Assessment of Student Learning Plan (ASLP): Chemistry Department

2014-15 Academic Year

University of Southern Maine

A. College, Department, Date: CSTH, Chemistry, May 27, 2015

B. Contact Person for the Assessment Plan: Caryn Prudenté

C. Degree Program: BS Chemistry and BS in Biochemistry

D. Assessment of Student Learning…Process

<u>Step 1: Identify Student Learning Outcomes</u> (For example, what are the most important things for students to know and be able to do when they have completed the degree?)

i. *List 3-5 of the most important student learning outcomes for your program.*
ii. *Identify one or two student learning outcomes that you will be assessing in this academic year. *(One of your outcomes may come from any Core course blueprints).*

1. Students will be able to apply critical thinking skills, problem solving strategies and advanced mathematic operations to solve complicated problems.

2. Students will be able to develop broad and deep understanding of the chemical principles that dictate chemical and physical properties of matter and be able to apply their understanding across the chemistry sub-disciplines: Organic, Inorganic, Analytical, Physical and Biochemical.

3. Students will be able to employ the scientific method to propose hypotheses, design experiments to test their hypotheses, interpret experimental results, and generate realistic conclusions consistent with data obtained.

4. Students will be able to effectively communicate their knowledge of chemistry to faculty and students in oral and written form.

5. Students will be able to operate classical analytical instrumentation and to accurately interpret the data obtained. Students will be able to distinguish between multiple instrumental methods and be able to determine which instrumental methods are best suited to address specific scientific questions.

Step 2: How and When will the Learning Outcomes be assessed?

This past year, we assessed outcomes 1 and 4

Outcome 1 Assessment: *Students will be able to apply critical thinking skills, problem solving strategies and advanced mathematic operations to solve complicated problems.*

As students progress through the program they illustrate their understanding of core concepts, learned at the 100 and 200 level, to advanced topics. At the end of the first year chemistry course (CHY 113 and 115) students complete the American Chemical Society's (ACS) standardized exam. The upper tier of the curriculum routinely requires students to apply core concepts to complicated topics on comprehensive exams. For example students are asked to deduce and explain the thermodynamic principles controlling biochemical pathways, or to elucidate the structure of unknown compounds through analysis of spectroscopic data.

Outcome 4 Assessment: *Students will be able to effectively communicate their knowledge of chemistry to faculty and students in oral and written form.*

At all levels of the Chemistry curriculum student's scientific writing is assessed. Notebook writing is emphasized in the 100 level, while written laboratory reports following standard chemical literature guidelines are required at the 200 level and beyond. Early in the curriculum students deliver short oral presentations in class. These presentations may be small subsets of an overall project or laboratory experiment. In the capstone course students deliver formal oral presentations on a research topic to the entire department.

Step 3: Using the Assessment results to Improve Student Learning

Briefly describe your department/program's plan for reviewing the assessment results and using them to improve teaching and learning. See the examples below.

CHY 115 ACS exam scores have been recorded and compared from year to year. Scores are evaluated against national averages. The 100-level content delivery format has dramatically changed in the last 3 years to better prepare students for upper level courses. Using a variety of teaching strategies student attrition rates have decreased and overall 100 level GPAs have

improved. Starting next year (2015-2016) the ACS comprehensive standardized final exam will be administered at the end of Organic Chemistry (CHY 251 and 253) to better assess if students are incorporating successful learning strategies acquired in their first year into the next level of chemistry.

A. Are there "community engagement" activities integrated in your departmental curriculum?

a. Please indicate which of the components, listed below, are <u>included</u> in your program's curriculum, and then indicate if the activities are <u>required or optional</u> for students in your major.

<u>Community Engagement Activity</u>	*<u>Included</u>*	*<u>Required/Optional</u>*	
Student Research (related to a community-based problem)	__X_	R	<u>O</u>
Student-Faculty Community Research Project	_X__	R	<u>O</u>
Internship, or a Field Experience	__X_	R	<u>O</u>
Independent Study (community-related project)	__X_	R	<u>O</u>
Capstone Course (community-related project)	__X_	R	<u>O</u>
Service-Learning (a component of a course)	___	R	O
Study Abroad, or an International Program	___	R	O
Interdisciplinary Collaborative Project (community related)	___	R	O
Student Leadership Activities (related to a team project)	__X_	R	<u>O</u>
Students/Faculty Community Leadership (advisory boards, committees, conference presentations)	_X_	R	<u>O</u>
Other Activities (not mentioned above):			

b. Please list the courses (i.e. EDU 400) that have a "community engagement" activity in your program:
Entry-level courses: CHY 114 and 116
Mid-level courses: CHY 233
Upper-level courses: CHY 461, 462, 463, 464 and 470