

Detailed Assessment Report

As of: 5/08/2015 04:42 PM EDT

2014-2015 Chemistry BA & BS

(Includes those Action Plans with Budget Amounts marked One-Time, Recurring, No Request.)

Mission / Purpose

The Bachelor of Science degree in Chemistry is designed to provide students with the background needed for science-related industrial and academic positions, for entry into chemistry graduate programs or professional programs (for example: such as medicine, veterinary medicine, dentistry, optometry) and, coupled with the appropriate education courses, to prepare students to teach high school chemistry. The mission is consistent with the IU Kokomo Mission Statement.

Goals

G 1: understanding of the theoretical basis of chemistry

Goal I: Knowledge and understanding of the theoretical basis of chemistry.

Goal II Laboratory Work and Performance

Goal III: Application of Quantitative Reasoning Skills and Critical Thinking to Problem Solving

G 2: Laboratory Work and Performance **Laboratory Work and Performance**

G 3: Application of Quantitative Reasoning Skills and Critical Thinking to Problem Solving

Application of Quantitative Reasoning Skills and Critical Thinking to Problem Solving

Student Learning Outcomes/Components, with Any Associations and Related Artifacts/Objects, Benchmarks, Findings, and Action Plans

S 1: Students will be able to connect observations with prior information/comp#1

Goal I: Knowledge and understanding of the theoretical basis of chemistry.

Outcome 1: Students will be able to connect observations with prior information

Components:

1. Prediction of chemical reaction products

3. Explanation of the significance and/or validity of the results.

Goal II: Laboratory Work and Performance

Outcome 1: Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely.

Components:

1. Explanation of the purpose of the steps in a laboratory procedure.
2. Use of standard laboratory equipment and instrumentation properly and safely.

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data.

Components:

1. Collection and organization of relevant data.
2. Analyze experimental data appropriately.
3. Interpretation of processed data.
4. Identification of experimental errors.

Outcome 3: Design procedures appropriate to the goal of an investigation.

Components:

1. Selection of a suitable experimental approach.
2. Modification of the approach to optimize the experimental outcome.

Goal III: Application of Quantitative Reasoning Skills and Critical Thinking to Problem Solving

Outcome 1: Students will learn to organize relevant information for analysis.

Components:

1. Identification of critical data elements necessary to understand the problem
2. Identification of applicable theories and/or mathematical relationships

Outcome 2: Students will calculate quantitative values and/or formulate an explanation of observations.

Components:

1. Application of theories to illustrate how observations can be understood
2. Application of equations to determine mathematical values with appropriate significant figures and units

Outcome 3: Students will draw conclusions from quantitative values and/or experimental observations.

Component:

1. Correlation of quantitative results to chemical and/or physical properties of systems.
3. Interpretation of processed data.
4. Identification of experimental errors.

Outcome 3: Design procedures appropriate to the goal of an investigation.

Components:

1. Selection of a suitable experimental approach.
2. Modification of the approach to optimize the experimental outcome.

Goal III: Application of Quantitative Reasoning Skills and Critical Thinking to Problem Solving

Outcome 1: Students will learn to organize relevant information for analysis.

Components:

1. Identification of critical data elements necessary to understand the problem
2. Identification of applicable theories and/or mathematical relationships

Outcome 2: Students will calculate quantitative values and/or formulate an explanation of observations.

Components:

1. Application of theories to illustrate how observations can be understood
2. Application of equations to determine mathematical values with appropriate significant figures and units

Outcome 3: Students will draw conclusions from quantitative values and/or experimental observations.

Component:

1. Correlation of quantitative results to chemical and/or physical properties of systems.

Outcome 1:

Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely.

Components:

1. Explanation of the purpose of the steps in a laboratory procedure.
2. Use of standard laboratory equipment and instrumentation properly and safely.

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data.

Components:

1. Collection and organization of relevant data.
2. Analyze experimental data appropriately.

Related Artifacts/Objects:

A 1:pre and post quiz before and after explanation

We ask student question about suggested reaction and test their knowledge about prediction of the reaction product , then I explain the subject and ask same question again

Source of Evidence: Faculty pre-test / post-test of knowledge mastery

Benchmark:

We expect 70% of the students to be able to predict the reaction product after explanation.

A 2:course tests

in course tests

Source of Evidence: Academic direct measure of learning - other

Benchmark:

60% got three out of 4 question correct

A 4:Survey for chemsitry courses (lectures

1- for 100 Level courses (C105/C106) 68% of students meet the bench mark for goal 1 and 3 (outcome 1 with component 1 and 2)

2- For 300 level courses only 47% of the students meet the bench mark (C310 75% while C342 only 20%) for goal 1, while for goal 3 (C310 85% while C342 only 20%)

For the very low out come in C342 (organic chemistry, the low achievement percentage requires more emphasis on fundamental physical /organic concepts and focusing on smaller set of reactions

Source of Evidence: Academic direct measure of learning - other

A 5:Survey for chemsitry courses (lectures

We used faculty developed tests , with more concentration of the data from the final comprehensive tests. We surveyed two level of courses , first is 100 level courses . We combined data for C105 and C106 to judge the outcome one of goal 1 and goal 3 . Second we surveyed 300 level courses that offered once a year (C310 -analytical chemistry and C342 Organic chemistry I)

Source of Evidence: Academic direct measure of learning - other

Benchmark:

We set bench mark of 70 % of student to achieve this mark .for either goals i or 3 (outcome 1 -

S 2:Students will be able to connect observations with prior information/cop#2

outcome 1: Students will be able to connect observations with prior information
Comp#2 . Identification of chemical reaction products

Related Artifacts/Objects:

A 1:pre and post quiz before and after explanation

We ask student question about suggested reaction and test their knowledge about prediction of the reaction product , then I explain the subject and ask same question again

Source of Evidence: Faculty pre-test / post-test of knowledge mastery

Benchmark:

We expect that also 75% of the student will be able to achieve the recognition of reaction product/s

A 2:course tests

in course tests

Source of Evidence: Academic direct measure of learning - other

Benchmark:

70 % of the students were be able to answer three out of 4 questions correctly

A 4:Survey for chemsitry courses (lectures

1- for 100 Level courses (C105/C106) 68% of students meet the bench mark for goal 1 and 3 (outcome 1 with component 1 and 2)

2- For 300 level courses only 47% of the students meet the bench mark (C310 75% while C342 only 20%) for goal 1, while for goal 3 (C310 85% while C342 only 20%)

For the very low out come in C342 (organic chemistry, the low achievement percentage requires more emphasis on fundamental physical /organic concepts and focusing on smaller set of reactions

Source of Evidence: Academic direct measure of learning - other

A 5:Survey for chemsitry courses (lectures

We used faculty developed tests , with more concentration of the data from the final comprehensive tests. We surveyed two level of courses , first is 100 level courses . We combined data for C105 and C106 to judge the outcome one of goal 1 and goal 3 . Second we surveyed 300 level courses that offered once a year (C310 -analytical chemistry and C342 Organic chemistry I)

Source of Evidence: Academic direct measure of learning - other

S 3:Students will be able to explain the physical and chemical properties of substances /comp#1

outcome 2: Students will be able to explain the physical and chemical properties of substances based on an understanding of atomic and molecular structure.

comp#1 :1. Explanation of physical properties

S 4:Students will be able to explain the physical and chemical properties of substances /comp#2

outcome #2 : Students will be able to explain the physical and chemical properties of substances

comp#2 : Explanation of chemical properties

S 5: Students will perform quantitative calculations using experimental data./comp#1

Outcome #3 : Students will perform quantitative calculations using experimental data.
comp #1 : Selection of an appropriate theoretical relationship/equation for data analysis

S 6: Students will perform quantitative calculations using experimental data/comp#2

outcome #3 : Students will perform quantitative calculations using experimental data
compo#2: Completion of quantitative calculations 3. Explanation of the significance and/or validity of the results

S 7: Students will perform quantitative calculations using experimental data/comp #3

outcome # 3: **Students will perform quantitative calculations using experimental data**
comp #3: Explanation of the significance and/or validity of the results.

S 8: Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely/comp#1

Outcome 1: Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely.

Components: 1. Explanation of the purpose of the steps in a laboratory procedure.

Related Artifacts/Objects:

A 6: Survey for laboratory work

Students participated in lab work associate with chemistry courses at 300 level. We used student performance in C311 (Instrumental analysis lab, and C344 organic chemistry I lab) to set a bench mark for our finding.

Source of Evidence: Performance (recital, exhibit, science project)

Benchmark:

we set 70% as a bench mark for goal II

S 9: Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely/comp#2

Outcome 1: Students will demonstrate the understanding and ability to carry out laboratory procedures effectively and safely.

Components 2: . Use of standard laboratory equipment and instrumentation properly and safely.

S 10: Students will collect, analyze, and draw relevant conclusions from experimental data/comp#1

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data..

Components:1. Collection and organization of relevant data.

S 11: Students will collect, analyze, and draw relevant conclusions from experimental data/comp#2

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data.

Components:2. Analyze experimental data appropriately.

S 12: Students will collect, analyze, and draw relevant conclusions from experimental data/comp#3

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data.

Components:3. Interpretation of processed data.

S 13: Students will collect, analyze, and draw relevant conclusions from experimental data/comp#4

Outcome 2: Students will collect, analyze, and draw relevant conclusions from experimental data.

Components:4. Identification of experimental errors.

S 14: Design procedures appropriate to the goal of an investigation/comp#1

Outcome 3: Design procedures appropriate to the goal of an investigation.

Components:1. Selection of a suitable experimental approach.

S 15: Design procedures appropriate to the goal of an investigation./comp#2

Outcome 3: Design procedures appropriate to the goal of an investigation.
Components:2. Modification of the approach to optimize the experimental outcome.

S 16:Students will learn to organize relevant information for analysis./comp#1

Outcome 1: Students will learn to organize relevant information for analysis.
Components1. Identification of critical data elements necessary to understand the problem

S 17:Students will learn to organize relevant information for analysis./comp#2

Outcome 1: Students will learn to organize relevant information for analysis.
Components:2. Identification of applicable theories and/or mathematical relationships

S 18:Students will calculate quantitative values and/or formulate an explanation of observations/comp#1

Outcome 2: Students will calculate quantitative values and/or formulate an explanation of observations.
Components1. Application of theories to illustrate how observations can be understood

Related Artifacts/Objects:

A 3:class test

questions about stoichiometry and balancing chemical equations

Source of Evidence: Academic direct measure of learning - other

Benchmark:

70% of the students

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

continue same assesment for next year

Established in Cycle: 2012-2013

we intend to continue with the same goals and outcomes to collect more data . this is because of the small number of chemistry s...

S 19:Students will calculate quantitative values and/or formulate an explanation of observations/comp#2

Outcome 2: Students will calculate quantitative values and/or formulate an explanation of observations.

Components:2. Application of equations to determine mathematical values with appropriate significant figures and units

Related Artifacts/Objects:

A 3: class test

questions about stoichiometry and balancing chemical equations

Source of Evidence: Academic direct measure of learning - other

Benchmark:

70% of students

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

continue same assesment for next year

Established in Cycle: 2012-2013

we intend to continue with the same goals and outcomes to collect more data . this is because of the small number of chemistry s...

S 20: Students will draw conclusions from quantitative values and/or experimental observations/comp#1

Outcome 3: Students will draw conclusions from quantitative values and/or experimental observations.

Component1. Correlation of quantitative results to chemical and/or physical properties of systems.

Details of Action Plans for This Cycle (by Established cycle, then alpha)

continue same assesment for next year

we intend to continue with the same goals and outcomes to collect more data . this is because of the small number of chemistry student involved in the assessment.. We think that combining two or three years of data may give us more realistic analysis and conclusion for these goals and outcomes.

Established in Cycle: 2012-2013

Implementation Status: Planned

Priority: High

Relationships (Artifact/Object | Outcomes/Components):

Artifact/Object: class test | **Outcomes/Components:** Students will calculate quantitative values and/or formulate an explanation of observations/comp#2

Responsible Person/Group: chemistry faculty teaching first year major courses

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we intend to continue with the same goals and outcomes to collect more data . this is because of the small number of chemistry student involved in the assessment.. We think that combining two or three years of data may give us more realistic analysis and conclusion for these goals and outcomes.

Established in Cycle: 2012-2013

Implementation Status: Planned

Priority: High

Relationships (Artifact/Object | Outcomes/Components):

Artifact/Object: class test | **Outcomes/Components:** Students will calculate quantitative values and/or formulate an explanation of observations/comp#1

Responsible Person/Group: Chemistry faculty who teach the first year major course.