

Course Student Learning Outcomes Assessment

CHEM 210 General, Organic, and Biochemistry

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General Information (Course Student Learning Outcomes Assessment)

Standing Requirements

Course Description

An introduction to the fundamental concepts of general organic and biochemistry for majors in nursing and other allied health majors. Includes atomic structure nuclear chemistry bonding solutions acids and bases organic nomenclature hydrocarbons alcohols aldehydes ketones carboxylic acids carbohydrates proteins lipids nucleic acids and metabolism.

Course Student Learning Outcomes

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome	
Outcome	Mapping
Outcome 1 Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.	Institutional Student Learning Outcomes: Act 1, Communicate 1, Learn 1, Think 1, Think 2
Outcome 2 Solve problems using chemical concepts and chemical principles.	Institutional Student Learning Outcomes: Act 1, Communicate 1, Learn 1, Think 1, Think 2
Outcome 3 Perform experiments with given directions and collect valid scientific data.	Institutional Student Learning Outcomes: Act 1, Communicate 1, Learn 1, Think 1, Think 2

2014-2015 Assessment Cycle

Measurements

Outcomes and Measures

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ **Measure:** Chem 210_SLO A
Course level; Direct - Exam

Description of Measurement Tool: SLO A is assessed using a stoichiometry problem. Students had to write a chemical equation, predict products, balance the equation, then calculate amount of product based on a given volume and molarity of one of the reactants.

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the exam/quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the course

Supporting Attachments:

 SLO_A_Chem 210 rubric.docx (Word Document (Open XML)) (See appendix)

Outcome 2

Solve problems using chemical concepts and chemical principles.

▼ **Measure:** Chem 210_SLO B
Course level; Direct - Exam

Description of Measurement Tool: Final exam or a final quiz MCQ to evaluate the students' mastery of the concepts

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the class

Outcome 3

Perform experiments with given directions and collect valid scientific data.

▼ **Measure:** Chem 210 SLO C
Course level; Direct - Other


Description of Measurement Tool: The assessment of this SLO was done as the students ran an experiment in lab and they were required to record all the data and observation, perform calculations, then comment on their data. This SLO was assessed using a titration experiment and lab report. They were required to perform the titration, calculate the molarity of an unknown, comment on their results and answer some post-lab questions. A rubric was provided to grade their lab reports.

Criteria for Success: Individual & Collective Student Criterion: Students who achieve the SLO should get 60% or higher on their laboratory report grade when graded using the provided rubric

Cycle of Assessment: Yearly assessment in fall semester

Who is Responsible for Assessment Activity?: Instructor of the course.

Supporting Attachments:

 SLO_C_Chem 210_lab Rubric.doc (Microsoft Word) (See appendix)

Findings

Finding per Measure

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ Measure: Chem 210_SLO A Course level; Direct - Exam


Description of Measurement Tool: SLO A is assessed using a stoichiometry problem. Students had to write a chemical equation, predict products, balance the equation, then calculate amount of product based on a given volume and molarity of one of the reactants.

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the exam/quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the course

Supporting Attachments:

 SLO_A_Chem 210 rubric.docx (Word Document (Open XML)) (See appendix)

Findings for Chem 210_SLO A

Summary of Findings: No of students assessed = 18 students, No of sections = 1, Average score: 12/15 (80%)

Number of students who got 10.8 /15 (60%) = 14/18 = 78%

There are 14 (78% of the students) students who obtained 60% or more on the stoichiometry problem. The students achieved SLO A for the course.


Results: Criteria for Success Achievement Status: Met

Analysis of Findings: From the data presented, only 4 students did not achieve the SLO A of the course while 14 students (78%) achieved the SLO. Two of the students did not attempt the problem while the other two predicted the products of the reaction, balanced the equation but failed to do any meaningful calculations.

Recommendations: Students achieved both SLO A of the course. Seventy eight percent of the students achieved 60% or more on the SLO stoichiometry question. There is no plan of action as students achieved SLO A for the course.

Substantiating Evidence:

 Chem 210 SLO A Data F14.xlsx (Excel Workbook (Open XML)) (See appendix)

 SLO_A_Chem 210 rubric.docx (Word Document (Open XML)) (See appendix)

Outcome 2

Solve problems using chemical concepts and chemical principles.

▼ Measure: Chem 210_SLO B Course level; Direct - Exam

Description of Measurement Tool: Final exam or a final quiz MCQ to evaluate the students' mastery of the concepts

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the class

Findings for Chem 210_SLO B

Summary of Findings: No of students assessed = 18 students, No of sections = 1, Average score: 23.6/30 (79%)

Number of students who got 18 or more correct answers/30 (60% correct) = 16/18 = 89%
There are 16 (89% of the students) students who obtained 60% or more on the SLO B quiz assessment.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: From data analysis and looking at topics covered on the questions missed by the majority (over 50%) of the students taking the MCQ assessment, only 5 questions were missed by more than 50% of the students.

The questions covered the topics of :

Q 1 – identifying a secondary alcohol

Q 11 – partial charges

Q 14- Saponification

Q 22- Citric Acid Cycle

Q 27 - Chiral centers in a molecule

Recommendations: Students achieved SLO B of the course. Eighty nine percent of the students achieved 60% or more on the SLO quiz.

There is no plan of action as students achieved SLO B for the course.

Substantiating Evidence:

 Chem 210 SLO B Data F14.xlsx (Excel Workbook (Open XML)) (See appendix)

Outcome 3

Perform experiments with given directions and collect valid scientific data.

▼ Measure: Chem 210 SLO C

Course level; Direct - Other


Description of Measurement Tool: The assessment of this SLO was done as the students ran an experiment in lab and they were required to record all the data and observation, perform calculations, then comment on their data. This SLO was assessed using a titration experiment and lab report. They were required to perform the titration, calculate the molarity of an unknown, comment on their results and answer some post-lab questions. A rubric was provided to grade their lab reports.

Criteria for Success: Individual & Collective Student Criterion: Students who achieve the SLO should get 60% or higher on their laboratory report grade when graded using the provided rubric

Cycle of Assessment: Yearly assessment in fall semester

Who is Responsible for Assessment Activity?: Instructor of the course.

Supporting Attachments:

 SLO_C_Chem 210_lab Rubric.doc (Microsoft Word) (See appendix)

Findings for Chem 210 SLO C

Summary of Findings: Number of students = 18 students

Number of sections = 1 section

The average score on this assessment was 87.78%. In performing the experiment and writing their data, all 18 students have exceeded 60% (10.8 points out of total 18 points) on their reports.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: Based on this criterion, 100% of students met SLO C.

The most difficult part for this group was identifying acidic hydrogen from non-acidic hydrogen. Out of 18 students, 5 students were not able to achieve this goal (28% of total students).

It seems that the calculation part was less difficult with this group as only one student still


developing the calculation skills while 17 students showed completely correct calculations.


Recommendations: We will continue to use this assessment method to collect SLO data and monitor any gaps in learning.

All students achieved SLO C for the course.

There is no plan of action as students achieved SLO A for the course.

Substantiating Evidence:

 Chem 210_SLO C_Data F14.xlsx (Excel Workbook (Open XML)) (See appendix)

 SLO_C_Chem 210_lab Rubric.doc (Microsoft Word) (See appendix)

Overall Recommendations

No text specified

Plans of Action

Status Reports

2013-2014 Assessment Cycle

Measurements

Outcomes and Measures

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ **Measure:** Chem 210_SLO A
Course level; Direct - Exam

Description of Measurement Tool: Final exam or final quiz with MCQ to evaluate the students' mastery of the topics.

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the exam/quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the course

Outcome 2

Solve problems using chemical concepts and chemical principles.

▼ **Measure:** Chem 210_SLO B
Course level; Direct - Exam

Description of Measurement Tool: Final exam or a final quiz MCQ to evaluate the students' mastery of the concepts

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the class

Outcome 3

Perform experiments with given directions and collect valid scientific data.

▼ **Measure:** Chem 210 SLO C
Course level; Direct - Other

Description of Measurement Tool: The assessment of this SLO was done as the students ran an experiment in lab and they were required to record all the data and observation, perform calculations, then comment on their data. This SLO was assessed using a titration experiment and lab report. They were required to perform the titration, calculate the molarity of an unknown, comment on their results and answer some post-lab questions. A rubric was provided to grade their lab reports.

Criteria for Success: Individual & Collective Student Criterion: Students who achieve the SLO should get 60% or higher on their laboratory report grade when graded using the provided rubric

Cycle of Assessment: Yearly assessment in fall semester

Who is Responsible for Assessment Activity?: Instructor of the course.

Findings

Finding per Measure

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ **Measure:** Chem 210_SLO A
Course level; Direct - Exam

Description of Measurement Tool: Final exam or final quiz with MCQ to evaluate the students' mastery of the topics.

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the exam/quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the course

Findings for Chem 210_SLO A

Summary of Findings: No of students assessed = 14 students, No of sections = 1, Average score: 21.5/30

Number of students who got 18 or more correct answers/30 (60% correct) = 11/14 = 79%

There are 11 (79% of the students) students who obtained 60% or more on the SLO quiz assessment. The students achieved that SLO for the course.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: From data analysis and looking at topics covered on the questions missed by the majority (over 50%) of the students taking the MCQ assessment, only 5 questions were missed by more than 50% of the students.

The questions covered the topics of :

Q 3 - Significant Figures

Q 9 - Diatomic molecule

Q 15- Solubility based on Polarity

Q 21- Citric Acid Cycle

Q 27 - Chiral centers in a molecule

Recommendations: Students achieved SLO A of the course. Seventy nine percent of the students achieved 60% or more on the SLO quiz.

There is no plan of action as students achieved SLO A for the course.

Substantiating Evidence:

 SLO A and B Data.pdf (Adobe Acrobat Document) (See appendix)

Outcome 2

Solve problems using chemical concepts and chemical principles.

▼ **Measure:** Chem 210_SLO B
Course level; Direct - Exam

Description of Measurement Tool: Final exam or a final quiz MCQ to evaluate the students' mastery of the concepts

Criteria for Success: Individual & Collective Student Criterion: Criteria of success is that 70% of the students achieving 60% or better on the quiz.

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: Instructor of the class

Findings for Chem 210_SLO B

Summary of Findings: No of students assessed = 14 students, No of sections = 1, Average score: 21.5/30

Number of students who got 18 or more correct answers/30 (60% correct) = 11/14 = 79%

There are 11 (79% of the students) students who obtained 60% or more on the SLO quiz assessment. The students achieved that SLO for the course.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: From data analysis and looking at topics covered on the questions missed by the majority (over 50%) of the students taking the MCQ assessment, only 5 questions were missed by more than 50% of the students.

The questions covered the topics of :

Q 3 – Significant Figures

Q 9 – Diatomic molecule

Q 15- Solubility based on Polarity

Q 21- Citric Acid Cycle

Q 27 - Chiral centers in a molecule

Recommendations: Students achieved SLO B of the course. Seventy nine percent of the students achieved 60% or more on the SLO quiz.

There is no plan of action as students achieved SLO B for the course.

Substantiating Evidence:

 SLO A and B Data.pdf (Adobe Acrobat Document) (See appendix)

Outcome 3

Perform experiments with given directions and collect valid scientific data.

▼ **Measure:** Chem 210 SLO C
Course level; Direct - Other

Description of Measurement Tool: The assessment of this SLO was done as the students ran an experiment in lab and they were required to record all the data and observation, perform calculations, then comment on their data. This SLO was assessed using a titration experiment and lab report. They were required to perform the titration, calculate the molarity of an unknown, comment on their results and answer some post-lab questions. A rubric was provided to grade their lab reports.

Criteria for Success: Individual & Collective Student Criterion: Students who achieve the SLO should get 60% or higher on their laboratory report grade when graded using the provided rubric

Cycle of Assessment: Yearly assessment in fall semester

Who is Responsible for Assessment Activity?: Instructor of the course.

Findings for Chem 210 SLO C

Summary of Findings: Number of students = 10 students

Number of sections = 1 section

The average score on this assessment was 85.6%. In performing the experiment and writing their data, all 10 students have exceeded 60% (passing) on their reports. Based on this criterion, 100% of students met SLO C.


Results: Criteria for Success Achievement Status: Met

Analysis of Findings: The calculation for the conversion of concentration of the acetic acid from percent to molarity was the most difficult part of the lab for the students (average score of 1.90); one student did not even complete the calculation

Recommendations: There is no need for an action plan as 100% of students met SLO C.

Substantiating Evidence:

 Chem 210_lab Exp 19_ assessment.doc (Microsoft Word) (See appendix)

 SLO C Data.pdf (Adobe Acrobat Document) (See appendix)

Overall Recommendations

No text specified

 **Plans of Action**

 **Status Reports**

2012-2013 Assessment Cycle

Measurements

Outcomes and Measures

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ **Measure:** Final Exam
Course level; Direct - Exam

Description of Measurement Tool: Final exam for the course. It is a MCQ exam.

Criteria for Success: Individual & Collective Student Criterion: Pass final exam with 60% or better

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: instructor of the course

Outcome 2

Solve problems using chemical concepts and chemical principles.

No measures specified

Outcome 3

Perform experiments with given directions and collect valid scientific data.

No measures specified

Findings

Finding per Measure

CHEM 210 General, Organic, and Biochemistry Outcome Set

Outcome

Outcome 1

Explain chemical events and processes in a clear and coherent manner using chemical symbols and chemical equations.

▼ **Measure:** Final Exam
Course level; Direct - Exam

Description of Measurement Tool: Final exam for the course. It is a MCQ exam.

Criteria for Success: Individual & Collective Student Criterion: Pass final exam with 60% or better

Cycle of Assessment: Yearly assessment of the course in fall semester.

Who is Responsible for Assessment Activity?: instructor of the course

Findings for Final Exam

Summary of Findings: No of students assessed = 24 students

No of sections = 1

No of versions of the exam: 2

Average correct answers:

Version A: 41.5, 85% (11 students)

Version B: 40.6, 83% (13 students)

All 24 students got over 60% on their final exam. That is 100% meeting the SLO.

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: From data analysis and looking at topics covered on the questions missed by the majority (over 50%) of the students taking the MCQ based final exam, only 4 questions were missed by more than 50% of the students. They were the same exact 4 questions on both versions of the exam (# 1, 7, 8, & 9 on version A and # 37, 43, 44, & 45 on version B). The questions covered the topics of metabolism, acidosis, active transport, and glycolysis.

Recommendations: The results of this class were extremely good. All students passed the final exam with more than 60% on the final. Some of the final exam questions that students missed were very specific detail and came at the end of the course.

Outcome 2

Solve problems using chemical concepts and chemical principles.

No measures specified

Outcome 3

Perform experiments with given directions and collect valid scientific data.

No measures specified

Overall Recommendations

No text specified

 **Plans of Action** **Status Reports**

Appendix

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- A. **SLO_A_Chem 210 rubric.docx** (Word Document (Open XML))
 - B. **SLO_C_Chem 210_lab Rubric.doc** (Microsoft Word)
 - C. **Chem 210 SLO A Data F14.xlsx** (Excel Workbook (Open XML))
 - D. **Chem 210 SLO B Data F14.xlsx** (Excel Workbook (Open XML))
 - E. **Chem 210_SLO C_Data F14.xlsx** (Excel Workbook (Open XML))
 - F. **SLO_A_Chem 210 rubric.docx** (Word Document (Open XML))
 - G. **SLO_C_Chem 210_lab Rubric.doc** (Microsoft Word)
 - H. **Chem 210_lab Exp 19_assessment.doc** (Microsoft Word)
 - I. **SLO A and B Data.pdf** (Adobe Acrobat Document)
 - J. **SLO A and B Data.pdf** (Adobe Acrobat Document)
 - K. **SLO C Data.pdf** (Adobe Acrobat Document)
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