2016 Annual Assessment Report- Chemistry

I. Annual Assessment Meeting

This BCS assessment meeting was held on April 28, 2016 and was attended by Kristy Blake, Lindsay Burwell, Christina Schmidt and Jackie Schnurr. Chris Bailey was on sabbatical. We discussed how the BCS assessment plans should be broken down and decided that BMB had too much overlap with the Chemistry and Biology programs to warrant its own assessment plan. Therefore, BCS is only submitting a revised chemistry and biology assessment plan. At the beginning of next year, we will discuss is what to do with the BMB major.

II. Examination of Assessment Data

For an initial analysis of the reformatted assessment outcomes, one example was analyzed for each learning objective using Organic Chemistry, Biochemistry and Biochemical Pathways course examples. These courses taught by Lindsay Burwell were chosen for the initial assessment since it was her first year teaching these courses and Chris Bailey was on sabbatical during the Spring semester. One of the goals of this year is to analyze the remainder of the assessments outlined for the chemistry courses.

Goal	Objective		How outcome is measured	Measurement Tool	Specific Example	Success (>70% pass)/ average
1	a	Has a working knowledge of the concepts and principles presented in class	Exam	Answer Key	Biochemical Pathways Exam I Short Answer Questions 1-2	There is no quantitative analysis for these two spefic questions. Analysis will be done on similar questions next year. Examples of student responses can be found in faculty files.
	b	Becomes profiecent in technology used in class and/or lab	Group Post-lab Assignment	Answer Key	Marvin Sketch Activity Organic Chem I	97%/ 90%
2	a	Can think critically, reason wisely, and quantitatively about data collected in lab and class problem sets.	Post-lab problem set	Post-lab Answer Key	Organic Chem II- SN1 reaction kinetics	85%/ 80%
	b	Can apply critical thinking and reasoning skills to current issues arising in the world around them, including ethical conflicts surrounding particular scientific theories, technologies, or applications.	Exam	Answer Key	Biochemistry Mid-term exam question 6- Chronic Wasting Disease (Prions)	There is no quantitative analysis for this spefic question. Analysis will be done on similar questions next year. Examples of student responses can be found in faculty files.
3	a	Is able to write about scientific work in a clear, coherent manner.	Lab report	Lab report rubric	Organic Chemistry I Isolation of Beta carotene	94%/ 82%
	b	Is able to *speak* about scientific work in a clear and coherent manner.	Presentations	Presentation Rubric	Organic Chemistry II independent project presentations	95%/ 85%
4	a	Can efficently organize exercises designed by the instructor and can keep a lab notebook to be used for data analysis and lab reports	lab notebook	Lab Notebook Rubric	Organic Chemistry I	90%/ 82%
	b	Appreciates the importance of diversity in the practice of science through collaborative learning where different perspectives are valued and evaluated.	Design and write out a protocol for an independent project within a group of 3-4 peers.	Protocol Writing Rubric	Organic Chemistry II independent projects	95%/ 80%

III. Program Changes

Since this was Lindsay's first year teaching at Wells there were changes made to the Organic Chemistry and Biochemistry courses. These changes included:

- Group assignments in **Organic Chemistry**. These assignments included practice questions that students had to complete in groups, with a teaching assistant, and/or Lindsay. Based on course evaluations students liked this strategy to review material. This was a way to foster small group learning among the students rather than in a large whole class review session.

- New labs were developed in both **Organic and Biochemistry**. These included a Bioengineering lab in Biochemistry focused on how glucometers work to measure glucose levels in a fake blood sample. In Organic Chemistry a new Food chemistry lab was developed to measure the amount of beta carotene in a variety of food samples (carrots, orange peppers, mango, etc.). Students became more engaged with lab activities, like beta carotene isolation, that were applied and relatable to the students.

- In **Biochemical Pathways** in lieu of a traditional final students reviewed the information obtained throughout the semester by writing mini-review articles and delivering presentations on a topic related to a biochemical pathway covered in class. Students also provided questions to their peers before the presentations to help promote in-class discussion. Based on student feedback they enjoyed this approach to reviewing the course material and were also able to apply material covered in other classes.

IV. Action Plan for the Upcoming Year

→ Plan for Assessment

- The grid above only represents a subset of measureable outcome examples. Additional examples are listed in the assessment plan and await further analysis. Next year, we plan to continue the assessment of existing courses in the program using the new assessment plan goals, objectives and outcomes.

→ Plan for Coursework

- There will be changes in **Medicinal Chemistry (CHEM303)** since it will be the first time Lindsay is teaching the class. This course will be taught as a project based course focused on basic principles of pharmacology and drug development.

- **Organic Chemistry CHEM 213L and 214L** is switching textbooks. The new textbook (Loudon Organic Chemistry) is cheaper, explains a variety of concepts more thoroughly and includes more real world applications to the concepts learned throughout the course.

- Students in **BCS403** will be divided between the chemistry and biology majors.

- During Chris Bailey's sabbatical he has assessed and revised a number of laboratory exercises recently introduced as a result of his participation in several summer programs for Faculty, particularly those in Nanochemistry, Solid State, and Renewable Energy. Among the courses affected are **General Chemistry, Chemical Analysis, Inorganic Chemistry, and Solid State Chemistry.** For further details, please refer to his sabbatical report to the dean.

A. The Updated Assessment Plan

The assessment plan was updated this year and submitted as a separate document.