Program: Biochemistry

Intended Outcome: SLO 1: Demonstrate comprehensive knowledge of the key principles of biochemistry; using a strong foundation in the disciplines of chemistry.

Means of Assessment: 1. END OF PROGRAM ASSESSMENT. Oral presentations of advanced topics in biochemistry and completion of portfolio in Chemistry 490, the capstone course. 2. The following SLOs were assessed in Chemistry 232, Organic Chemistry I: Analyze the conformations of linear and cyclic molecules especially in regard to relative energy between two molecules, Correlate a given compound's structural elements to chemical or physical properties, and Analyze the structures of reacting molecules to predict the products with correct regio-and stereochemistry. 3. Five SLOs were assessed in Chemistry 233, Organic Chemistry II. They included describing reactions of various types of organic compounds, explaining the outcome of a chemical reaction using an appropriately drawn mechanism, proposing chemical synthetic schemes, understanding aromaticity, and interpreting spectroscopic data. 4. Eight SLOs were assessed in a section of Chemistry 113, General and Analytical Chemistry. They include calculations of gas properties, evaluation of intermolecular forces based on structure of a substance and determination of the properties arising from the forces, calculations using rate laws, calculations using general, acid-base and solubility equilibrium constants. 5. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. Students score 3 or higher on rubric scale (1-4) in the following rubric categories for their final presentation in the capstone course: Subject Knowledge (background), Subject Knowledge (questions), and Organization. 2. 60% of students answer questions correctly. 3. Two-thirds of class score in highly competent or moderately competent categories (> 90% and 60-90%, respectively). 4. 70% 5. 75% successful completion.

Results or Progress: 1. 100% of students scored 3 or higher in Subject Knowledge (background), Subject Knowledge (questions), and Organization. Mean scores ranged from 81-96% 2. Percentage of students answering questions correctly are 76%, 68%, and 70%, 3. Three categories met goal (70-85%). Two categories did not meet goal (33% and 63%). respectively. 4. Five categories met goal (70-82%). Three did not meet goal (60-68%). 5. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goal met. 2. Goals met. Plans for improvement are to include worksheets and consideration of use of decision trees for predicting reactions. 3. Provide students with more practice problems and work more problems in class. 4. Spend more time in

class on equilibrium and kinetics calculations. 5. Devise an EXCEL instruction sheet; include a videoclip on the CHEM 113L course website that discusses in greater detail the types of isomers present in coordination complexes and the identification of these isomers.

Program: Biochemistry

Intended Outcome: SLO #3--Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 330L (advanced organic chemistry, research track), the following outcomes were assessed: Use NMR spectrometer to obtain spectra for identifications and molecules and Use proper notebook procedures to document all experiments. 2. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 3. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. Mean scores of 60% and 70%, respectively. 2. 75% successful completion (4.5/5) of each SLO assessed. 3. 75% successful completion.

Results or Progress: 1. Mean assessment for each goal were 7.9/10 and 7.3/10, respectively. 2. 84% of students received 4.5/5 or greater. 3. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Goals met. 3. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Chemistry

Intended Outcome: SLO #3--Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 330L (advanced organic chemistry), the following outcomes were assessed: Use NMR spectrometer to obtain spectra for identifications and molecules and Use proper notebook procedures to document all experiments. 2. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 3. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. Mean scores of 60% and 70%, respectively. 2. 75% successful completion (4.5/5) of each SLO assessed. 3. 75% successful completion.

Results or Progress: 1. Mean assessment for each goal were 7.9/10 and 7.3/10, respectively. 2. 84% of students received 4.5/5 or greater. 3. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Goals met. 3. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Forensic Chemistry

Intended Outcome: SLO #3--Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 2. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. 75% successful completion (4.5/5) of each SLO assessed. 2. 75% successful completion.

Results or Progress: 1. 84% of students received 4.5/5 or greater. 2. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Chem-Business

Intended Outcome: SLO #2--Record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 2. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. 75% successful completion (4.5/5)of each SLO assessed. 2. 75% successful completion.

Results or Progress: 1. 84% of students received 4.5/5 or greater. 2. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Clinical Chem

Intended Outcome: SLO #2--Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 2. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. 75% successful completion (4.5/5) of each SLO assessed. 2. 75% successful completion.

Results or Progress: 1. 84% of students received 4.5/5 or greater. 2. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Chem-Computers

Intended Outcome: SLO #3--Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 2. 2. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. 75% successful completion (4.5/5) of each SLO assessed. 2. 75% successful completion.

Results or Progress: 1. 84% of students received 4.5/5 or greater. 2. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Chemistry

Intended Outcome: SLO 1: Demonstrate comprehensive knowledge of the major disciplines in the chemical sciences: analytical, biochemistry, inorganic, organic chemistry, and physical chemistry.

Means of Assessment: 1. END OF PROGRAM ASSESSMENT. Students will present results of their research projects as a written thesis and an oral defense. 2. The following SLOs were assessed in Chemistry 232, Organic Chemistry I: Analyze the conformations of linear and cyclic molecules especially in regard to relative energy between two molecules, Correlate a given compound's structural elements to chemical or physical properties, and Analyze the structures of reacting molecules to predict the products with correct regio-and stereochemistry. 3. Five SLOs were assessed in Chemistry 233, Organic Chemistry II. They included describing reactions of various types of organic compounds, explaining the outcome of a chemical reaction using an appropriately drawn mechanism, proposing chemical synthetic schemes, understanding aromaticity, and interpreting spectroscopic data. 4. Eight SLOs were assess in a section of Chemistry 113, General and Analytical Chemistry. They include calculations of gas properties, evaluation of intermolecular forces based on structure of a substance and determination of the properties arising from the forces, calculations using rate laws, calculations using general, acid-base and solubility equilibrium constants. 5. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. Students score 2 or higher on rubric scale (0-3) in the following rubric categories for their thesis defense: a. Students will be able to summarize key concepts across a broad base of chemistry. b. Students will be able to discuss the chemistry of their chosen subdiscipline or thematic area of chemistry. 2. 60% of students answer questions correctly. 3. Two-thirds of class score in highly competent of moderately competent categories (> 90% and 60-90%, respectively). 4. 70% 5. 75% successful completion.

Results or Progress: 1. 100 % of students scored 2 or higher in each of the categories chosen. Mean scores were each 2.3 on (0-3) scale. 2. Percentage of students answering questions correctly are 76%, 68%, and 70%. 3. Three categories met goal (70-85%). Two categories did not meet goal (33% and 63%). respectively. 4. Five categories met goal (70-82%). Three did not meet goal (60-68%). 5. 83.6% met 75% successful completion.

Use of Results for Improvement: 1.Goal met. Results will be presented to chemistry department in 2015/16. 2. Goals met. Plans for improvement are to include worksheets and consideration of use of decision trees for predicting reactions. 3. Provide students with more practice problems and work more problems in class. 4. Spend more time in class on equilibrium and kinetics calculations. 5. Devise an EXCEL

instruction sheet, include a videoclip on the CHEM 113L course website that discusses in greater detail the types of isomers present in coordination complexes and the identification of these isomers.

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Forensic Chemistry

Intended Outcome: SLO 1: Demonstrate comprehensive knowledge of the major disciplines in the chemical sciences: analytical, biochemistry, inorganic, organic chemistry, and physical chemistry.

Means of Assessment: 1.The following SLOs were assessed in Chemistry 232, Organic Chemistry I: Analyze the conformations of linear and cyclic molecules especially in regard to relative energy between two molecules, Correlate a given compound's structural elements to chemical or physical properties, and Analyze the structures of reacting molecules to predict the products with correct regio-and stereochemistry. 2. Five SLOs were assessed in Chemistry 233, Organic Chemistry II. They included describing reactions of various types of organic compounds, explaining the outcome of a chemical reaction using an appropriately drawn mechanism, proposing chemical synthetic schemes, understanding aromaticity, and interpreting spectroscopic data. 3. Eight SLOs were assess in a section of Chemistry 113, General and Analytical Chemistry. They include calculations of gas properties, evaluation of intermolecular forces based on structure of a substance and determination of the properties arising from the forces, calculations using rate laws, calculations using general, acid-base and solubility equilibrium constants. 4. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Course-embedded measure

Criteria for Success: 1. 60% of students answer questions correctly. 2. Two-thirds of class score in highly competent of moderately competent categories (> 90% and 60-90%, respectively). 3. 70% 4. 75% successful completion.

Results or Progress: 1. Percentage of students answering questions correctly are 76%, 68%, and 70%. 2. Three categories met goal (70-85%). Two categories did not meet goal (33% and 63%). respectively. 3. Five categories met goal (70-82%). Three did not meet goal (60-68%). 4. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. Plans for improvement are to include worksheets and consideration of use of decision trees for predicting reactions. 2. Provide students with more practice problems and work more problems in class. 3. Spend more time in class on equilibrium and kinetics calculations. 4. Devise an EXCEL instruction sheet, include a videoclip on the CHEM 113L course website that discusses in greater detail the types of isomers present in coordination complexes and the identification of these isomers.

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Chem-Business

Intended Outcome: SLO 1: Demonstrate comprehensive knowledge of major disciplines in the chemical sciences: analytical, industrial, and organic chemistry.

Means of Assessment: 1. The following SLOs were assessed in Chemistry 232, Organic Chemistry I: Analyze the conformations of linear and cyclic molecules especially in regard to relative energy between two molecules, Correlate a given compound's structural elements to chemical or physical properties, and Analyze the structures of reacting molecules to predict the products with correct regio-and stereochemistry. 2. Five SLOs were assessed in Chemistry 233, Organic Chemistry II. They included describing reactions of various types of organic compounds, explaining the outcome of a chemical reaction using an appropriately drawn mechanism, proposing chemical synthetic schemes, understanding aromaticity, and interpreting spectroscopic data. 3. Eight SLOs were assess in a section of Chemistry 113, General and Analytical Chemistry. They include calculations of gas properties, evaluation of intermolecular forces based on structure of a substance and determination of the properties arising from the forces, calculations using rate laws, calculations using general, acid-base and solubility equilibrium constants. 4. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Course-embedded measure

Criteria for Success: 1. 60% of students answer questions correctly. 2. Two-thirds of class score in highly competent of moderately competent categories (> 90% and 60-90%, respectively). 3. 70% 4. 75% successful completion.

Results or Progress: 1. Percentage of students answering questions correctly are 76%, 68%, and 70%. 2. Three categories met goal (70-85%). Two categories did not meet goal (33% and 63%). respectively. 3. Five categories met goal (70-82%). Three did not meet goal (60-68%). 4. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. Plans for improvement are to include worksheets and consideration of use of decision trees for predicting reactions. 2. Provide students with more practice problems and work more problems in class. 3. Spend more time in class on equilibrium and kinetics calculations. 4. Devise an EXCEL instruction sheet, include a videoclip on the CHEM 113L course website that discusses in greater detail the types of isomers present in coordination complexes and the identification of these isomers.

OEA Follow-up

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If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Clinical Chem

Intended Outcome: SLO 1: Demonstrate comprehensive knowledge of the key principles of biochemistry; using a strong foundation in the disciplines of chemistry.

Means of Assessment: 1. The following SLOs were assessed in Chemistry 232, Organic Chemistry I: Analyze the conformations of linear and cyclic molecules especially in regard to relative energy between two molecules, Correlate a given compound's structural elements to chemical or physical properties, and Analyze the structures of reacting molecules to predict the products with correct regio-and stereochemistry. 2. Five SLOs were assessed in Chemistry 233, Organic Chemistry II. They included describing reactions of various types of organic compounds, explaining the outcome of a chemical reaction using an appropriately drawn mechanism, proposing chemical synthetic schemes, understanding aromaticity, and interpreting spectroscopic data. 3. Eight SLOs were assess in a section of Chemistry 113, General and Analytical Chemistry. They include calculations of gas properties, evaluation of intermolecular forces based on structure of a substance and determination of the properties arising from the forces, calculations using rate laws, calculations using general, acid-base and solubility equilibrium constants. 4. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Course-embedded measure

Criteria for Success: 1. 60% of students answer questions correctly. 2. Two-thirds of class score in highly competent of moderately competent categories (> 90% and 60-90%, respectively). 3. 70% 4. 75% successful completion.

Results or Progress: 1. Percentage of students answering questions correctly are 76%, 68%, and 70%. 2. Three categories met goal (70-85%). Two categories did not meet goal (33% and 63%). respectively. 3. Five categories met goal (70-82%). Three did not meet goal (60-68%). 4. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. Plans for improvement are to include worksheets and consideration of use of decision trees for predicting reactions. 2. Provide students with more practice problems and work more problems in class. 3. Spend more time in class on equilibrium and kinetics calculations. 4. Devise an EXCEL instruction sheet, include a videoclip on the CHEM 113L course website that discusses in greater detail the types of isomers present in coordination complexes and the identification of these isomers.

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Clinical Chem

Intended Outcome: SLO #2: Proficiently record, analyze, and disseminate data utilizing chemical instrumentation and software.

Means of Assessment: 1. In Chemistry 370L(Instrumental Analysis), the following outcomes were assessed: Students will prepare standards of a given concentration in a variety of solvents and Students will use calibration curves generated from standards to determine concentrations of analytes in samples. 2. Six to seven SLOs were measured in 22 sections of Chemistry 113 (152 SLOs total). They included calculations of gas laws, concentration units, and equilibrium constants; construction and interpretation of a graph using computer software; defining and identifying acids and bases; drawing and understanding geometric isomers; and safety.

Type of Assessment: Other

Criteria for Success: 1. 75% successful completion (4.5/5)of each SLO assessed. 2. 75% successful completion.

Results or Progress: 1. 84% of students received 4.5/5 or greater. 2. 83.6% met 75% successful completion.

Use of Results for Improvement: 1. Goals met. 2. Devise an EXCEL instruction sheet; include statement in syllabus prohibiting use of cell phones in lab (safety).

OEA Follow-up

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If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.

Program: Biochemistry

Intended Outcome: No specific SLO.

Means of Assessment: In Chemistry 490, Biochemistry Capstone, students were asked to evaluate the curriculum and suggest improvements. It was suggested that they survey other programs for ideas.

Type of Assessment: Other

Criteria for Success: Open-ended. The goal was for students to reflect on the 4 year program and suggest improvements.

Results or Progress: The most common comments was that the program would be improved if there were more elective courses offered in the major and that the number of general education credits required is quite high, making taking additional courses difficult. Elective courses suggested were pharmaceutical, medicinal chemistry, and a first year course introducing students to the the major (including current topics, professional opportunities for biochemists, preparing for various career goals, etc.) Other suggestions were related to specific course requirements (for example taking an additional math course would make some chemistry courses easier to understand).

Use of Results for Improvement: Recommendations will be shared with the department as we review our curricula.

OEA Follow-up

Has the assessment evidence described above been reviewed/discussed since the program assessment report was submitted in July?

If yes, please describe the results of the review/discussion.

Include the steps taken to make improvements to the program, or plans for future assessment activities and/or revisions to the program.