

Chemistry Program Assessment Plan, 2007

I. Student Learning Goals (Objectives/Outcomes)

When students complete a Chemistry Major, they should be able to:

1. Demonstrate an understanding of basic principles and theories in the core disciplines of chemistry: analytical, biochemistry, inorganic, organic, and physical chemistry.
2. Demonstrate a proficiency in safely applying laboratory techniques and utilizing modern chemical instrumentation.
3. Analyze and evaluate the scientific literature, formulate hypotheses, design experimental methods to test hypotheses, collect appropriate data, and critically evaluate the results.
4. Communicate effectively to a variety of audiences in various formats.

In addition to Goal 1 above, the learning outcomes specific to the individual options to a chemistry major are listed below:

- Biochemistry: display an understanding of regulation and metabolic pathways.
- Polymers: be able to correlate molecular structure with bulk material properties.
- Education: meet the requirements determined by the College of Education and Professional Studies.
- ACS: meet the accreditation requirements determined by the American Chemical Society.

II. Identification of where Objectives/Outcomes are being Achieved

See the Curriculum Map spreadsheet at the bottom of this document.

III. Assessment Tools used to Measure Objectives/Outcomes

<i>Measures</i>	<i>Goal 1</i>	<i>Goal 2</i>	<i>Goal 3</i>	<i>Goal 4</i>	<i>Use of Information</i>
Exit exams given to graduating seniors in the seminar course (CHEM 480).	X				The faculty member in charge of CHEM 480 will administer the exit exam. Chemistry Department teams by sub-discipline will evaluate the results... <i>(these results will be discussed at the annual assessment faculty meeting)</i>
In the senior seminar course (CHEM 480), students are required to deliver a 30-45 minute departmental seminar (students and faculty). The students can present original research or a topic of interest from recent literature.	X		X	X	The faculty member in charge of the course evaluates the students' seminars with input from the other faculty in attendance... <i>(these results will be discussed at the annual assessment faculty meeting)</i>

In the research class (CHEM 495) students conduct a literature search for an original research project. The students then prepare a written and oral research proposal, conduct the research under the supervision of a faculty member, and present progress reports (oral and written) to the class.	X	X	X	X	The faculty member evaluates their work using explicit criteria with input from the supervising faculty member. The final written reports are kept on file in the Chemistry office... <i>(these results will be discussed at the annual assessment faculty meeting)</i>
Exit surveys given to graduating seniors in the seminar course (CHEM 480) asks questions about how student's feel about meeting the department's learning goals, what aspects/experiences helped them learn, and suggestions for improvements.	X	X	X	X	The faculty member in charge of CHEM 480 will administer the exit survey... <i>(these results will be discussed at the annual assessment faculty meeting)</i>
Alumni survey asks questions regarding students' preparedness following graduation.	X	X	X	X	Administering surveys will be coordinated with the annual Chemistry Family Day. The results of these surveys inform the department of strengths and weaknesses... <i>(these results will be discussed at the annual assessment faculty meeting)</i>
In the Advanced Chemistry Laboratory II (CHEM 402) students will research and develop project demonstrating a reasonable laboratory skill set.	X	X	X	X	The faculty member in charge of CHEM 402 will evaluate the proposed projects, the experimental implementation, and the written reports... <i>(these results will be discussed at the annual assessment faculty meeting)</i>

IV. Timetable Indicating the Cycle of Assessment and Continuous Improvement

The Chemistry Department Assessment Committee will meet annually during the spring semester to discuss the various assessment measures, identify any changes that are to be made to the assessment plan, and report their findings along with recommendations for any actions to the Chemistry Department.

V. Data Presentation and Discussion Process

As outlined in the Measure Objectives/Outcomes, various Chemistry Department faculty will be responsible for collecting and interpreting the data, and forwarding the results to the Chemistry Department Assessment Committee.

VI. Implementation of Revisions based on Assessment Results

Following the annual Assessment Committee meeting the Chemistry Department will meet, also during the spring semester, to review the report and implement any actions that are deemed necessary.

VII. Results Availability

A summary of the results will be made available on the Chemistry Department web site.

Assessment Plan for Chemistry, 2007

Common courses to all of the chemistry majors with the exception of Chemical Education.

Core Courses

Assessment Outcome	121	122	231	232	246	247	251	256	341
Principles and theories									
-organic		I	E	E	E	E	R		R
-analytical	I	I					E	E	R
-physical	I	I	R	R					E
-inorganic	I	I					R		R
-biochemistry				I			I		
Safe Laboratory Technique	I _{AOPI}	I _{API}			E _O	E _O		E _A	
Instrumentation	I _A	I _A	I _O	I _O	E _O	E _O	E _A	E _A	I _P
Analyze/Evaluate Scientific Lit.						I _O	E _A	E _A	I _P
Formulate Hypotheses, Collect and Evaluate Data	I _{AOPI}	I _{API}			E _O	E _O	E _A	E _A	R _P
Communication									
-written	I	I			I	E	E	E	
-oral		I			I	E			

Assessment Outcome	342	355	356	361	401	402	422	480	495
Principles and theories								R	R
-organic	R	R		R		R	R		
-analytical	R	E	E	R					
-physical	E			R	E	E	R		
-inorganic				R	E	R	E		
-biochemistry				E					
Safe Laboratory Technique		E _A	E _A		E _{PI}	E _{PIO}			R
Instrumentation	E _{AP}	E _A	E _A R _{OPI} B	I _B	E _{PI}	E _{PR} O			R
Analyze/Evaluate Scientific Lit.	E _P	E _A	E _A	R _B	R _{PI}	R _{PI}	E _I	E	E
Formulate Hypotheses, Collect and Evaluate Data	E _{PO}		E _A	I _B	E _{PI}	R _I E _P	E _I		E
Communication									
-written			E	E	E	E	E		E
-oral	R							E	E

Abbreviations: Learning Goals

I = Introduction

E = emphasized in the course (major component or focus of the course)

R = reinforced in the course (previously exposure and not primary emphasis)

Abbreviations: Area Subscripts correspond to the five sub-disciplines of chemistry

A = Analytical Chemistry

B = Biochemistry

I = Inorganic Chemistry

O = Organic Chemistry

P = Physical Chemistry

For example: the learning outcome, Safe Laboratory Technique, is introduced in Chem 122: I_{AOPI}, in safe laboratory

techniques in the sub-disciplines: analytical organic, physical and inorganic chemistry.

phase II assessment points

Chem 402
 Chem 480
 Chem 495

Written evaluation of literature and experimental results
 Oral presentation
 Rubric for seminars, exit survey and exam

Assessment Plan for Chemistry, 2007

The following courses are specific to the various options of a chemistry major.

Biochemistry

Assessment Outcome	362	366
Principles and theories		
-organic		
-analytical		
-physical		
-inorganic		
-biochemistry	R _B	R _B
Safe Laboratory Technique		R _B
Instrumentation		R _B
Analyze/Evaluate Scientific Lit.		R _B
Formulate Hypotheses, Collect and Evaluate Data		R _B
Communication	E	E
-written		
-oral		

Polymers

Assessment Outcome	311	411	416
Principles and theories			
-organic	E _{OP}	R _{OP}	R _{OP}
-analytical			
-physical	E _{OP}	R _{OP}	R _{OP}
-inorganic			
-biochemistry			
Safe Laboratory Technique			R _{OP}
Instrumentation			R _{OP}
Analyze/Evaluate Scientific Lit.			R _{OP}
Formulate Hypotheses, Collect and Evaluate Data			R _{OP}
Communication			
-written		E	E
-oral			