Plan for Assessment of Student Learning Outcomes
College of Arts and Sciences
The University of New Mexico

A. College, Department and Date

    1. College: *Main Campus Arts & Sciences*
    2. Department: *Chemistry & Chemical Biology*
    3. Date: *November 15, 2016*

B. Academic Program of Study*
B.A. Chemistry

C. Contact Person(s) for the Assessment Plan
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D. Broad Program Goals & Measurable Student Learning Outcomes
1. Broad Program Learning Goals for this Degree/Certificate Program

A. **Content Mastery:** Understand major chemical concepts, theoretical principles and experimental findings in the field of chemistry
  1. Apply their understanding of atomic theory, molecular structure and bonding, thermodynamics, kinetics, chemical reactions, spectroscopy and synthesis on examinations and laboratory exercises. (**NM HED Area III: 2**)
  2. Be able to employ critical thinking to solve problems using multiple layers of data analysis (**NM HED Area III: 2, 4**)

B. **Communication Skills:** Convincingly present scientific data and arguments in an oral and written format
  1. Organize and represent experimental data using appropriate methods (spreadsheets, etc) (**NM HED Area III: 1, 2, 4**)
  2. Write coherent scientific reports (**NM HED Area III: 3**)

C. **Professional Development:** Be prepared for entry into professional school (e.g. medical, dental, pharmacy, etc) or the chemical industry or government service.
  1. Have a working knowledge of basic laboratory safety (**NM HED Area III: 5**)
  2. Demonstrate scientific literacy (**NM HED Area III: 3, 5**)
  3. Have general skills to work in small groups to accomplish scientific projects (**NM HED Area III: 5**)

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* Academic Program of Study is defined as an approved course of study leading to a certificate or degree reflected on a UNM transcript. A graduate-level program of study typically includes a capstone experience (e.g. thesis, dissertation, professional paper or project, comprehensive exam, etc.).

2. **List of Student Learning Outcomes (SLOs) for this Degree/Certificate Program**

A1. Apply their understanding of atomic theory, molecular structure and bonding, thermodynamics, kinetics, chemical reactions, spectroscopy and synthesis on examinations and laboratory exercises. **UNM Goals (X Knowledge   X Skills   ___ Responsibility)**

A2. Be able to employ critical thinking to solve problems using multiple layers of data analysis **UNM Goals (X Knowledge   X Skills   ___ Responsibility)**

B1. Organize and represent experimental data using appropriate methods (spreadsheets, etc) **(X Knowledge   X Skills   ___ Responsibility)**

B2. Write coherent scientific reports **(X Knowledge   X Skills   ___ Responsibility)**

C1. Have a working knowledge of basic laboratory safety **UNM Goals (X Knowledge   X Skills   X Responsibility)**

C2. Demonstrate scientific literacy **UNM Goals (X Knowledge X Skills ___ Responsibility)**

C3. Have general skills to work in small groups to accomplish scientific projects **UNM Goals (X Knowledge   X Skills   X Responsibility)**

E. **Assessment of Student Learning Three-Year Plan**

1. **Timeline for Assessment**

Goal/SLO	Year 1: Courses to be assessed	Year 2: Courses to be assessed	Year 3: Courses to be assessed
A. Content Mastery: Understand major chemical concepts, theoretical principles and experimental findings in the field of chemistry 1. Apply their understanding of atomic theory, molecular structure and bonding, thermodynamics, kinetics, chemical reactions, spectroscopy and synthesis on examinations and laboratory exercises. (**NM HED Area III: 2**) 2. Be able to employ critical thinking to solve problems using multiple layers of data analysis (**NM HED Area III: 2, 4**)	A1. CHEM 315 Indirect measure: Exit interview	A2. CHEM 421/425 Indirect measure: Exit interview	Indirect measure: Exit interview

B. Communication Skills: *Convincingly present scientific data and arguments in an oral and written format* 1. Organize and represent experimental data using appropriate methods (spreadsheets, etc) (**NM HED Area III: 1, 2, 4)** 2. Write coherent scientific reports (**NM HED Area III: 3)**	B2. CHEM 253L Indirect measure: Exit interview	B1. CHEM 253L Indirect measure: Exit interview	Indirect measure: Exit interview
C. Professional Development: *Be prepared for entry into professional school (e.g. medical, dental, pharmacy, etc) or the chemical industry or government service.* 1. Have a working knowledge of basic laboratory safety (**NM HED Area III: 5)** 2. Demonstrate scientific literacy (**NM HED Area III: 3, 5)** 3. Have general skills to work in small groups to accomplish scientific projects (**NM HED Area III: 5)**	C3. CHEM 124L Indirect measure: Exit interview	C2. CHEM 452 Indirect measure: Exit interview	C1. CHEM 304L Indirect measure: Exit interview

2. **How will learning outcomes be assessed?**
   A. <u>What</u>:
      1. Each SLO will be measured using samples of evidence of learning from courses listed in the table above.
      2. Each SLO measured will be a direct measure or indirect measure determined by the nature of SLO and what data can be collected. At least half of the measures will be direct measures. The indirect measure will be an end-of-program exit survey.
      3. The program's assessment target is to have at least 60% of the students in the B.A. program to perform satisfactory or better. Scoring rubrics will be used for some measures, designed by the faculty member who analyzes the data, and explained in the annual reports.
      4. All students would be included in the assessment of a service course without separating majors from the analysis with the assumption that a large sample can represent a small subset.

   B. <u>Who</u>: We will try to include all students in Chemistry B.A. degree program in the assessment, but it is difficult to implement. For example, students switched their major frequently so that the list of B.A. students was changing from semester to semester.

3. **What is the unit's process to analyze/interpret assessment data and use results to improve student learning?**
   1. Priority SLOs will be measured by at least one semester's performance. The number of priority SLOs measured each year may vary between one and three SLOs. The results of the outcomes measured the previous fall will be discussed each August by an Assessment Committee. All department faculty will be notified via email and invited to the meeting no less than a week before the scheduled meeting.
   2. The faculty collecting evidence during that academic year and the chair of the Assessment Committee will meet each August to analyze and interpret the assessment data. All contributing faculty will be invited to participate in the meeting. Each faculty member who collected data will present how they carried out the assessment (the tools/techniques used), how they analyzed the data, and what will be done to improve student learning. Finally, plans will then be made for the following year so that only one or two SLOs are tested using one or more direct measures.
   3. Recommendations will be compiled after the faculty meeting by the assessment committee chair and communicated in writing to the department chair by December 15st each year. Copies of the document will be provided and discussed in the faculty meeting each October.