formatted. One of the required sections is missing or more emphasis should be placed on several of the required sections.*	*The research proposal is well-organized and is of appropriate length. References are appropriately formatted. More emphasis should be placed on several of the required sections.*	*The research proposal is well-organized and is of appropriate length. All required sections (background, significance, related preliminary results (or examples from literature), broader impacts, and a concise summary) are included. References are appropriately formatted.*	
Aims/Objectives	*The proposal fails to adequately describe the aims/objectives and the rationale for the proposed project is unclear.*	*Aims/objectives are described, however, the rationale for the aims/objectives is unclear.*	*Aims/objectives are described. A rationale for the aims/objectives is included.*	*The proposal aims/objectives are clearly described and provide a logical framework to address a problem. A compelling rationale for the aims/objectives is included.*	
Background Knowledge	*Demonstrates limited knowledge of chemical principles and the current literature.*	*Demonstrates adequate knowledge of chemical principles and an awareness of the current literature, but does not identify unanswered questions in the field.*	*Demonstrates sufficient knowledge of the current literature and chemical principles. Correctly identifies and understands the importance of unanswered questions in the field.*	*Demonstrates the ability to apply fundamental concepts to advanced topics in chemistry and in-depth knowledge of the current literature. Correctly identifies and illustrates the importance of unanswered questions in the field and presents the proposal within the context of these questions.*	
Experimental Approach	*The experimental approach is neither clearly defined nor logical. The expected outcomes are not discussed.*	*The experimental approach is clearly defined and logical, however the expected outcomes are either not discussed or are not plausible.*	*The experimental approach is clearly defined and logical. The expected outcomes are discussed and plausible. Alternative outcomes have not been sufficiently addressed.*	*The experimental approach is clearly defined and logical. The expected outcomes have been discussed and are plausible. Alternative outcomes have been sufficiently addressed.*	
Research Progress	*Limited progress has been made.*	*Some progress has been made.*	*Sufficient progress has been made.*	*Significant progress has been made.*	

	1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)	Score

Written Communication	*Fails to clearly communicate results and conclusions.*	*Adequately communicates results and conclusions, however supporting information and explanations are missing.*	*Successfully communicates results and conclusions, supporting information and explanations are provided.*	*Results and conclusions are not only successfully summarized and supported, but are also analyzed in the context of the field.*	
Oral Communication	*Fails to clearly communicate results and conclusions.*	*Adequately communicates results and conclusions, however supporting information and explanations are missing.*	*Successfully communicates results and conclusions, supporting information and explanations are provided.*	*Results and conclusions are not only successfully summarized and supported, but are also analyzed in the context of the field.*	

Comments:

CHEM-5470 Presentation Rubric **Name** _____

Standards	5 - 4 Exemplary	3 - 2 Satisfactory	1 - 0 Weak	Score	Weight	Total Score
Organization	Has a clear opening statement that catches audience's interest; maintains focus throughout; summarizes main points	Has opening statement relevant to topic and gives outline of speech; is mostly organized; provides adequate "road map" for the listener	Has no opening statement or has an irrelevant statement; gives listener no focus or outline of the presentation		x 2	
Content	Demonstrates substance and depth; is comprehensive (4 med chem topics covered); shows mastery of material	Covers topic; uses appropriate sources; is objective	Does not give adequate coverage of topic; lacks sources		x 4	
Quality of conclusion	Delivers a conclusion that is well documented and persuasive	Summarizes presentation's main points; draws conclusions based upon these points	Has missing or poor conclusion; is not tied to analysis; does not summarize points that support the conclusion		x 1	
Delivery	Has natural delivery; modulates voice; is articulate; projects enthusiasm, interest, and confidence; uses body language effectively	Has appropriate pace; has no distracting mannerisms; is easily understood;	Is often hard to understand; has voice that is too soft or too loud; has a pace that is too quick or too slow; demonstrates one or more distracting mannerisms		x 1	
Use of media	Uses slides effortlessly to enhance presentation	Looks at slides to keep on track; uses an appropriate number of slides	Relies heavily on slides and notes; makes little eye contact; uses slides with too much text		x 1	
Response to Questions	Demonstrates full knowledge of topic; explains and elaborates on all questions	Shows ease in answering questions but does not elaborate	Demonstrates little grasp of information; has undeveloped or unclear answers to questions		x 1	
Comments				Grand Score (max 50)		

Adapted from Dorothy Mitstifer, https://rubrics.kon.org

SLU Chemistry Department – 4th Year Seminar for PhD students

	1 (Poor)	2 (Fair)	3 (Good)	4 (Excellent)	Score
Presentation skills	*Speaker was unprepared and significantly outside the time limits. Speaker did not look at the audience and read from slides. Many distracting habits. Slides were unorganized and poorly prepared.*	*Speaker was outside time limits by less than 4 min. A few instances of poor or distracting presentation skills.*	*Speaker was outside time limits by less than 2 min. Less polished, but still professional presentation.*	*Speaker was polished and within provided time limits. Speaker made eye contact with audience and did not read from slides. Speaker avoided distracting habits. Slides were visually appealing and organized.*	
Demonstrate advanced level knowledge in the student's area of research focus	*Student lacks basic knowledge in chemistry topics.*	*Student displays knowledge, but is weak in several key concepts.*	*Student displays knowledge, with minor weaknesses.*	*Student displays great knowledge chemistry topics.*	
Communicate chemical topics effectively	*Student unable to clearly communicate chemical topics.*	*Student can sometimes communicate chemical topics effectively.*	*Student can effectively communicate chemical topics.*	*Student can communicate chemical topics effectively and compellingly.*	

Comments:

Rubric adapted from examples from Texas A&M Chemistry (http://www.chem.tamu.edu/graduate/)